LATENT CLASSES OF SEXUAL BEHAVIORS:
COMPARISONS BY GENDER AND PARTNER TYPE

A Thesis in
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by
Rose Wesche

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The thesis of Rose Wesche was reviewed and approved* by the following:

Eva S. Lefkowitz  
Associate Professor of Human Development and Family Studies  
Thesis Adviser

Eric Loken  
Research Associate Professor of Human Development

Steven H. Zarit  
Distinguished Professor of Human Development and Family Studies  
Head of the Department of Human Development and Family Studies

*Signatures are on file in the Graduate School
ABSTRACT

Scholars of adolescent and emerging adult sexuality have recently begun to study how diverse sexual experiences, including sexual behaviors ranging from kissing to penetrative sex with partners ranging from strangers to committed romantic partners, contribute to development and sexual health (e.g. Halpern-Felsher, Cornell, Kropp, & Tschann, 2005; Brady & Halpern-Felsher, 2007). Adopting a person-oriented approach to studying sexual behavior provides a more nuanced understanding of sexual repertoires and can help elucidate the meanings of behaviors in the context of one another. The goals of this project were to use Latent Class Analysis (LCA) to (1) document patterns of sexual behaviors ranging from kissing to penetrative sex, (2) determine how latent class structure varies by gender and partner type (romantic v nonromantic), and (3) determine how latent class distribution varies by gender and partner type. Our analyses revealed four latent classes of sexual behavior, including Kissing Only, Kissing and Touching, All Behaviors, and Oral and Penetrative Only. Only men belonged to the Oral and Penetrative Only class. Engaging in the full range of behaviors was most common for students with romantic partners, whereas profiles characterized by only kissing and/or touching were most common for those with nonromantic partners. These findings demonstrate that college students engage in diverse patterns of sexual behaviors, and that these behaviors differ by gender and type of partner. Researchers may achieve a more accurate and detailed understanding of sexuality in adolescence and emerging adulthood by recognizing the diversity of behaviors in sexual partnerships and between partner types. Implications are discussed in terms of normative sexual development and prevention.
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Introduction

Adolescent and emerging adult sexual behaviors and partnerships are important from developmental and risk-taking perspectives because the timing, sequencing, context, and patterning of sexual behaviors correspond to psychological and sexual health outcomes later in life (Haydon, Herring, Prinstein & Halpern, 2012; Sandfort, Orr, Hirsch, & Santelli, 2008). Understanding the behavioral and relational contexts of sexual encounters is key to understanding the outcomes associated with sexual behaviors, because sexual behaviors and relationship contexts vary in their implications for sexual and psychological health (e.g. Halpern-Felsher et al., 2005; Brady & Halpern-Felsher, 2007). The behavioral and relationship contexts of sexual encounters are complex and vary in their relational and emotional significance.

Regarding behavioral context, the relational significance of one sexual behavior depends on whether and what other behaviors are performed; for example, adolescent girls report greater partner support on days with only fellatio, compared to days with both fellatio and vaginal sex (Hensel, Fortenberry, & Orr, 2008). Regarding relational context, the significance of specific sexual behaviors may differ between romantic and nonromantic relationships; for example, college students rate kissing as more important with romantic than nonromantic partners (Hughes, Harrison, & Gallup, 2007).

Although research has demonstrated the complex associations of different sexual behaviors with each other, and with relationship context, most research using traditional variable-centered methods has not thoroughly examined the complexity of sexual behavior. Person-oriented approaches offer a new perspective on college students’ sexual behaviors that recognizes the interconnectedness of behaviors. This project uses a person-oriented approach, latent class analysis (LCA), and a range of sexual behaviors from kissing to penetrative sex, in
order to 1) identify patterns of sexual behavior in college students, 2) determine whether the same latent class structures describe sexual behavior in romantic and nonromantic contexts, and 3) determine how probabilities of latent class membership differ between individuals who engage in sexual behaviors with romantic versus nonromantic partners.

**Variable- vs. Person-Oriented Approaches to Understanding Sexual Behaviors**

Adolescent and emerging adult sexual behavior has been studied extensively, primarily from variable-oriented approaches (for a review, see Diamond & Savin-Williams, 2009). Such methods focus on how variables, such as number of sex partners and STI diagnosis, are related to one another. Variable-oriented approaches have demonstrated the diversity in adolescent sexual behaviors. Adolescents initiate sexual behaviors at different times and in different sequences (Gowen, Feldman, Diaz, & Yisrael, 2004; Smiler, Frankel, & Savin-Williams, 2011; Smith & Udry, 1985; Woody, Russel, D'Souza, & Woody, 2000). Even after behaviors are initiated, individuals may choose to engage in different behaviors during different sexual encounters (Hensel et al., 2008).

One likely reason for the diversity in sexual behaviors during adolescence and emerging adulthood is that different behaviors are perceived differently and serve different relational and practical purposes. Variable-oriented studies focusing on oral sex have found that adolescents perceive it to be both less risky and less intimate than vaginal sex (Bay-Cheng & Fava, 2011; Chambers, 2007; Halpern-Felsher et al., 2005). Sexual touching, manual stimulation, and fellatio are less strongly related to sexual desire and pleasure than sexual intercourse is (Bay-Cheng, Robinson, & Zucker, 2009; Brady & Halpern-Felsher, 2007).

Furthermore, individuals’ perceptions of their sexual behaviors differ depending on the presence or absence of other sexual behaviors. For example, adolescent virgins who have
engaged in other genital sexual behaviors (e.g. oral sex or sexual touching) report more positive feelings about their sexual behaviors, compared to nonvirgins, most of whom have also engaged in other genital behaviors (Woody et al., 2000). Abstinent days, coitus-only days, and days with both coital and noncoital sexual behaviors differ in terms of perceived partner support and negativity, sexual interest, and feeling in love (Hensel et al., 2008).

Variable-oriented studies have found that sexual behaviors are diverse, complex, and interrelated. These characteristics make sexual behaviors well-suited for person-oriented analytic approaches. Although variable-oriented approaches have been useful in studying individual sexual behaviors, researchers have argued that 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 is complex and may involve many factors that interact at multiple levels, and that processes are often organized as patterns, where each factor derives its meaning from its relation to the others (Bergman & Magnusson, 1997). In addition to emphasizing the relatedness of behaviors, person-oriented analyses capture the diversity of sexual behaviors because they do not narrow the focus to a single behavior; instead, they help us in understanding how behaviors are related to one another without making a priori assumptions (Beadnell et al., 2005). Thus, these techniques can provide clarity on the nature of sexual behaviors in adolescence.

Studies using latent class analysis (LCA), latent profile analysis (LPA), and cluster analysis have demonstrated the utility of person-centered approaches for understanding adolescent and emerging adult sexual behavior (Beadnell et al., 2005; Haydon, Herring, & Halpern, 2012b; Haydon et al., 2012a; Hipwell, Stepp, Keenan, Chung, & Loeber, 2011;
Several person-oriented studies of adolescent sexual behavior have adopted a developmental perspective to examine variation in the presence, timing, and sequencing of sexual behavior initiation. Classes of sexual behaviors identified in these studies include postponement of sexual intercourse, normative timing and sequencing of oral and vaginal sex, and early initiation of these behaviors (Haydon et al., 2012a; Haydon et al., 2012b; Hipwell et al., 2011; Vasilenko et al., 2014).

In addition to using developmental perspectives to understand sexual activity, researchers have also incorporated risk perspectives in person-oriented analyses of sexual behaviors. Sexual behavior initiation patterns are associated with health outcomes including depression, STI diagnosis, concurrent sexual partnerships, and substance use (Haydon et al., 2012; Haydon et al., 2012b; Hipwell et al., 2011; Vasilenko et al., 2014). 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 STIs and pregnancy. Beadnell et al. (2005) and Newman and Zimmerman (2000) found profiles that vary in their level of risk: consistent condom use, inconsistent condom use with few partners, and inconsistent condom use with multiple partners. These results show how person-centered analyses can aid understanding of adolescent sexuality by highlighting the importance of the relatedness of behaviors—condom use and number of partners by themselves may not be risky behaviors, but the combination of the two is key to understanding risk.

**Why Assess a Range of Sexual Behaviors?**

Extant person-oriented studies of sexual behaviors demonstrate the value of this approach to understanding sexual behaviors in adolescence. Such studies find that adolescents and emerging adults engage in a variety of sexual behaviors, that these behaviors co-occur, and that
sexual behaviors are related to one another and to health outcomes. This research provides a more holistic perspective of sexuality in adolescence by examining behavior patterns instead of single behaviors. However, most person-oriented studies of adolescent and emerging adult sexuality have focused on genital behaviors. Genital behaviors are important because they correspond to STI diagnosis and pregnancy risk, but they do not represent the range of adolescents’ and emerging adults’ sexual encounters. Sexual encounters involving oral or penetrative sex often also involve other behaviors such as kissing and touching, and many sexual encounters do not involve oral or penetrative sex at all (Hensel et al., 2008; Schuster, Bell, & Kanouse, 1996; Woody et al., 2000).

Including measures of kissing and touching in sexual behavior research is important from developmental, risk, and holistic perspectives. From a developmental perspective, focusing only on genital behaviors excludes individuals who have never engaged in genital sexual behaviors. Only about half of college freshmen have ever had oral or vaginal sex, whereas virtually all college students have kissed a partner (Hughes et al., 2007; Siegel, Klein, & Roghmann, 1999). Including kissing and touching as indicators of latent classes will capture a sample that is more representative of college students because it includes people at different stages of sexual initiation, allowing for a more accurate understanding of the variety of sexual behavior patterns.

From a risk perspective, much research on sexual risk focuses on oral and penetrative sex while excluding other important behaviors. However, abstaining from oral and penetrative sex is common, and can be viewed as a protective strategy because nongenital behaviors carry less risk of pregnancy and STIs. In fact, some evidence suggests that adolescents consciously avoid penetrative sex as a form of harm reduction, actively choosing to engage in less risky behaviors (Halpern-Felsher, 2008). Incorporating a range of sexual behaviors will improve understandings
of the full spectrum of more and less risky sexual behaviors and how these types of behaviors interact with one another.

From a holistic perspective, sexual behaviors derive their meaning from their relation to other behaviors. A key strength of person-centered analyses is that they highlight the associations between behaviors. It is possible that the meaning of genital behaviors differs in the presence or absence of nongenital behaviors like kissing and touching. Kissing, in particular, has a unique connotation of affection. Welsh, Haugen, Widman, Darling, and Grello (2005) found that kissing was positively associated with relationship satisfaction and commitment in adolescent romantic couples, even after controlling for the contributions of sexual touching and sexual intercourse. Sexual behavior patterns characterized by the presence or absence of kissing may imply differences in relationship commitment and/or satisfaction. Including nongenital behaviors will clarify the meanings of sexual behaviors in the context of a range of other behaviors.

Because of the potential importance of kissing and touching, one purpose of this study is to incorporate a wider range of sexual behaviors into a person-centered analysis of sexual behaviors, to determine the patterns of sexual behavior that exist in a college sample when a wide variety of behaviors are used as indicators.

**The Importance of Relationship Context**

Although most sexual encounters in adolescence occur in the context of a romantic relationship, engaging in sexual behaviors with nonromantic partners is common (Manning, Longmore, & Giordano, 2005). Sexual encounters with nonromantic partners are qualitatively different than encounters with romantic partners. Nonromantic sexual partnerships may be with strangers, acquaintances, or friends (Grello, Welsh, & Harper, 2006; Manning et al., 2005), often have no expectation of future encounters, and typically do not require an emotional commitment
from those involved (although friends with benefits may be an exception; see Furman & Shaffer, 2011; Vanderdrift, Lehmiller, & Kelly, 2012). Nonromantic sexual encounters are navigated differently than romantic relationships in terms of social behaviors (e.g., drinking alcohol) and communication between partners (Backstrom, Armstrong, & Puentes, 2012; Epstein, Calzo, Smiler, & Ward, 2009). Romantic and nonromantic sexual relationships also differ in the sexual behaviors that occur with each type of partner. Variable-oriented studies have demonstrated that lower frequencies of sexual behaviors and a lower likelihood of oral and penetrative sex characterize nonromantic sexual relationships (Armstrong, England, & Fogarty, 2009; Backstrom et al., 2012; Fielder, Carey, & Carey, 2013; Furman & Shaffer, 2011; Lehmiller, VanderDrift, & Kelly, 2012).

Understanding the differences in sexual behaviors between romantic and nonromantic relationship contexts is important from both developmental and risk perspectives. Nonromantic sexual relationships are common enough to be considered a normative part of sexual development (Fielder & Carey, 2010; Manning et al., 2005), but research on relationship context often uses a risk perspective, which focuses on genital behaviors because of their relevance to STIs and pregnancy (e.g. Lehmiller et al., 2012; Manlove, Ryan, & Franzetta, 2003; Manning, Longmore, & Giordano, 2006). Therefore, the sexual behavior patterns that typify nonromantic relationships are unknown. Comparing sexual behaviors across relationship contexts from a person-oriented approach will help determine what behavior patterns are normative in nonromantic sexual relationships, and whether specific behavior patterns are equally common in nonromantic and romantic relationships. By taking relationship context into account, researchers can gain a more thorough understanding of normative sexual development in adolescence that recognizes the importance and uniqueness of nonromantic relationships. From a risk perspective,
researchers also learn how the association between riskier (i.e. oral and penetrative sex) and less risky (i.e. kissing and touching) behaviors differs across relationship contexts, which may be useful for prevention efforts.

**Gender and sexual behaviors**

Some person-oriented studies have demonstrated gender differences in sexual profile membership. Women may be more likely than men to have a sexual behavior profile 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 than women (Beadnell et al., 2005; Newman & Zimmerman, 2000). Additionally, latent classes characterized by more risky behaviors more strongly predict STI diagnoses in men than in women (Vasilenko et al., 2014). 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.

**Research Aims**

In this thesis I will use latent class analysis to determine patterns of sexual behaviors in a college sample, using kissing, sexual touching, performing and receiving oral sex, and penetrative sex as indicators. Additionally, I will test whether the same profiles of sexual behavior are found for romantic and nonromantic sexual partners, and if so, how the distribution of the profiles differs between romantic and nonromantic partners. This work will expand on past research by incorporating a range of sexual behaviors and addressing the relationship context of
sexual behaviors. Specifically, I will address the following research questions:

1. What latent classes of sexual behavior exist in a college sample, using a wide variety of sexual behaviors as indicators?
2. Are the latent classes defined the same way across genders and for romantic and nonromantic partners?
3. If the classes are similarly defined, is the distribution of classes similar across genders and for romantic and nonromantic partners?

Method

Participants and Procedure

The current sample comes from the University Life Study, a longitudinal, web-based study of college students at a large public university. 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 participants received a letter containing a description of the study, a pen, and a $5 cash incentive. Five days later, the students received an email containing a personal, secure link to the Semester 1 baseline survey. After completing the baseline survey, students received an email invitation to begin 14 consecutive daily diary web-based surveys. At Semester 1, participants were compensated $20 for completing the baseline survey and $3 per day for each of the 14 days of the daily diary survey, plus a bonus of $8 for completing all 14 days. In total, 744 students completed the Semester 1 baseline survey (65.6% initial response rate). Eighty six percent of participants who completed the baseline survey completed at least 12 of the 14 daily surveys, resulting in a total of 9,482 days of daily data from 718 participants in Semester 1.
This thesis uses data from the Semester 1 baseline and daily surveys. In the baseline survey, participants indicated their gender, sexual orientation, age, and race/ethnicity. On each of the 14 days of the study, participants were asked about their activities on the previous day, including their sexual behaviors. For the purposes of this thesis, I included only participants who reported at least one sexual behavior (kissing, touching under clothes/without clothes on, performing or receiving oral sex, or having penetrative sex) during the two weeks of data collection.

The final sample consists of the 269 participants who reported at least one sexual behavior during the two weeks of data collection. The sample excludes 413 participants who did not report any partnered sexual behaviors in the Semester 1 daily surveys. It also excludes 36 participants who reported both romantic and nonromantic partners in the Semester 1 daily surveys because it is impossible to determine which behaviors they did with which type of partner.

The final sample was 57% female and predominantly heterosexual (98%). The sample was diverse with respect to race/ethnicity; 32% were White Non-Hispanic/Latino [NHL], 26% were Hispanic/Latino, 16% were African American NHL, 16% were Asian/Hawaiian-Pacific Islander NHL, and 10% were multiracial NHL. The average age of the sample was 18.44 years ($SD = 0.41$), with a range from 17.58 to 20.75. I compared the 269 participants in the current sample to those in the larger ULS sample on demographic measures using a series of $X^2$ and $t$-tests. Compared to the overall Semester 1 sample, participants in the final sample were more likely to be female ($X^2 (1, N = 744) = 5.35, p < .05$) and less likely to be Asian ($X^2 (1, N = 744) = 13.46, p < .001$). The final and overall samples did not differ in age ($t(741) = .25, p = .81$), and there was not enough variation in sexual orientation to test differences between the final sample.
and the overall sample.

Measures

**Indicators of sexual behavior latent class membership.** Each day of the study, participants answered questions about their sexual behaviors the previous day. Six questions assessed whether the participant and a partner kissed on the lips, touched each other under clothing or with no clothing on, performed oral sex on a partner, received oral sex from a partner, had vaginal sex, and had anal sex. Participants were also asked if they engaged in kissing or touching, or oral, vaginal, or anal sex, on more than one occasion the previous day. If they had, they were asked to select the behaviors they did the most recent time.

The five indicators of latent class membership for this thesis were dichotomous measurements of whether or not the participant kissed, touched, 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 were collapsed into one item measuring penetrative sex because very few people (13 out of a sample of 269) reported having anal sex on any of the 14 days and everyone who reported having anal sex during the two-week period also reported having vaginal sex.

**Predictors of latent class membership.** Gender and sexual partner type were used to predict class membership. In the baseline survey participants were asked to select their gender: male (coded as 1) or female (coded as 0). Each day that participants reported engaging in any sexual behaviors, they were asked to select one of seven options to describe their relationship to their partner. If the person engaged in sexual behavior on more than one occasion the previous day, they were asked to describe their most recent partner. For the current analyses, I categorized the options as nonromantic (stranger or friend) or romantic (casual dating partner, regular dating
partner, someone the participant lived with, a fiancé, or a spouse) partner.

Analysis

In this thesis, I used latent class analysis, a statistical procedure that identifies latent subgroups of individuals with unique patterns of sexual behavior (Collins & Lanza, 2010; Goodman, 1974). The analyses will be conducted in three steps. First, I used PROC LCA, a SAS command developed by Lanza, Collins, Lemmon, and Schafer (2007), to identify latent classes of sexual behavior based on the five indicators. I relied on information criteria and interpretability to choose the number of classes in the solution.

Second, I used the grouping variables of gender and sexual partner type (romantic or nonromantic) to explore measurement invariance. This analysis tested whether the latent classes were defined the same way across grouping variables, determining whether the same patterns of sexual behaviors exist for men and women and for romantic and nonromantic partnerships.

Third, I used chi-square analyses and a logit model to determine if the likelihood of membership in each class was similar across gender and sexual partner type. This analysis determined if the prevalence of each class is similar for men and women and for romantic and nonromantic partnerships.

Results

Latent Classes of Sexual Behavior

To examine the class structure of sexual behaviors, I used PROC LCA in SAS (Lanza et al., 2007) to compare models with one through five latent classes. 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 group comprised 25% of the sample. Therefore, I selected the four-class model.

Table 1. *Fit Statistics for Models of Sexual Behavior with One Through Five Latent Classes*

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

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

Using item-response probabilities, I interpreted the classes produced by LCA (see Table 2). All Behaviors was the largest class, containing 42% of participants. Kissing Only and Kissing and Touching contained 26% and 30% of the sample, respectively. Individuals in the Kissing Only class were very likely to have kissed but much less likely to have performed more advanced sexual behaviors during the two weeks of the study. Similarly, individuals in the Kissing and Touching class reported both of these behaviors, but a much lower likelihood of oral and penetrative sex.
Table 2. Item-Response Probabilities (Standard Errors) for Four Class Model of Sexual Behavior

<table>
<thead>
<tr>
<th>Latent Class</th>
<th>Oral and Penetrative</th>
<th>Kissing and Touching</th>
<th>All Behaviors</th>
<th>Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Membership Probabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probabilities</td>
<td>0.25</td>
<td>0.30</td>
<td>0.42</td>
<td>0.02</td>
</tr>
<tr>
<td>Behavioral Indicators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kissing</td>
<td>1.00</td>
<td>(0.01)</td>
<td>0.93 (0.03)</td>
<td>1.00 (0.01)</td>
</tr>
<tr>
<td>Touching</td>
<td>0.07</td>
<td>(0.14)</td>
<td>1.00 (0.01)</td>
<td>1.00 (0.01)</td>
</tr>
<tr>
<td>Perform Oral</td>
<td>&lt;0.01</td>
<td>(&lt;0.01)</td>
<td>0.01 (0.03)</td>
<td>0.71 (0.07)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receive Oral</td>
<td>&lt;0.01</td>
<td>(&lt;0.01)</td>
<td>0.10 (0.06)</td>
<td>0.74 (0.06)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penetrative Sex</td>
<td>&lt;0.01</td>
<td>(0.01)</td>
<td>0.32 (0.08)</td>
<td>0.83 (0.04)</td>
</tr>
</tbody>
</table>

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

The smallest class, Oral and Penetrative Sex Only, contained only 2% of the sample.

Although this class was small, it was present in both three- and four-class models, indicating that it was a distinct group. The Oral and Penetrative Sex Only class contained six men, each of
whom reported one sexual encounter within the two weeks of the daily diary study. The
encounters included only oral and/or penetrative sex, with no kissing or touching. Their partners
varied and included strangers, friends, and casual dating partners. All but one of the partners
were female.

Class Structure and Class Distribution by Gender

The next goals of the analysis were to examine measurement invariance in the class
structure in order to determine if the same classes were found for men and women, and to
examine class distribution in order to determine if the likelihood of belonging to each class was
the same for men and women. To examine measurement invariance in the latent class structure
across gender, I used LCA with grouping variables. This statistical procedure consisted of two
steps. First, I used a four-class model with gender as a grouping variable and parameters
estimated freely. Second, I used 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 allows us to determine whether the same types of
classes exist for men and women. The difference in $G^2$ was not significant, meaning that the
latent class structure did not vary by gender ($\chi^2 (20) = 12.04, p = .09$). In other words, the same
four classes existed for men and women.

To examine the distribution of class membership by gender, I used a chi-square test.
Because the Oral and Penetrative Only class was small and consisted of only males, it violated
the cell size requirements of the test. Therefore, I conducted a chi-square test using the three
remaining classes to examine gender differences in the likelihood of belonging to each class. The
test did not reach statistical significance ($\chi^2 (2) = .827, p = .34$), meaning that there were no
significant gender differences in the likelihood of belonging to each latent class. See Table 3 for distributions of latent class membership separated by gender.

Table 3. Latent Class Membership by Gender

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kissing Only</td>
<td>38</td>
<td>(25%)</td>
<td>26</td>
<td>(22%)</td>
</tr>
<tr>
<td>Kissing and Touching</td>
<td>52</td>
<td>(34%)</td>
<td>44</td>
<td>(38%)</td>
</tr>
<tr>
<td>All Behaviors</td>
<td>62</td>
<td>(41%)</td>
<td>41</td>
<td>(35%)</td>
</tr>
<tr>
<td>Oral and Penetrative Only</td>
<td>0</td>
<td>(0%)</td>
<td>6</td>
<td>(5%)</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td></td>
<td>117</td>
<td></td>
</tr>
</tbody>
</table>

n (%) of females, n (%) of males in each class

Class Structure and Class Distribution by Partner Type

To examine measurement invariance in the latent class structure across partner type, I used LCA with grouping variables (Lanza et al., 2007). Comparing the G² statistics of the unconstrained and constrained models determined that the latent class structure did not vary by partner type ($\chi^2 (20) = 12.78, p = .11$). Put simply, the same four classes existed for participants with casual partners and those with romantic partners.

To examine the distribution of class membership by relationship status, I used a chi-square test with partner type and latent class as variables. The test revealed a significant difference in the likelihood of class membership according to partner type ($\chi^2 (3) = 29.40, p < .001$). 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 than individuals in the Kissing Only ($\chi^2 (1) = 24.15, p < .001$), Kissing and Touching ($\chi^2 (1) = 21.89, p < .001$), and Oral and Penetrative Only ($\chi^2 (1) = 7.03, p < .01$) classes were.
Table 4. Latent Class Membership by Partner Type

<table>
<thead>
<tr>
<th></th>
<th>Nonromantic</th>
<th>Romantic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kissing Only</td>
<td>29 (35%)</td>
<td>35 (19%)</td>
</tr>
<tr>
<td>Kissing and Touching</td>
<td>39 (47%)</td>
<td>57 (31%)</td>
</tr>
<tr>
<td>All Behaviors</td>
<td>12 (14%)</td>
<td>91 (49%)</td>
</tr>
<tr>
<td>Oral and Penetrative Only</td>
<td>3 (4%)</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>186</td>
</tr>
</tbody>
</table>

n(%) of participants with nonromantic partners, n(%) of romantic partners in each class

**Discussion**

This project examined the patterns of sexual behaviors that exist in a sample of college students, building on previous work by incorporating a range of sexual behaviors and by examining differences by gender and partner type in what types of classes exist, and the proportion of people who belong to each class. Four latent classes of sexual behavior were found, with patterns ranging from kissing only to all assessed behaviors. Although the same types of classes were found for men and women and for those with romantic and nonromantic partners, the likelihood of class membership varied across gender and partner type. These results provide insight into the nature of sexual behaviors in emerging adulthood, and are useful from both developmental and prevention perspectives.

**Oral and Penetrative Sex.**

The latent class solution identified oral and penetrative sex as linked behaviors. Although prior studies have found that oral and penetrative sex have distinct connotations for pleasure and intimacy (Bay-Cheng & Fava, 2011; Chambers, 2007; Cornell & Halpern-Felsher, 2006; Halpern-Felsher, 2008), sexual repertoires were characterized by both behaviors or neither. The finding that oral and penetrative sex typically co-occur reinforces the holistic idea that, although these behaviors have distinct meanings, the subjective experiences of oral and penetrative sex are derived from their relation to one another. The co-occurrence of oral and penetrative sex in
college students is consistent with the developmental literature, which has found that oral sex typically emerges within six months of penetrative sex (Lindberg et al., 2008). This project’s findings confirm that oral and penetrative sex continue to jointly define sexual repertoires after the initiation of these behaviors.

Findings regarding oral and penetrative sex are also important because of the implications of these behaviors for sexual risk. Adolescents perceive oral sex to be less risky than vaginal sex (Halpern-Felsher et al., 2005), and some evidence indicates that adolescents use oral sex as an alternative to initiating vaginal sex in order to reduce health risks while maintaining intimacy (Cornell & Halpern-Felsher, 2006). Interestingly, in our sample, no classes were characterized by a high likelihood of oral sex and a low likelihood of penetrative sex. This finding suggests that college students do not use oral sex as a harm reduction strategy after they have initiated penetrative sex. Rather, oral sex is used as a complementary behavior to penetrative sex. Because most individuals who are sexually active engage in multiple behaviors that may confer health risk, research and prevention programs that focus solely on penetrative sex (or only oral sex, although this is not common) neglect a key component of college students’ sexual repertoires. Researchers who work from a risk framework should focus on how both oral and penetrative sex correspond to sexual health outcomes, and how emerging adults navigate both of these behaviors in terms of safety. Halpern-Felsher et al. (2005) provided a base for examining oral and penetrative sex together, but much work remains in order to understand how these behaviors interact in conferring risk. Prevention scientists should consider the co-occurrence of oral and penetrative sex when addressing safer sex behaviors; programs that incorporate both oral and penetrative sex will likely be more effective than those that only address one of these behaviors.

**Kissing and Touching**
Unlike oral and penetrative sex, kissing and touching pose virtually no risk to physical health. The emergence of Kissing Only and Kissing and Touching classes, which comprised 25% and 30% of the sample, respectively, demonstrates that sexual repertoires vary widely in their riskiness, and that a substantial proportion of college students engage in sexual behaviors that involve little to no health risk. Acknowledging the prevalence of kissing-only and kissing/touching sexual interactions and incorporating these behaviors into future studies of sexual behaviors can help balance frameworks of sexual risk-taking and normative sexual development, which is a key challenge for researchers who study adolescent and emerging adult sexuality (Calzo, 2013; Tolman & Mclelland, 2011).

In addition to their risk implications, kissing and touching may also differ from oral and penetrative sex in their relational significance. Although the subjective meanings of sexual touching have not been explored, kissing holds connotations of relationship maintenance and partner assessment (Wlodarski & Dunbar, 2013). Because of the distinctive significance of kissing, sexual behaviors may take on different meanings when kissing is present versus absent. The absence of kissing and touching in one latent class was noteworthy. A small class emerged that, during the two weeks assessed, 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 those who are sexually active. The absence of kissing may connote a lack of affection or partner satisfaction in these relationships. Prior research has found that kissing is associated with satisfaction with both romantic relationships and nonromantic sexual encounters (Paul & Hayes, 2002; Welsh et al., 2005), although the subjective experiences of participants were not assessed in the present project.
This project may also bring insight into the subjective meanings of sexual touching, which has received limited attention from researchers. Kissing and Touching emerged as a separate class from those who only kissed and those who engaged in oral/penetrative sex. A 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 sexual risk. The presence of the Kissing and Touching class highlights the possible purposes of sexual touching outside of the context of oral/penetrative sex. Because it confers little health risk, sexual touching may be useful for those who wish to engage in sexual behaviors and avoid the risk of pregnancy and STIs. Alternatively, sexual touching may be an intermediate step between kissing and oral/penetrative sex in sexual relationships, performed in order to assess sexual compatibility with a partner before engaging in more intimate behaviors, or as an intermediate behavior in a progression from kissing to oral/penetrative sex.

It is also important to recognize that about one-third of individuals in the Kissing and Touching class did engage in penetrative sex. This may indicate diversity in the subjective purposes of touching. For example, individuals who engage in touching and penetrative sex, but not oral sex, may perceive their sexual relationships as less intimate than those who engage in all sexual behaviors do, as oral/penetrative sex has been shown to be perceived as less intimate than vaginal sex (Bay-Cheng et al., 2009; Chambers, 2007). In contrast, kissing and touching without oral or penetrative sex may be a harm reduction approach, as discussed in the previous paragraph. Future research should investigate the role of touching in college students’ sexual relationships, including whether it is used as a risk management approach or as an intermediate step before engaging in more advanced sexual behaviors, and how its meanings differ in the presence/absence of oral and penetrative sex.
The Importance of Relationship Context

In addition to providing insight about the interrelated nature of sexual behaviors, this project adds to the literature by examining how sexual behaviors differ for those with romantic versus nonromantic sexual partners. The finding that the same latent classes exist for those with romantic and nonromantic partners suggests that there is nothing qualitatively different about sexual behavior patterns with nonromantic partners than with romantic partners. Prior variable-oriented research comparing sexual behaviors with romantic and nonromantic partners has necessarily assumed that this is the case. However, because the meanings of sexual behaviors are derived from their relation to one another, qualitative differences in the patterns of sexual behavior may reflect differences in the subjective meanings of sexual behaviors in romantic versus nonromantic partnerships. If differences in the types of patterns were found, comparing the prevalence of patterns of sexual behavior or individual sexual behaviors across partner type may not be useful because the behaviors have different subjective meanings for romantic and nonromantic partnerships. Because patterns of behavior are the same, it makes sense to compare sexual behaviors across relationship contexts.

Despite their qualitative similarities, differences in the class distributions for romantic and nonromantic partnerships reveal that there are still distinctions between these two types of partnerships. These differences are relevant to the study of sexual partnerships from risk and normative development perspectives. Although some studies on nonromantic sexual relationships have used a definition that focuses on oral and penetrative sex (e.g. Eshbaugh & Gute, 2008; Fielder & Carey, 2010; Lehmiller et al., 2012; Manning et al., 2006), this project found that those interactions represent the minority of nonromantic partnerships. This finding is consistent with variable-oriented studies, which have found a lower likelihood of oral and
penetrative sex in nonromantic than romantic sexual relationships (Armstrong et al., 2009; Backstrom et al., 2012; Fielder et al., 2013; Furman & Shaffer, 2011; Lehmiller et al., 2012). Although researchers have demonstrated the emotional health risks associated with casual sex, such as increased depression and sexual regret and lower self-esteem, (Eshbaugh & Gute, 2008; Fielder & Carey, 2010), less is known about how kissing and touching with a nonromantic partner is associated with mental health. The predictors and outcomes associated with oral/penetrative nonromantic sexual encounters contribute to a characterization of nonromantic sexual relationships as risky with regard to physical and emotional health. However, these predictors and outcomes may be specific to individuals who engage in oral and penetrative sex, and may not apply to the majority of individuals who only kiss and/or touch their nonromantic sexual partners. In order to address the psychological health risks and benefits of nonromantic sexual encounters, research should take into account differences in sexual behavior.

In contrast to nonromantic partnerships, All Behaviors was the most common class for those with romantic partners, and was significantly more common in romantic partnerships than nonromantic partnerships. Differences in the frequency of patterns of sexual behaviors for those with romantic versus nonromantic partners should inform how we think about sexual risk. Although much attention has been paid to the outcomes of oral and penetrative sex with nonromantic partners (e.g. Grello et al., 2006; Monahan & Lee, 2008), these behaviors are much more common in romantic than nonromantic relationships. The recent research focus on nonromantic sexual partnerships in adolescence and emerging adulthood has advanced scientific understandings of these experiences, but it is necessary to place the results of these studies in context. Not only are college students more likely to have sex with a romantic than a nonromantic partner, they are more likely to be in a romantic relationship than a nonromantic
sexual relationship (Furman & Shaffer, 2011), and they may be less likely to use condoms during sex with romantic than nonromantic partners (Manlove et al., 2007). Because of the differences in the prevalence and sexual behaviors of romantic and nonromantic partnerships, it may be beneficial for prevention scientists to target efforts to minimize sexual health risks to those in romantic relationships.

In addition to their implications for prevention, differences in the patterns of sexual behavior that occur in nonromantic versus romantic sexual relationships should inform how we think about normative sexuality in college students. First, although research has established that nonromantic sexual relationships are normative in emerging adulthood, oral and penetrative sex with nonromantic partners may be less normative.

Second, although this study was cross-sectional in nature, it may provide clues for future researchers about the development of romantic relationships. Although the majority of romantic relationships do not begin with nonromantic sexual encounters (Paik, 2010), some have argued that nonromantic sexual encounters such as hooking up are common ways to identify potential romantic partners (e.g. Bogle, 2008). Additionally, many individuals hope that their nonromantic sexual relationships will progress into romantic relationships (Vanderdrift et al., 2012). The idea that nonromantic sexual relationships are testing grounds for identifying romantic partners may explain the lower frequencies of oral and penetrative sex with nonromantic partners. Some college students may use kissing and touching to assess nonromantic partners’ sexual compatibility or to avoid more intimate sexual behaviors while they decide if the partner would be a good boyfriend or girlfriend. College students also report that they are less likely to engage in oral or penetrative sex with nonromantic partners with whom they hope to form a romantic relationship than partners they do not hope to see again. Individuals may be more conservative in
their sexual behaviors with potential romantic partners in order to avoid making partners think that they are indiscriminate about their sexual activity (Bogle, 2008). Because of the possible link between sexual behavior with nonromantic partners and intentions for a future romantic relationship, future research should examine romantic and nonromantic sexual relationships from a longitudinal perspective that recognizes the dynamic fluctuation of sexual relationships in emerging adulthood.

**Gender and Sexual Behaviors**

A key gender difference that emerged was that only men belonged to the Oral and Penetrative Only class. The finding that only men belonged to the Oral and Penetrative Only class may reflect gender differences in behavioral preferences. Female adolescents and emerging adults are more likely than their male counterparts to report emotional intimacy as a reason to have oral or penetrative sex (Cooper, Shapiro, & Powers, 1998; Cornell & Halpern-Felsher, 2006; Vannier & O’Sullivan, 2012). In the absence of kissing, oral and penetrative sex may lose their associations with intimacy. Because of the lack of intimacy, oral and penetrative sex may be more appealing to men when kissing does not occur. In contrast, women may prefer sexual scenarios that involve both kissing and oral/penetrative sex, consistent with greater intimacy motivations for sex.

An alternative explanation is that these gender differences were due to differences in reporting rather than actual behavior. Gender differences in self-reported sexual behaviors emerge frequently in research (Oliver & Hyde, 1993), which is troubling because partnered behaviors like kissing require both a male and a female partner in heterosexual relationships. Mathematically, there should be similar numbers of men and women who report such behaviors.
The fact that only men belonged to this group is difficult to explain, given that most of the men in this class reported female partners.

**Limitations and Future Research**

This project has several methodological limitations. One limitation is a lack of statistical power due to the small sample, which may have obscured statistically significant differences in the likelihood of class membership. The small sample also created problems in analyzing gender differences, because the small “oral and penetrative only” class was composed entirely of men.

The use of daily diary data in the project is both a strength and a limitation. Daily diary data on sexual behaviors may produce more accurate results because events are fresher in participants’ minds when they are reported. Daily diary data may be especially useful for measuring nonromantic sexual partners, whom an individual may see only once. However, it could be argued that two weeks of daily data are not enough to capture participants’ sexual repertoires. Individuals who have infrequent sexual encounters, as is often the case with nonromantic partners and long-distance romantic relationships, may not be represented in this sample. The same problem exists for infrequently-occurring sexual behaviors. One suggestion for more accurately capturing college students’ sexual repertoires in future studies is to measure behavior over a longer time course.

Studying sexual behaviors over a longer time course also opens the possibility of examining longitudinal change in patterns of sexual behaviors. From this two-week study, it is unclear whether the Kissing Only, Kissing and Touching, and All Behaviors classes represent a developmental progression in sexual behaviors, or whether they are distinct for another reason—for example, Kissing Only and Kissing and Touching may represent risk management approaches to sexual behavior that persist across the college years. Examining longitudinal
change in patterns of sexual behaviors would allow us to further elucidate the associations between multiple sexual behaviors.

This project was a between-person analysis of sexual behaviors. It compared those with only romantic partners to those with only nonromantic partners. As a result of focusing on between-person differences, we excluded participants who had both romantic and nonromantic partners in the two weeks of data collection, and we do not know how individuals’ behavior differs with their romantic partners versus their nonromantic partners. A promising future direction of research is to do a within-person analysis of sexual behavior with romantic and nonromantic partners using multi-level modeling.

Similarly, the cross-sectional nature of this project does not capture the dynamic nature of college students’ sexual relationships. Some nonromantic relationships transition into romantic relationships, and vice versa (Manning et al., 2006; Paik, 2010). As I discussed previously, sexual behaviors may indicate intentions for a future romantic relationship (Bogle, 2008). Future research could examine within-relationship changes in sexual behaviors as partners move into or out of a state of a romantic relationship with each other.

Finally, this project was primarily descriptive in nature. I can only speculate on the functional differences between latent classes. Future research should examine the subjective meanings of behaviors and how they change in the context of other behaviors. For example, how do individuals in the Oral and Penetrative Only class explain why they did not kiss their partners? How are their sexual experiences different from those who engage in kissing in addition to oral and penetrative sex?

Conclusion
Despite its limitations, this project contributes to understandings of the nature of sexual activity in college students. Patterns of behavior were diverse and differed between romantic and nonromantic partnerships. Efforts to understand and prevent health consequences of sexual activity should focus on both oral and penetrative sex, because these behaviors typically co-occur. Prevention efforts may also benefit from targeting individuals in romantic relationships, because they are more likely to have sexual repertoires characterized by oral and penetrative sex. In addition to prevention implications, these findings emphasize the prevalence of kissing and touching, two behaviors that confer virtually no health risk. Patterns characterized by kissing and/or touching without oral and/or penetrative sex were especially common among those with nonromantic sexual partners, which underscores the need to recognize variation in sexual risk in these relationships and to further explore the role of sexual behaviors in explaining variation in mental health outcomes associated with nonromantic sexual partnerships.
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