Latent classes of sexual behaviors: Prevalence, predictors, and consequences

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Abstract

Scholars of adolescent and emerging adult sexuality have recently begun to study how diverse patterns of sexual behaviors contribute to development and well-being. A person-oriented approach to studying sexual behaviors provides a nuanced understanding of sexual repertoires. The goals of this paper were to document patterns of sexual behaviors ranging from kissing to penetrative sex, and to examine how latent classes of behaviors, gender, and partner type (romantic vs. nonromantic) predict intra- and interpersonal consequences of sexual behaviors. Latent class analysis of a stratified random sample of U.S. college students revealed four classes of sexual behaviors: Kissing Only, Kissing and Touching, All Behaviors, and Oral and Penetrative Only. Compared to individuals in the All Behaviors class, individuals in the Kissing Only class were less likely to experience a positive or a negative intrapersonal consequence of sexual behaviors. Men were less likely to report a negative intrapersonal consequence than women were. Partner type predicted negative interpersonal consequences for the All Behaviors class. Implications are discussed in terms of normative sexual development, prevention, and sexual and relationship education.

Keywords

Sexual behaviors; sexual health; casual sex

Although the majority of research on the consequences of sexual behavior has focused on the physical health consequences of penetrative sex, social and emotional consequences also represent key components of sexual health (Edwards & Coleman, 2004). Young adults engage in a range of sexual behaviors from kissing to penetrative sex that vary in their implications for social and emotional well-being. For example, young adults report fewer positive and negative emotional consequences for oral sex than vaginal sex (Lefkowitz,

Vasilenko, & Leavitt, 2016). Additionally, romantic and nonromantic sexual partnerships confer different benefits and risks for emotional well-being (Furman & Collibee, 2014). In this paper, we aim to advance understanding of how young adults' sexual behaviors and partner types are associated with consequences of sexual behavior. We use a person-oriented approach, latent class analysis (LCA), to identify what patterns of sexual behaviors exist, and thus provide a complex view of sexual activity. We also examine how behavior patterns differ by partner type (romantic versus nonromantic), and how behavior patterns and partner type correspond to perceived consequences of sexual experiences. Using a person-oriented approach to answer these questions helps to explain the emotional and practical significance of a range of sexual behaviors.

The Value of a Person-oriented Approach

The majority of research on adolescent and young adult sexual behaviors has used variable-oriented approaches (for a review, see Diamond & Savin-Williams, 2009). In these methods, the associations between each isolated sexual behavior and outcomes of interest are averaged across participants. Variable-oriented approaches have demonstrated the diversity in adolescents' and young adults' sexual repertoires, and have also demonstrated that individuals evaluate different sexual behaviors in distinct ways. For example, adolescents who have never had penetrative sex but have engaged in other genital sexual behaviors (e.g. oral sex or sexual touching) report more positive feelings about their sexual behaviors than adolescents who have had penetrative sex, most of whom have also engaged in other genital behaviors (Woody, Russel, D'Souza, & Woody, 2000).

Variable-oriented approaches, however, are limited in their ability to document the multidimensional nature of sexual behaviors because of their focus on single variables pooled across participants. Understanding human behavior and development necessitates a more holistic perspective, which focuses on the person, not the variable, as the unit of analysis (Bergman & Magnusson, 1997; Cairns, 1983; Magnusson, 1985). Person-oriented approaches emphasize that behavior may involve many factors interacting at multiple levels, and that processes are often organized as patterns, where each factor derives meaning from its relation to the other factors (Bergman & Magnusson, 1997). A person-oriented approach is well-suited for studying sexual behaviors because of their complex, multidimensional nature. Because each sexual behavior has unique meaning, and this meaning differs in the presence or absence of other behaviors, each pattern of sexual behaviors may differ with respect to its consequences. For example, oral and penetrative sex together may be experienced more positively than either behavior alone, as research has found this behavior combination to be associated with partner support and positive mood (Hensel, Fortenberry, & Orr, 2008). Thus, analyzing how behavior patterns, rather than individual behaviors, correspond to consequences of sexual behaviors can bring additional insight into the emotional impact of sexual behaviors.

Studies using LCA, latent profile analysis, and cluster analysis have demonstrated the utility of person-oriented approaches for understanding adolescent and young adult sexual behaviors (e.g., Haydon, Herring, & Halpern, 2012; Hipwell, Stepp, Keenan, Chung, & Loeber, 2011; Vasilenko, Kugler, Butera, & Lanza, 2015). By identifying patterns of

behaviors that tend to co-occur (also called classes or profiles), these studies demonstrate the multidimensional nature of sexual behaviors in adolescence and young adulthood. Classes of sexual behaviors identified in prior work include postponement of sexual intercourse, normative timing and sequencing of oral and vaginal sex, and early initiation of sexual behaviors (Haydon, Herring, & Halpern, 2012; Haydon, Herring, Prinstein, & Halpern, 2012; Hipwell et al., 2011; Vasilenko et al., 2015). Profiles of risky sexual behaviors (e.g. condom use, number of partners) have also emerged, demonstrating that adolescents use a variety of strategies to reduce risk of sexually transmitted infections (STIs) and pregnancy (Beadnell et al., 2005; Newman & Zimmerman, 2000). In addition, classes marked by different sexual behavior patterns are differentially associated with health outcomes such as number of sexual partnerships, STI diagnosis, depression, and substance use (Haydon, Herring, & Halpern, 2012; Haydon, Herring, Prinstein et al., 2012; Hipwell et al., 2011; Vasilenko et al., 2014).

Although extant person-oriented studies of sexual behaviors demonstrate the value of this approach for understanding sexual behaviors, their focus on oral and penetrative sex limits the conclusions we can draw about how sexual behavior patterns may influence sexual health. In order to understand the role of sexual behavior patterns in emotional health, it is necessary to assess additional sexual behaviors. Although oral and penetrative sex are important to study, kissing and touching are also key to understanding relational outcomes because of their associations with affection and relationship maintenance (Hughes, Harrison, & Gallup, 2007; Wlodarski & Dunbar, 2013). One person-oriented study of adolescent girls found variation in the likelihood of kissing and touching in different latent classes (Hipwell et al., 2011), but it is unknown how these behaviors factor into sexual repertoires for boys or beyond mid-adolescence. The current paper builds on past person-oriented research on sexual behaviors by using a range of sexual behaviors in a sample of U.S. college students.

Emotional Consequences of Sexual Behaviors

Additionally, although past research has focused on physical health consequences of sexual behaviors, emotional consequences represent another domain of sexual health that may differ according to sexual behavior pattern. Research on emotional consequences of different sexual behaviors often focuses on short-term consequences, which may be a mechanism through which behaviors influence longer term mental health and well-being (Strokoff, Owen, & Fincham, 2014; Vasilenko, Lefkowitz, & Welsh, 2014). Research on short-term consequences of sexual behavior distinguishes between the valence of consequences (positive versus negative), and whether consequences are intrapersonal or interpersonal (Campbell, 2008; Vasilenko et al., 2012). Intrapersonal consequences include health, guilt/ regret, or physical satisfaction (Vasilenko et al., 2012). Interpersonal consequences include feelings about one's partner or peers, such as feeling used, feeling disappointed that the relationship did not further develop, or hoping that friends do not find out about the encounter (Vasilenko et al., 2012).

Research has found that specific sexual behaviors may be associated with different positive and negative consequences. For example, young adults may experience anal sex and performing oral sex as less positive than vaginal sex (Lefkowitz et al., 2016; Malacad &

Hess, 2010; Vasilenko, Maas, Lefkowitz, & Maggs, 2014). In contrast, young adults may perceive kissing or touching as less negative than vaginal sex, at least among women (Vasilenko et al., 2014).

Although research has distinguished how specific sexual behaviors relate to positive and negative consequences, research has not explored how different sexual behaviors relate to intrapersonal and interpersonal consequences. Examining intrapersonal and interpersonal consequences separately is important because the types of consequences associated with behavior patterns suggest the mechanisms by which behavior patterns influence emotional well-being. For example, a pattern characterized by oral and penetrative sex may be more emotionally risky than just kissing due to either differences in interpersonal (e.g., relationship concerns) or intrapersonal (e.g., sexual regret) consequences, or both. These differences can inform prevention and sexual education programs, whose content may specifically address the types of concerns that are most relevant to individuals engaging in specific behavior patterns. In this paper, we aim to understand how sexual behavior patterns are associated with positive and negative intrapersonal and interpersonal short-term consequences of sexual activity.

The Role of Partner Type

We are also interested in the role of sexual partner type (romantic versus nonromantic) in predicting sexual behavior patterns and their consequences, given that sexual behaviors differ between individuals with romantic and nonromantic partners. Nonromantic sexual experiences, such as friends with benefits, one-night stands, and booty calls, are normative among college students (Claxton & van Dulmen, 2013). Variable-oriented studies have found that individuals are less likely to engage in oral and vaginal sex, and engage in all sexual behaviors less frequently, with nonromantic partners than romantic partners (Armstrong, England, & Fogarty, 2009; Fielder, Carey, & Carey, 2013; Furman & Shaffer, 2011). These behavior differences make it important to account for partner type in person-oriented studies of sexual behaviors. However, we know of no person-oriented study that has examined how latent classes of sexual behaviors differ by partner type.

Specific sexual behavior patterns may also differentially predict perceived outcomes of sexual activity for people with romantic versus nonromantic partners. Various factors associated with nonromantic sexual encounters, such as not knowing a partner well, alcohol intoxication, and a lack of communication about sexual topics may mean that more intimate behaviors such as penetrative sex are associated with worse outcomes for individuals with nonromantic partners, but not for individuals with romantic partners. Past variable-oriented research has found that, compared to other behaviors, penetrative sex with a nonromantic partner may be associated with greater regret for women (Eshbaugh & Gute, 2008; Fielder & Carey, 2010). In contrast, penetrative sex does not appear to be detrimental to adolescents in romantic relationships (Welsh, Haugen, Widman, Darling, & Grello, 2005).

Although past research suggests that specific sexual behaviors may have different consequences for people with romantic versus nonromantic partners, using a person-oriented approach will further elucidate how sexual behavior patterns correspond to different

outcomes for these two groups. For example, kissing and touching a romantic partner may be associated with similar outcomes as just kissing a romantic partner; in contrast, kissing and touching a nonromantic partner may be associated with different consequences than kissing alone. Adopting a person-oriented approach will account for the interrelated meanings of sexual behaviors. Therefore, we examine the interaction of sexual behavior patterns and partner type in predicting perceived consequences of sexual experiences.

The Role of Gender

Some person-oriented studies have demonstrated gender differences in sexual behavior patterns. Women may be more likely than men to have a sexual behavior pattern characterized by fewer partners but inconsistent condom use; in contrast, a profile characterized by more partners and inconsistent condom use is more common among men (Beadnell et al, 2005; Newman & Zimmerman, 2000). Variable-oriented studies have found that men report more sexual experience and a higher likelihood of having casual sex partners than women (for reviews, see Petersen & Hyde, 2010; Santelli, Lindberg, Abma, McNeely, & Resnick, 2000). Although differences in reporting may account for some of these gender differences, the presence of gender differences in self-reported sexual behaviors demonstrates the need to include gender in person-oriented analyses of sexual behavior. Therefore, we examine whether the latent class structure is defined similarly for men and women, and if so, whether the distribution of latent classes is similar across gender.

Additionally, past variable-oriented research has found gender differences in the emotional consequences of sex. Some of this research suggests that women may react more negatively to sexual behaviors than men (Bradshaw, Kahn, & Seville, 2010; Meier, 2007; Vasilenko, Lefkowitz, & Maggs, 2012). Additional research suggests that the type of sexual behavior performed may influence gender differences in emotional consequences; for example, women may feel more positively about vaginal sex than oral sex, whereas men find both behaviors similarly rewarding (Lefkowitz et al., 2016). These findings demonstrate the need to account for gender in understanding between-person differences in the consequences of sexual behaviors. Therefore, we examine the interaction of sexual behavior patterns and gender in predicting perceived consequences of sexual experiences.

The Present Research

The present paper explores patterns of recent sexual behaviors in a college sample using LCA (Collins & Lanza, 2013). The analyses expand on past work by incorporating a range of sexual behaviors from kissing to penetrative sex, predicting both intrapersonal and interpersonal short-term consequences of sexual encounters from behavior patterns, and assessing the roles of gender and partner type in predicting sexual behavior patterns and consequences. In contrast to prior person-oriented work, which focuses on lifetime, yearly, or monthly occurrences of sexual behaviors, we use daily reports of sexual behaviors and consequences aggregated across two weeks. This strategy limits recall bias, given that relationship changes (e.g., break-up) that occur between a sexual event and data collection may influence memories of the event. Time passed since an event can also impede memory,

and therefore, daily measurement may be especially useful for behaviors with nonromantic partners, whom a participant may only see once.

Specifically, we addressed the following research questions:

1. What latent classes of sexual behaviors exist in a college sample, using a wide variety of sexual behaviors as indicators?

2. Are the latent classes defined the same way across gender and partner type?

3. If the classes are similarly defined, is the distribution of classes similar across gender and partner type?

4. How do latent classes of sexual behaviors, partner type, and the interaction of latent class by partner type predict consequences of sexual behaviors?

Method

Participants and Procedure

The current paper used data from [identifying information deleted], a longitudinal, web-based study of college students at a large public university in the United States [identifying reference deleted]. Eligible participants (first-year, first-time students who were under 21 years of age, U.S. citizens or permanent residents, and living within 25 miles of campus) were recruited from registrar lists using a stratified random sampling procedure designed to achieve a sample that was diverse with respect to gender and race/ethnicity. Selected students received a letter containing a description of the study, a pen, and a $5 cash incentive. Five days later, students received an email with a personal, secure link to the Semester 1 (S1) baseline survey. After the baseline survey, students were invited by email to begin 14 consecutive daily web-based surveys. At S1, participants were compensated $20 for completing the baseline survey and $3 per day for each of the 14 days of the daily survey, plus a bonus of $8 for completing all 14 days. In total, 744 students provided informed consent and completed the S1 baseline survey (65.6% initial response rate). The majority of participants who completed the baseline survey completed at least 12 of the 14 daily surveys (86%).

In the baseline survey, participants answered demographic questions. On each of the 14 daily surveys, participants responded to questions about their activities on the previous day, including sexual behaviors. This paper focused on the 269 participants who reported at least one sexual behavior during the two weeks of S1 daily data collection. Participants who did not report any partnered sexual behaviors in the daily surveys (N=413) were excluded. An additional 36 participants who reported both romantic and nonromantic partners in the daily surveys were also excluded. Because the LCA used data aggregated across days, it would not be clear which behaviors occurred with which type of partner.

The final sample was 57% female and predominantly heterosexual (98%). The sample was diverse with respect to race/ethnicity; 26% were Hispanic/Latino [HL]—of non-HL, 43% were White, 21% African American, 21% Asian/Hawaiian-Pacific Islander, and 14% multiracial. The average age was 18.44 years ($SD = 0.41$; range 17.58 to 20.75). We

compared the demographic information of the 269 participants in the current sample to those who participated in S1 data collection but were excluded from the current sample using a series of six X^2 tests and one t-test. Participants in the final sample were more likely to be female ($X^2 = 5.35$, $p < .05$) and less likely to be Asian ($X^2 = 13.46$, $p < .001$). The final and overall samples did not differ in likelihood of belonging to other racial/ethnic groups ($X^2 = 0.01$ to 1.62, $ps > .05$) or in age ($t(741) < 1$, $p > .05$), and there was not enough variation in sexual orientation to test differences.

Measures

Indicators of sexual behavior latent class membership—Each day of the study, participants answered questions about their sexual behaviors the previous day. From these items, we used five indicators of latent class membership, which were dichotomous measurements of whether or not the participant kissed a partner on the lips, touched a partner under clothing or with no clothing on, performed oral sex, received oral sex, or had penetrative sex (vaginal or anal) on any of the 14 survey days. Although separate items asked about vaginal and anal sex, these items were collapsed into one because anal sex occurred infrequently and everyone who reported having anal sex also reported vaginal sex.

Predictors of latent class membership—Gender and sexual partner type were used to predict class membership. In the baseline survey, participants reported their gender (coded as 1 = male or 2 = female for LCA analyses, and as 1 = male or 0 = female for ANOVA analyses). Each day that participants reported engaging in any sexual behaviors, they selected one of seven options to describe their relationship to their partner. Partners were categorized as nonromantic (stranger or friend, coded as 0) or romantic (casual dating partner, regular dating partner, someone the participant lived with, a fiancé, or a spouse, coded as 1).

Perceived consequences of sexual behavior—On days they reported any sexual behavior, participants also responded to the question, "As a result of all your sexual experiences (including kissing and touching, as well as oral, vaginal or anal sex) on [day], did you…" assessing whether they experienced each of 19 consequences of their sexual encounter on the prior day (For the complete list of items, see Vasilenko et al., 2012). These consequences were either intrapersonal (referring to health, guilt/regret, or physical satisfaction) or interpersonal (referring to thoughts about one's relationship with one's partner or peers), and either positive or negative.

We created four dichotomous variables indicating whether a participant experienced at least one positive intrapersonal (four items, e.g., "feel a thrill or rush" or "feel physically satisfied," reported by 84% of participants), negative intrapersonal (eight items, e.g., "not enjoy it" or "wish you had not had sex" reported by 31% of participants), positive interpersonal (three items, e.g., "feel intimate or closer to your partner" or "feel you enhanced your reputation," reported by 88% of participants) or negative interpersonal (four items, e.g., "worry your partner wants more commitment" or "feel like things moved too fast," reported by 39% of participants) consequence of sexual behavior at any point during the 14 days of data collection. We dichotomized reported consequences within each category

for two reasons. First, the data were positively skewed, with most participants reporting zero or one consequence of each type. Second, the count of consequences reported is likely to correspond to number of days of sexual activity; using a dichotomous measure makes it less likely that consequences are confounded with number of days of sexual activity.

Results

Data Analysis

We used PROC LCA in SAS (Lanza, Collins, Lemmon, & Schafer, 2007) to uncover multidimensional patterns of sexual behaviors. LCA categorizes individuals into mutually exclusive subgroups (or latent classes) based on an unobserved latent variable, which is measured by several categorical indicators (Collins & Lanza, 2013). In this analysis, the latent classes represent groups of individuals with similar response patterns across the five sexual behavior indicators. LCA uses the response patterns in the sample to estimate types of latent classes of behavior patterns that would be present in the population, as well as the prevalence of each latent class. These latent classes are characterized by differing probabilities of engaging in each of the sexual behaviors measured.

In latent class analysis, the user specifies the number of latent classes for the model to use and uses fit criteria and interpretability to select the optimal model. To determine the optimal latent class solution, we compared models with one through five latent classes. The AIC and BIC fit indices indicate relative model fit using a penalized log-likelihood strategy. Lower AIC and BIC values indicate better fit, and the model with the lowest AIC and BIC values shows the best balance between fit and parsimony. The lowest AIC value was found in the four-class model, indicating that a four-class solution was optimal. The lowest BIC suggested a three-class model (see Table 1 for model fit statistics). Whereas the three-class model only included one class of participants who did not engage in any genital sexual behaviors, the addition of a fourth class resulted in a class structure that separated those who only kissed from those who kissed and touched. The distinction between these two classes is theoretically significant because sexual touching is unique—although it may include genital stimulation, it confers little health risk. Also of note, the Kissing and Touching class comprised an estimated 25% of the sample. Therefore, we selected the four-class model.

Latent Classes of Sexual Behaviors

All Behaviors was the largest class, containing an estimated 42% of participants. Kissing Only and Kissing and Touching contained an estimated 26% and 30% of participants, respectively. Item-response probabilities were used to interpret the classes produced by LCA (see Table 2). LCA groups individuals based on similar probabilities across behavioral indicators, resulting in latent classes of individuals with differing probabilities of engaging in each behavior. The item-response probabilities indicate the likelihood that individuals in each latent class engaged in a particular behavior. For example, individuals in the Kissing Only class had a high probability of kissing, but a very low probability of performing any other sexual behaviors. Individuals in the Kissing and Touching class had a very high probability of kissing and touching, a very low probability of performing or receiving oral sex, and about 1/3 chance of engaging in sexual intercourse in the past two weeks.

Individuals in the All Behaviors class had a probability of .7 or higher of engaging in each sexual behavior in the past two weeks.

The smallest class, Oral and Penetrative Sex Only, contained only an estimated 2% of the sample (an estimated 5% of men and 0% of women). Although this class was small, it was present in both three- and four-class models, indicating that it was a distinct group. Individuals in this class had high probabilities of engaging in oral and penetrative sex and low probabilities of engaging in other sexual behaviors.

Class Structure and Class Distribution by Gender

We examined measurement invariance in the class structure (1) to determine if the same classes were found for men and women, and if so, (2) to examine class distribution to determine if the likelihood of belonging to each class was the same for men and women. LCA with grouping variables tested measurement invariance in the latent class structure across gender. This statistical procedure consisted of two steps. First, we produced a four-class model with gender as a grouping variable and parameters estimated freely. Second, we produced a four-class model with gender as a grouping variable and measurement invariance imposed across groups (Lanza et al., 2007). Comparing the G^2 statistics of the unconstrained and constrained models allowed us to determine whether the same types of classes existed for men and women. The difference in G^2 was not significant, meaning that the latent class structure did not vary by gender (χ^2 (20) = 12.04, $p > .05$).

A chi-square test assessed the distribution of class membership by gender. Because the Oral and Penetrative Only class was small and consisted of only males, it violated the cell size requirements of the test. Therefore, for subsequent analyses making comparisons between classes, we used the classify-analyze approach to assign individuals to latent classes based on posterior probabilities of class membership (e.g., individuals were assigned to the class they were estimated to have the highest probability of belonging to). Then we conducted a chi-square test using the three larger classes. The test did not reach statistical significance (χ^2 (2) < 1, $p > .05$), meaning that there was no significant gender difference in the likelihood of belonging to each of the three latent classes. See Table 3 for distributions of latent class membership by gender.

Class Structure and Class Distribution by Partner Type

As with tests of gender differences, we used LCA with grouping variables to examine measurement invariance in the latent class structure across partner type. Comparing the G^2 statistics of the unconstrained and constrained models determined that the latent class structure did not vary by partner type (χ^2 (20) = 12.78, $p > .05$). That is, the same four classes existed for participants with nonromantic partners and those with romantic partners.

A chi-square test assessed the distribution of class membership by relationship status. There was a significant difference in the likelihood of class membership by partner type (χ^2 (3) = 29.40, $p < .001$; see Table 4). Follow-up pairwise chi-square tests indicated that individuals in the All Behaviors class were more likely to engage in sexual behaviors with romantic partners during the 14 days of daily data collection than individuals in the Kissing Only (χ^2

(1) = 24.15, $p < .001$), Kissing and Touching (χ^2 (1) = 21.89, $p < .001$), and Oral and Penetrative Only (χ^2 (1) = 7.03, $p < .01$) classes were.

Predicting Perceived Consequences of Sexual Behaviors From Latent Class

A series of four logistic regressions used latent class membership to predict whether participants experienced a positive intrapersonal, positive interpersonal, negative intrapersonal, or negative interpersonal consequence of sexual behaviors. Because of its small size, the Oral and Penetrative Only class was excluded from the model. The All Behaviors class served as a comparison group because prior research on consequences of sexual activity focuses on penetrative sex (Campbell, 2008; Vasilenko et al., 2012). The (centered) variables in the model were gender, partner type, Kissing Only, Kissing and Touching, and two-way interactions of each latent class with gender and partner type.

Results of logistic regressions are presented here by predictor. Gender was a significant predictor in one of the four regressions. Men reported fewer negative intrapersonal consequences than women did (see Table 5). Partner type was significant in three of the four regressions. Individuals with romantic partners were more likely to report a positive intrapersonal and positive interpersonal consequence, and less likely to report a negative interpersonal consequence than individuals with nonromantic partners were. For latent classes as predictors, the Kissing Only class, but not the Kissing and Touching class, was a significant predictor. Compared to individuals in the All Behaviors class, individuals in the Kissing Only class were less likely to report a positive or negative intrapersonal consequence of sexual behaviors.

There were also marginally significant interactions for Kissing Only by partner type and Kissing and Touching by partner type in predicting negative interpersonal consequences of sexual behaviors. Because of the difficulty of finding statistically significant interactions in regression models (Jaccard & Wan, 1995; McClelland & Judd, 1993), we decided to interpret marginally significant interactions. Follow-up logistic regressions split by latent class membership and predicting negative interpersonal consequences from gender and partner type were performed to clarify the direction of the interactions. Participants in the All Behaviors class were less likely to experience a negative interpersonal consequence of sexual behaviors when they had a romantic partner than a nonromantic partner ($OR = 0.10$, $p < .01$); this effect was nonsignificant for the Kissing and Touching class ($OR = 0.40$, $p > .05$) and the Kissing Only class ($OR = 0.516$, $p > .05$). Figure 1 shows the probabilities of reporting a negative interpersonal consequence for individuals with romantic versus nonromantic partners, split by latent class.

Discussion

We examined patterns of sexual behaviors, building on previous person-oriented work by including a range of sexual behaviors, examining latent class differences by partner type, and predicting short-term consequences of sex. The use of LCA in this paper allowed us to identify which sexual behaviors tend to co-occur, and to identify how different behavior *patterns*, rather than just different behaviors, matter for reactions to sexual experiences. Four latent classes of sexual behaviors were found, with patterns ranging from kissing only to all

assessed behaviors. Although the class structure did not significantly differ for individuals with romantic and nonromantic partners, the likelihood of class membership varied by partner type. Some consequences of sexual activity also differed by class membership and partner type. These results provide insight into the nature of sexual behaviors in college students, and have practical implications for sex and relationship researchers and educators.

Emotional Significance of Sexual Behaviors

The results of the present research highlight the emotional significance of different sexual behavior patterns. A person-oriented approach to studying sexual behaviors was key to these findings. The use of person-oriented analyses enabled us to identify how the emotional consequences of one sexual behavior differ in the context of other sexual behaviors. In particular, we found that kissing by itself may differ in emotional significance from kissing in the context of other sexual behaviors. We found that, compared to the All Behaviors class, individuals in the Kissing Only class were less likely to report a positive or negative intrapersonal consequence of sexual behaviors. It is worth noting that Kissing Only was the only class that differed from the All Behaviors class on perceived consequences. Although the lack of other significant findings may be due to a lack of statistical power, it is also possible that kissing by itself has different connotations than kissing in the context of touching and/or oral and penetrative sex. Specifically, it may be perceived as less physically satisfying (Goins, Garcia, & Barger, 2013), or less emotionally intense. These different consequences indicate that engaging in kissing only is in some ways less positive than engaging in other behaviors, but is also protective against negative intrapersonal consequences.

Interestingly, the Kissing Only class did not differ from other latent classes on interpersonal consequences. This finding indicates that, although kissing may be less physically satisfying or intense than other sexual behaviors, it serves a similar purpose as other behavior patterns with regard to connecting (or failing to connect) with a partner. Kissing may be as relationally meaningful as other behaviors, even if less personally intense. This finding is consistent with past research finding that the frequency of kissing is associated with adolescents' relationship satisfaction and commitment (Welsh et al., 2005).

Prior research has found that kissing serves the purposes of relationship maintenance and assessment of potential romantic partners for sexual compatibility (Hughes et al., 2007; Wlodarski & Dunbar, 2013). Because of kissing's distinct significance, sexual behaviors may have different meanings when kissing is present versus absent. The absence of kissing and touching in one latent class was noteworthy; during the two weeks assessed, young men in the Oral and Penetrative Only class engaged in oral and/or penetrative sex, but did not kiss or touch. The existence of this class demonstrates that kissing and touching are not universal among sexually active individuals. The absence of kissing may connote a lack of affection or emotional intimacy in these relationships (Paul & Hayes, 2002; Welsh et al., 2005), although this class was too small to include in explorations of consequences of sexual behaviors.

A benefit of using a person-oriented analysis is that this statistical approach facilitates a more holistic understanding of how sexual behaviors are performed in sexual relationships. By identifying patterns of behaviors rather than examining individual behaviors, a person-

oriented approach enabled the identification of Kissing and Touching as a unique behavior pattern, separate from individuals who only kissed and those who engaged in oral/ penetrative sex. The emergence of the Kissing and Touching class invites thought on the role of sexual touching in individuals' sexual repertoires. Sexual touching has received limited attention in past research. A behavior pattern characterized by kissing and touching only is unique with regard to risk and pleasure—although participants may have engaged in genital stimulation, they likely experienced low risk of negative sexual health outcomes, and this pattern may be useful for individuals who wish to engage in sexual behaviors while avoiding pregnancy and STIs. Alternatively, sexual touching may be an intermediate step in a progression from kissing to oral/penetrative sex. Past research on sexual timetables has found that touching typically precedes oral and penetrative sex, and that adolescents report intimacy as an important factor in deciding to engage in more advanced sexual behaviors (O'Sullivan, Cheng, Harris, & Brooks-Gunn, 2007; Rosenthal & Smith, 1997; Smiler, Frankel, & Savin-Williams, 2011). Given these findings, it is possible that individuals in the Kissing and Touching class were waiting until more emotional intimacy developed with a partner before engaging in more sexually intimate behaviors. However, the Kissing and Touching class did not differ from All Behaviors class in perceived consequences, suggesting that this behavior pattern is not unique in terms of perceived health, emotional, or relationship risks or benefits. Further research is needed to investigate the role of touching in adolescents' and young adults' sexual relationships, including whether it is used as a risk management approach or as an intermediate step before more advanced sexual behaviors, and how its meanings differ in the presence/absence of oral and penetrative sex.

A person-oriented approach also enabled the identification of oral and penetrative sex as linked behaviors, finding that sexual repertoires tended to be characterized by either both oral and penetrative sex or neither. The co-occurrence of oral and penetrative sex in college students is consistent with the developmental literature, which shows that oral and penetrative sex typically emerge within six to twelve months of one another (Haydon, Herring, & Halpern, 2012; Lindberg, Jones, & Santelli, 2008; Reese, Haydon, Herring, & Halpern, 2013). Our findings support the idea that oral and penetrative sex continue to jointly define sexual repertoires after the initiation of these behaviors.

The Importance of Relationship Context

Although the same latent classes of sexual behaviors were found for people with romantic versus nonromantic sexual partners, there were differences in the class distributions by partner type, with romantic partnerships more likely for individuals in the All Behaviors class than any other class. Although research has established that nonromantic sexual relationships are normative in young adulthood (e.g., Manning, Giordano, & Longmore, 2006), oral and penetrative sex may be less normative than kissing and touching with nonromantic partners. Our findings are consistent with prior research demonstrating that the majority of nonromantic sexual partnerships do not involve oral or penetrative sex (Armstrong et al., 2009; Fielder et al., 2013; Furman & Shaffer, 2011). Although much research on nonromantic sexual partnerships focuses on oral and penetrative sex (e.g. Eshbaugh & Gute, 2008; Grello, Welsh, & Harper, 2006; Manning et al., 2006), additional research on kissing and touching with nonromantic partners is needed.

In addition to finding that engaging in oral and penetrative sex with a nonromantic partner may be less normative than kissing and/or touching, our findings suggest that oral and penetrative sex may be more detrimental to emotional well-being. Partner type predicted negative interpersonal consequences of sexual activity only in the All Behaviors class, suggesting that negative emotional health outcomes of nonromantic sexual encounters may be specific to individuals who engage in oral and penetrative sex. These findings may help explain why sexual intercourse has differential associations with emotional well-being for people with and without committed romantic partners (e.g., Furman & Collibee, 2014). The association of nonromantic sexual intercourse with poorer emotional well-being may operate primarily through interpersonal concerns, such as worrying about commitment or feeling like things moved too fast, rather than intrapersonal concerns.

Practical and Policy Implications

Findings about differences in perceived consequences have implications for sex and relationship education. The results support a more holistic approach to sexual education that emphasizes the range of sexual behaviors in which individuals engage and addresses the emotional consequences of sexual behaviors. The majority of sexual education efforts focus on oral and penetrative sex and the negative physical health consequences of these behaviors (Horne & Zimmer-Gembeck, 2005). However, our results demonstrate diversity in sexual behavior patterns, with many individuals reporting kissing and or/touching only. Additionally, our results highlight the emotional consequences of sexual behaviors, with sexual behavior patterns predicting different reported consequences. Sexual education efforts may benefit from an enhanced focus on (a) non-penetrative sexual behaviors, and (b) emotional consequences of these behaviors. Incorporating a perspective that acknowledges the benefits and drawbacks of multiple sexual behaviors may encourage individuals to engage in behaviors with fewer emotional and health risks, such as kissing.

Additionally, our findings highlight the need for sexual education policy to address relationship and other contextual issues that make sexual behaviors more or less risky for emotional health. Because adolescents and emerging adults engage in sexual behaviors with a variety of partners, they must have skills to navigate a diverse range of sexual interactions. However, despite the normativity of nonromantic sexual partnerships, few resources exist that guide individuals in avoiding negative outcomes of these experiences. The present research adds to an existing body of research that demonstrates that casual sexual encounters may influence emotional health under some circumstances (Bersamin et al., 2014; Fielder, Walsh, Carey, & Carey, 2014). However, under other circumstances, these encounters seem to pose few risks to emotional health (e.g., Uecker, Pearce, & Andercheck, 2015; Vrangalova, 2015). If sexual education addressed the risks of nonromantic sexual encounters using research to guide curriculum development, individuals may better be able to make protective choices in their sexual partnerships. For example, research has found that nonromantic sexual encounters are not detrimental to emotional health when individuals are autonomously motivated to engage in nonromantic sexual partnerships (Uecker et al. 2015; Vrangalova, 2015). This research could guide sex educators to discuss sexual decision-making, encouraging students to avoid sexual scenarios that they aren't enthusiastic about. Our findings may also inform educational content on sexual decision-making. We found that

oral and penetrative sex with a nonromantic partner was associated with more negative interpersonal outcomes, suggesting that individuals may fare better if they limit these sexual behaviors to romantic partnerships. If sex and relationship educators were to openly discuss the relative risks of engaging in oral and penetrative sex with a romantic versus a nonromantic partner, individuals may be less likely to engage in these more advanced sexual behaviors with nonromantic partners.

Limitations and Future Research

The results of this paper should be interpreted in light of methodological limitations. One limitation is a lack of statistical power due to the small sample, which may have failed to detect differences in the likelihood of class membership. The small Oral and Penetrative Only class was composed entirely of men, which prevented us from using other methods, such as LCA with a distal outcome or inclusive classify-analyze, to estimate gender differences in associations between classes and predictors or outcomes; thus, associations of consequences with class membership may have been attenuated (Bray, Lanza, & Tan, 2012; Lanza, Tan, & Bray, 2013). Although LCA is a useful tool for understanding behavior patterns, it is important to recognize that there is variability within latent classes. For example, individuals in the Kissing and Touching class had about a one-third probability of also engaging in penetrative sex in the past two weeks. Latent class findings, therefore, should be interpreted with caution; the latent class solution does not produce perfect descriptions of behavior for every participant. In addition, the associations between latent classes of sexual behaviors and emotional consequences may be more strongly driven by some behaviors rather than others—for example, oral sex or penetrative sex may drive associations between the All Behaviors class and negative interpersonal consequences. However, because our latent class solution grouped oral and penetrative sex together, we were unable to determine whether one of these behaviors might be more important for emotional consequences using a person-oriented approach.

It is also important to note that our sample was limited to college students in the United States. Therefore, results may not be generalizable to other populations. Although the stratification procedure in [study name removed] makes this sample more diverse than convenience samples of college students, generalizations cannot be made to non-college students, or to college populations with different characteristics (e.g., two-year colleges). Sexual behaviors and their emotional consequences differ across countries (Madkour, Farhat, Halpern, Godeau, & Gabhainn, 2010; Wellings et al., 2006), and therefore, patterns of behaviors may differ internationally.

Our use of daily data is both a strength and a limitation. Daily data on sexual behaviors may produce more accurate results because events are reported more proximally to the event (McAuliffe, DiFranceisco, & Reed, 2007). Daily data may be especially useful for behaviors with nonromantic sexual partners, whom an individual may see only once. However, two weeks of data may not be enough to fully capture participants' sexual repertoires. This sample may underrepresent infrequent sexual behaviors, which often occur with nonromantic partners or long-distance relationships. Future research should consider measuring daily behaviors over a longer time course.

This paper was a between-person analysis of sexual behaviors, aggregating sexual behaviors across days, but sexual behavior patterns vary across days (Hensel et al., 2008). Daily variation in sexual repertoires may correspond to differences in perceived consequences of sexual behaviors, but focusing on aggregated behaviors could mask this effect. Additionally, we were unable to determine whether participants had multiple partners over the course of the study, and consequences may have differed across partners. In order to further disentangle the role of sexual behavior patterns in explaining perceived consequences, a promising future direction is to analyze within-person differences in sexual behavior patterns from a person-oriented approach.

Finally, this paper was primarily descriptive in nature. We can only speculate on the functional differences between latent classes. Future research should examine the subjective meanings of sexual behaviors and how they change in the context of other behaviors. For example, how do individuals in the Kissing Only class explain why they did not engage in other sexual behaviors with their partners? How are their sexual experiences different from those who engage in both kissing and touching?

Conclusion

Despite its limitations, this paper contributes to understanding the nature of college students' sexual behaviors. Patterns of behavior were diverse, differed by partner type, and predicted differences in reported consequences of sexual behaviors. Patterns characterized by all sexual behaviors were especially common among students with romantic sexual partners, and partner type differentially predicted consequences of sexual behaviors across classes. Findings underscore the need to recognize variation in consequences of sexual behaviors with both romantic and nonromantic sexual partners and to further explore the role of sexual behaviors in explaining variation in emotional health outcomes associated with nonromantic sexual partnerships.

Acknowledgments

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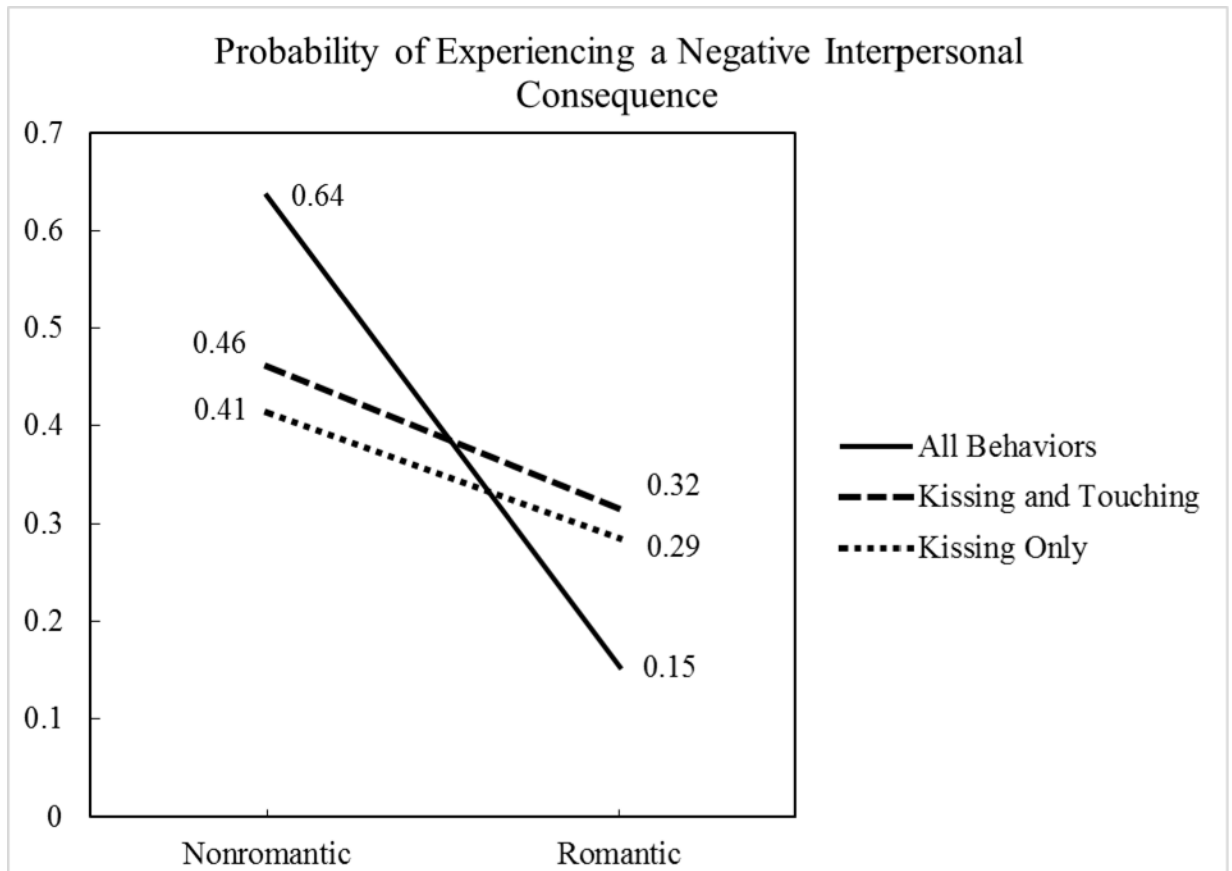
Figure 1.
Probability of Experiencing a Negative Interpersonal Consequence of Sexual Behavior by
Latent Class and Partner Type

Table 1

Fit Statistics for Models of Sexual Behavior With One Through Five Latent Classes

Number of Classes	Log-likelihood	G-squared	AIC	BIC	CAIC	Adjusted BIC	Entropy
1	−731.20	330.76	340.76	358.74	363.74	342.88	1.00
2	−603.43	75.22	97.22	136.76	147.76	101.88	0.82
3	−583.85	36.06	70.06	131.17	148.17	77.27	0.93
4	−573.15	14.67	60.67	143.34	166.34	70.42	0.84
5	−570.54	9.45	67.45	171.69	200.69	79.74	0.74

Note. AIC = Akaike Information Criteria, BIC = Bayesian Information Criteria, CAIC = Consistent Akaike Information Criteria

Table 2

Item-Response Probabilities (Standard Errors) for Four Class Model of Sexual Behavior

	Latent Class			
	Kissing Only	Kissing and Touching	All Behaviors	Oral and Penetrative Only
Class Membership Probabilities	0.25	0.30	0.42	0.02
Behavioral Indicators				
Kissing	**1.00** (<0.01)	**0.93** (0.03)	**1.00** (<0.01)	0.04 (0.08)
Touching	0.07 (0.14)	**1.00** (0.01)	**1.00** (<0.01)	0.05 (0.10)
Perform Oral Sex	<0.01 (<0.01)	0.01 (0.03)	**0.71** (0.07)	0.49 (0.20)
Receive Oral Sex	<0.01 (<0.01)	0.10 (0.06)	**0.74** (0.06)	**0.66** (0.19)
Penetrative Sex	<0.01 (0.01)	0.32 (0.08)	**0.83** (0.04)	**0.65** (0.19)

Note. Item-response probabilities greater than .5 are bolded to facilitate interpretation.

Table 3

Latent Class Membership by Gender

	Female[a]	Male[b]
Kissing Only	38 (25%)	26 (22%)
Kissing and Touching	52 (34%)	44 (38%)
All Behaviors	62 (41%)	41 (35%)
Oral and Penetrative Only	0 (0%)	6 (5%)
Total	152	117

[a] n (%) of female participants in each class

[b] n (%) of male participants in each class

Table 4

Latent Class Membership by Partner Type

	Nonromantic[a]	Romantic[b]
Kissing Only	29 (35%)	35 (19%)
Kissing and Touching	39 (47%)	57 (31%)
All Behaviors	12 (14%)	91 (49%)
Oral and Penetrative Only	3 (4%)	3 (2%)
Total	83	186

[a] *n* (%) of participants with nonromantic partners in each class

[b] *n* (%) of participants with romantic partners in each class

Table 5

Logistic Regression Results

	Positive Intrapersonal	Positive Intrapersonal	Negative Intrapersonal	Negative Intrapersonal
R^2	.22 ***	.17 ***	.14 ***	.13 ***
Odds Ratios				
Gender	0.81	1.40	0.36 ***	0.10
Partner Type	4.07 **	3.40 **	0.76	0.27 ***
Kissing Only	0.17 *	0.46	0.24 **	1.29
Kissing and Touching	1.43	1.03	0.60	1.52
Kissing Only X Partner Type	1.13	1.77	1.30	4.95 +
Kissing Only X Gender	3.22	3.55	0.91	1.82
Kissing and Touching X Partner Type	5.96	1.37	1.40	4.73 +
Kissing and Touching X Gender	2.54	1.72	1.15	0.53

Notes:

+ $p < .10$

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Gender: Female = 0, Male = 1; Centered values used in regression: Male = −.43, Female = .57 Partner Type: Nonromantic = 0, Romantic = 1; Centered values used in regression: Nonromantic = .31, Romantic = −.69