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Latent Classes of Adolescent Sexual and Romantic Relationship Experiences: Implications for Adult Sexual Health and Relationship Outcomes

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Abstract

Adolescents' sexual and romantic relationship experiences are multidimensional, but often studied as single constructs. Thus, it is not clear how different patterns of sexual and relationship experience may interact to differentially predict later outcomes. In this study we used latent class analysis to model patterns (latent classes) of adolescent sexual and romantic experiences, and then examined how these classes are associated with young adult sexual health and relationship outcomes in data from the National Longitudinal Study of Adolescent to Adult Health. We identified six adolescent relationship classes: No Relationship (33%), Waiting (22%), Intimate (38%), Private (3%), Low Involvement (3%), and Physical (2%). Adolescents in the Waiting and Intimate classes were more likely to have married by young adulthood than those in other classes, and those in the Physical class had a greater number of sexual partners and higher rates of STIs. Some gender differences were found; for example, women in the Low-involvement and Physical classes in adolescence had average or high odds of marriage, whereas men in these classes had relatively low odds of marriage. Our findings identify more and less normative patterns of romantic and sexual experiences in late adolescence, and elucidate associations between adolescent experiences and adult outcomes.

Keywords

adolescence; latent class analysis; sexual behavior; romantic relationships; Add Health

Both adolescent sexual and romantic behaviors are associated with young adult outcomes, including sexually transmitted infections (STIs), marriage and cohabitation (Harden, 2012; Kaestle, Halpern, Miller, & Ford, 2005; Meier & Allen, 2009; Raley, Crissey, & Muller (2007); Sandfordt, Ott, Hirsch, & Santelli, 2008; Teachman, 2003). Researchers have noted the importance of studying sexual behaviors and romantic relationships concurrently (Furman, 2002; Lefkowitz, Gillen, & Vasilenko, 2011), as much of sexual behavior occurs within the context of a relationship (Manning, Longmore, & Giordano, 2000; Leigh, Vanslyke, Hoppe, Rainey, Morrison, & Gillmore, 2008; Vasilenko, Lefkowitz, & Maggs, 2012). However, these two literatures have evolved separately, and although non-relationship sex has been studied with relative frequency, other facets of romantic relationships that may

influence sexual behavior and its outcomes have not been as widely considered (Lefkowitz et al., 2011). Specifically, research on outcomes of adolescent sexual behaviors and romantic relationships often focus on single variables to measure these constructs, an approach that ignores the complexities and heterogeneity of sexual and romantic relationships and the interaction of multiple behaviors (Hipwell, Stepp, Keenan, Chung, & Loeber, 2011; Lefkowitz et al., 2011; Whitaker, Miller, & Clark, 2000). However, the different patterns of sexual and romantic behaviors adolescents experience may impact their future outcome in different ways, necessitating a more thorough understanding of sexual and romantic behavior in a holistic, multidimensional way (Crissey, 2005; Vasilenko, Kugler, Butera, & Lanza, 2015). In this study, we use latent class analysis (LCA) to uncover classes marked by different patterns of adolescent sexual and romantic relationship experiences, and examine how these classes are associated with adult sexual health and relationship outcomes, using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health; Harris, 2011).

Long-Term Outcomes of Adolescent Sexual and Relationship Experiences

Although both sexual and relationship experiences carry some immediate physical and psychological risks (Vasilenko, Lefkowitz, & Welsh, 2014; Welsh, Grello, & Harper, 2003), researchers have also emphasized the important role they play in lifelong romantic and sexual development. For example, adolescent sexual behavior may help adolescents develop skills that are important to their adult sexual functioning and overall well-being (Sandfort et al., 2008). Romantic relationships can be a way for adolescents to explore and learn about sexual behavior and identity, disclosure, commitment, future planning, management of disagreements, and giving and receiving support (Diamond, Savin-Williams, & Dubé, 1999). Thus, romantic relationships and sexual behaviors in adolescence may be important ways adolescents gain knowledge and experience with relationships, which can influence how they approach sexual and romantic relationships later in life.

There are several possible ways in which these adolescent experiences may influence sexual health and relationship outcomes. At the most basic level, adolescents who engage in sexual behavior early may have greater lifetime risk of having multiple partners, and the associated greater risk of acquiring STIs, simply by having a greater period in which to be sexually active during their lifetime (Greenberg, Magder, & Aral, 1992). In addition, early experiences may shape individuals' later behavior by providing them a model for sexual and romantic relationships. Both attachment theory (Ainsworth & Bowlby, 1991) and theories of interactional continuity (Caspi, Bem, & Elder, 1989) emphasize how earlier patterns of behaviors set up models of how individuals' relationships or personal characteristics, and these models shape future behaviors. Although these theories focus primarily on how earlier infant or child experiences influence later relationships, adolescent sexual and romantic experiences may also play a unique role in shaping future expectations about relationships, as they are substantively different from prior relationships with family and friends (Collins, 1997; Laursen & Jensen-Campbell, 1999; Sroufe, Egeland, Carlson, & Collins, 2005). For example, an adolescent could receive positive feedback from their partner for acting in

loving and supportive ways, and thus be more likely to do so in later relationships. The concept of cumulative continuity (Caspi et al., 1989) suggests that early romantic and sexual experiences may indirectly shape future experiences. As an example, sexual behavior could potentially lead to an unplanned pregnancy, which could influence future academic and occupational outcomes (Hofferth, Reid, & Mott, 2001), which are linked to lower odds of marrying (Edin & Reed, 2005).

Research has documented links between adolescent sexual and romantic experiences and young adult relationship and sexual health outcomes. Sexual activity in adolescence is associated with having more romantic relationships and greater odds of both cohabitation and marriage (Meier & Allen, 2009). Early timing of sex is associated with greater odds of cohabitation, a greater number of romantic and sexual partners, higher odds of STI infection, lesser odds of marriage and greater likelihood of divorce, whereas later timing of sex is associated with lesser odds of cohabitation and less relationship dissatisfaction, but increased risk of sexual problems, in young adulthood (Kaestle et al., 2005; Harden, 2012; Teachman, 2003, Sandfordt et al., 2008). Sex within an adolescent romantic relationship is associated with greater odds of both cohabiting and marrying in young adulthood compared to no relationship in late adolescence, whereas non-relationship sex is associated only with greater odds of cohabiting (Raley et al., 2007). Individuals involved in a romantic relationship in late adolescence (11th or 12th grade) were more likely to have married or cohabited in young adulthood (Raley et al., 2007). Being in a steady adolescent relationship predicted greater odds of marriage and fewer relationship partners in young adulthood compared to having multiple or less stable romantic relationships (Meier & Allen, 2009). In addition, adolescents who expressed love in their relationship were more likely to be married by early adulthood (Raley et al., 2007).

Heterogeneity of sexual behavior and romantic relationships

Although research has documented links between adolescent sexual and romantic behaviors and adults outcomes, prior studies generally used single item indicators of these behaviors, such as relationship status or occurrence of sexual intercourse. However, single item measures may not adequately describe the complexities of sexual and relationship behaviors, as there is considerable heterogeneity in both adolescent sexual behaviors and romantic relationships. Sexual behavior is multidimensional, as adolescent may engage in a variety of behaviors (i.e., kissing, genital touching, intercourse) in a number of different relationship contexts (Vasilenko et al., 2015). Romantic relationships can involve differing degrees of passion, intimacy, commitment, social dating activities, conflict, and sexual behaviors (Connolly & McIsaac, 2011). Some behaviors such as holding hands, kissing, and thinking of themselves as a couple are common in adolescent relationships, whereas others, like exchanging gifts and engaging in sexual intercourse, are less common, suggesting the possibility of relationship types marked by different patterns of behavior (O'Sullivan, Cheng, Harris, & Brooks-Gunn, 2007). Some types of relationships and sexual behaviors likely aid in development of relationship skills such as communication or negotiation, and others may be associated with more negative outcomes such as increased depressive symptoms or sexually transmitted infections (STIs). Thus, it is important to examine

multiple dimensions of sexual behavior and romantic relationships to more fully understand their co-occurrence and consequences.

One way to gain a more holistic view of the heterogeneity of sexual behaviors and romantic relationships is to use a person-oriented approach, which aims to discover underlying subtypes of people based on a broad set of characteristics (von Eye & Bergman, 2003). LCA is one such approach, which can use indicators of different aspects of sexual and relationship experiences (e.g., dating, commitment, sexual intercourse) simultaneously to identify key patterns. Relatively few studies have used this approach to study adolescent sexual behavior and romantic relationships together. Several studies have examined latent classes of sexual behavior (Beadnell et al., 2005; Hipwell et al., 2011; Vasilenko, et al., 2015). However, these studies did not examine non-sexual romantic behaviors, and did not emphasize the relationship context of sexual behaviors. Other studies examined patterns of relationship behaviors, including the number of waves a participant reported being in a relationship and the number of relationship partners (Rauer, Petit, Lansford, Bates, & Dodge, 2013) and classes of courtship behaviors (Paik & Woodley, 2012). However, these studies did not include measures of sexual behaviors as indicators. One study with data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) used LCA to examine patterns of adolescent relationships based on multiple behaviors occurring within a relationship, including romantic and sexual activities, how partners were acquainted, and relationship duration (Crissey, 2005). This study identified 5 classes: Serious with Sex, Serious without Sex, Group Oriented, Physically Oriented, and Low Involvement. About 60% of adolescents were in the first two classes, which suggests that the majority of adolescents are in more serious and committed relationships. However, a substantial minority was involved in relationships without indicators of serious commitment, such as telling others they were a couple or saying “I love you.” Thus, a small but growing body of literature suggests the utility of examining the multidimensional nature of sexual and romantic behaviors.

Despite the potential of person-centered methods for examining the complexity of adolescent romantic relationships, there has been very little research on how multidimensional classes of romantic behaviors could be differentially associated with adult relationship outcomes. Crissey’s (2005) study found that adolescents in classes of more serious relationships (both with and without sex) had greater expectations of marrying, and boys in the low-involvement group had lower expectations to marry; however, this study did not examine long-term outcomes such as whether individuals in certain classes were actually more likely to marry by young adulthood. However, with long-term longitudinal data from studies like Add Health and newly developed methods that enable researchers to obtain unbiased estimates of the association between latent classes and distal outcomes (Lanza, Tan, & Bray, 2013), it is possible to estimate how particular patterns of adolescent sexual and romantic behaviors are associated with young adult outcomes. For example, one study using Add Health (Vasilenko et al., 2015) found that for male adolescents, classes marked by riskier patterns of sexual behaviors in adolescence were associated with greater rates of STIs in young adulthood, although this study included little information about romantic experiences. Thus, although research in this area is limited, past research supports the

heterogeneity of adolescent romantic relationships and their possible links to young adult relationship outcomes.

Predictors of romantic and sexual behavior and their outcomes

Gender is an important moderator of adolescents' sexual and romantic behaviors. Although some studies suggest that male and female adolescents engage in romantic behaviors at similar rates (Connelly, Craig, Goldberg, & Pepler, 2004; O'Sullivan et al., 2007), male adolescents engage in sexual intercourse earlier than female adolescents (Zimmer-Gembeck & Helfand, 2008) and male adolescents are more likely to belong to classes marked by riskier sexual behaviors than their female counterparts (Beadnell et al., 2005; Vasilenko et al., 2015). In addition, outcomes of sexual behavior may differ by gender. For example, being in classes marked by riskier sexual behaviors were a better predictor of future STI infection for male compared to female adolescents (Vasilenko, et al., 2015). Thus, understanding both how gender predicts class membership and how outcomes of membership in a particular class may differ by gender is important.

There are a number of other factors which have been found to predict individual romantic and sexual behaviors, and thus may be associated with different classes of behaviors. Rates of engaging in different behaviors differ by race; for example, adolescents in all racial/ethnic groups were more equally likely to express love for their partner, but white adolescents were more likely to tell others they are a couple, and black adolescents were more likely to engage in sexual intercourse (O'Sullivan et al., 2007). Adolescents who use substances, have poorer grades, are less religious and have higher depressive symptoms are more likely to engage in sexual risk behaviors (Zimmer-Gembeck & Helfand, 2008). Similarly, adolescents in romantic relationships are more depressed (Joyner & Udry, 2000). However, less is known about predictors of particular *classes* of sexual and romantic behaviors, and such information is useful in further understanding and characterizing multidimensional patterns of behavior.

Research Aims

In this study, we expand research on classes of adolescent sexual and romantic relationship experiences (Crissey, 2005; Vasilenko et al., 2014) and adolescent predictors of young adult relationship and sexual health outcomes (Kaestle et al., 2005; Harden, 2012; Meier & Allen, 2009; Raley et al., 2007; Teachman, 2003) by examining how classes marked by different patterns of behavior within adolescent relationships differ in their young adult relationship outcomes. We focus on late adolescents (16–18 years old), because relationships at this age are more stable and similar to adult relationships compared to younger adolescent relationships (Connolly & McIsaac, 2011), and thus may be particularly influential in shaping adult relationships. We have two aims:

1. To uncover latent classes of individuals based on their sexual and romantic relationship experiences in late adolescence, and to better understand the composition of these classes by examining a) class prevalence by gender and race/ethnicity and b) how substance use, mental health, school performance, religiosity and prior sexual behavior are associated with these classes.

2. To examine how adolescent class membership is associated with young adult sexual health and relationship outcomes, including number of sexual partners, STIs, marriage, and cohabitation.

Note that because LCA identifies classes based on model fit to a particular set of data, rather than theoretical constructs, we do not have specific hypotheses about the number or nature of latent classes. However, based on prior theories of continuity across relationships (Ainsworth & Bowlby, 1991; Allen & Land, 1999; Caspi et al., 1989), we would expect that classes marked by particular patterns of adolescent behaviors would predict related young adult outcomes. For example, classes marked by stronger commitment (e.g., identifying as a couple, love) may predict marriage, whereas classes characterized by sexual behavior but not commitment may predict a larger number of sexual partners.

Method

Participants and Procedure

Participants are a subsample of individuals from Add Health (see Harris, 2011). Eighty high schools and associated middle schools were part of the original sampling plan, which used a clustered sampling design and survey weights to ensure that the sample was representative of schools in the United States. In-school and in-home interviews were completed in 1994–1995 (Wave I), when participants were in 7th through 12th grade, with follow-up in-home interviews during 1995–1996 (Wave II), 2001–2002 (Wave III) and 2007–2008 (Wave IV). Because patterns of sexual and relationship experiences likely change throughout adolescence, we restricted our analysis to an analytic sample that was relatively homogeneous on age (aged 16, 17 or 18 at Wave I interview). In addition, because of our interest in young adult outcomes, we include only individuals who had data on our outcomes of interest in the Wave IV survey, when they were 28–34 years old. Of the eligible participants in the Wave I sample, 23% did not provide data in Wave IV, and an additional 5% had missing data on at least one outcome. Our resulting sample contained 4,125 individuals (53.7% female, 17.1% Black/African American, 11.6% Hispanic/Latino, 3.2% Asian, 2.0% other race, 1.14% gay, 5.8% bisexual M age at Wave I = 17.4 years, SD = .8; M age at Wave IV = 30.30 years, SD = .9). Wave IV survey weights were used in all analyses in order to make the results more representative of the young adult population of the United States.

Measures

Indicators of latent class membership—Seven indicators are based on questions asked of participants who answered “yes” to the question: “In the last 18 months-since {MONTH, YEAR}-have you had a special romantic relationship with anyone?” at Wave I. About 68% of participants reported at least one relationship. For individuals with more than one relationship (10%), we focused on the first relationship reported by the participant; however, class structure was substantively the same when second relationships were used for these individuals. Participants in a relationship indicated whether or not they engaged in the behavior within the reported relationship. For all relationship-specific indicators we added a third level, Not in a relationship. This allowed us to draw comparisons between individuals

who were not in a relationship and those in various types of relationships, and enabled us to retain the full sample and apply survey weights to ensure the representativeness of results. The items selected as indicators are either theoretically important components of adolescent relationships or have been shown to predict adult outcomes in variable-oriented analyses (Brown, 1999; Connolly, Craig, Goldberg, & Pepler, 2004; Meier & Allen, 2009; Raley et al., 2007). Group dating is drawn from the item, “We went out together in a group.” Dyadic dating is from one item, “We went out together alone.” Considered a couple was drawn from two items, “I told other people that we were a couple” and “We thought of ourselves as a couple”; participants were coded “yes” if they reported endorsed either item. Similarly, Said “I Love You” indicated whether a participant said “yes” to either “I told my partner that I loved him or her” or “My partner told me that he or she loved me.” Light physical contact measured whether an individual had kissed or held hands with their partner, whereas Touching indicates whether participants “touched each other under our clothing or with no clothes on” or “We touched each other’s genitals (private parts).” Sexual intercourse indicates whether a participant reported vaginal intercourse with the romantic partner. In addition, one indicator, non-relationship sex, indicates whether an individual reported having sex in the past 18 months with someone who was not a romantic partner; this question was asked to all participants, regardless of relationship status.

Correlates of class membership—We examined group differences in, and behavioral predictors of, class membership, with these covariates drawn from Wave I. Demographic covariates included gender and race/ethnicity (White, Black, Hispanic and other). Behavioral predictors included any heavy episodic drinking in the past year (5 or more drinks on a given occasion; reported by 37%) and any marijuana use in the past year (reported by 18%). Depressive symptoms was measured by a 19-item scale based on the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Each item was rated on a scale of 0–4 (*strongly disagree* to *strongly agree*), and we used the mean of responses to all items ($M = 0.68$, $SD = 0.48$). Religiosity was a measure of how often participants had attended religious services in the past year. This item was measured on a four-point scale from *Once a week or more* to *Never*. We recoded this item so higher scores indicated higher religiosity ($M = 2.62$, $SD = 1.19$). Grades is the mean of a students’ self-reported grades in the past year, rated on a 4-point scale. We recoded this item so higher number indicated better grades (4 = *A*, 1 = *D or F*; $M = 2.85$, $SD = .75$). Early sex is a dichotomous measure of whether or not an individual engaged in sexual behavior prior to age 15 (reported by 17%), a cutoff that has been used in prior Add Health studies (Meier, 2007; Spriggs & Halpern, 2008). All continuous variables were standardized to facilitate interpretation.

Adult outcomes—We assessed associations between class membership and four adult (Wave IV) outcomes. Lifetime number of partners indicates how many partners a participant reported having vaginal sex with in their lifetime ($M = 12.21$, $SD = 23.19$). Lifetime STI indicates whether a participants reported having any of 9 STIs (chlamydia, gonorrhea, trichomoniasis, syphilis, genital herpes, genital warts, human papilloma virus, pelvic inflammatory disease, HIV/AIDS) in their lifetime (24% reported an STI in their lifetime). Marriage indicates whether participants report having ever been married (60% had been

married). Cohabitation measures whether an individual lived with any romantic partner they had not married (28% had cohabited).

Statistical Analyses

Our analysis proceeded in three stages. First, we modeled classes based on eight indicators of adolescent sexual and romantic relationship experiences using PROC LCA in SAS (Lanza, Collins, Lemmon, & Schafer, 2007; Lanza, Dziak, Huang, Wagner, & Collins, 2015). We selected the model with the optimal number of latent classes based on information criteria (AIC and BIC) and interpretability. Next, we examined prevalence of class membership by gender and race/ethnicity using LCA with grouping variables, and then used LCA with covariates to examine predictors of class membership (Collins & Lanza, 2010). Finally, we assessed how adolescent class membership predicted young adult relationship outcomes, as well as gender differences in these associations, using the SAS macro LCA_Distal (Yang, Tan, Lanza, & Wagner, 2012), a model-based approach that provides less biased estimates of associations between class membership and outcomes compared to standard approaches (Lanza, et al., 2013). Marriage, cohabitation, and STI models were treated as dichotomous outcomes, and number of partners was treated as a count outcome.

Results

We fit models with one through eight classes (Table 1). The AIC indicated a six-class model, and the BIC indicated a four-class model. Upon comparing the interpretability of the models, we chose the six-class model, as it captured additional meaningful patterns of behaviors (Table 2). The first class, No Relationship (33% of the total sample), comprises participants who did not report a relationship in the past 18 months, and thus did not complete any of the relationship items; however, 14% of these individuals did engage in non-relationship sex. The Waiting class (22%) had a high probability of engaging in all relationship behaviors, with two exceptions; they were almost equally likely to have or have not engaged in touching, and almost universally did not engage in sexual intercourse. The Intimate class (38%) had high probabilities of all relationship behaviors. The Private class (3%) was similar to the Intimate class, with the exception of having a low probability of reporting both group and dyadic dating. A fifth class, Low-involvement (3%), did not have a high probability of engaging in any relationship behaviors; adolescents in this class may have engaged in dating or considered themselves a couple, but were very unlikely to have said “I love you” or engaged in touching or sex. Finally, the Physical class (2%) includes adolescents who were unlikely to consider themselves a couple or say “I love you”, but were very likely to engage in light physical contact and touching, with 51% reporting sexual intercourse. No class was marked by a high probability of non-relationship sex; however, nearly half of individuals in the classes marked by higher probabilities of sexual intercourse within a relationship (Intimate, Private and Physical) had non-relationship sex.

Table 3 shows the prevalence of membership in each latent class by gender and race/ethnicity. Male adolescents were more likely to report no relationship, whereas female adolescents were more likely to be in the Intimate class. Compared to other races, white

adolescents and those reporting another ethnicity were less likely to be in the No Relationship class, and white adolescents were more likely to be in the Waiting and Intimate classes. Black adolescents were less likely than other races to be in the Waiting class, and were much more likely to be in the Private class (16% of black adolescents). Hispanic and Asian adolescents had high rates of being in the No Relationship class.

Next, we introduced covariates of latent class membership (Table 4). Intimate, the largest class among adolescents in a relationship, was specified as the reference group; results indicate whether the probability of being in a particular class compared to the Intimate class differed based on the covariate. Both the No Relationship and Waiting classes differed from the Intimate class on most covariates. Adolescents who did not use substances, were less depressed or more religious, or had not engaged in early sex were more likely to be in both of these classes compared to the Intimate class. Adolescents with higher grades were more likely to be in the Waiting class, and were less likely to be in the Private class. Finally, adolescents reporting heavy episodic drinking or marijuana use were more likely to be in the Physical than the Intimate class.

Finally, we examined associations between class membership and young adult relationship and sexual health outcomes. Overall, class membership was a significant predictor of lifetime sexual partners ($p < .0001$) and lifetime STI ($p < .0001$). Membership in any class without sexual behavior (No Relationship, Waiting and Low-involvement) was generally associated with a smaller than average number of partners, whereas membership in a class marked by sexual behavior (Intimate, Private and Physical) was associated with more partners than average (Figure 1). Similar patterns were observed for lifetime STI; adolescents in the Intimate and Physical classes had a greater than average probability of contracting an STI in their lifetime. Male adolescents in the Physical class were at particularly high risk of these young adult outcomes; they had an average of about 23 sexual partners (compared to a male average of 14) and over 60% probability of contracting an STI (compared to a male average of about 12%). Patterns were relatively similar by gender, with one exception; women in the Low-Involvement class as adolescents had a lower than average number of partners and low rates of STIs, whereas men in this class had close to an average number of partners and rates of STIs.

Class membership was also a significant overall predictor of both marriage ($p < .001$) and cohabitation ($p < .05$). In general, individuals in the Waiting and Intimate classes were more likely to have married, whereas those in the Private, No Relationship and Low-Involvement classes were less likely to have married (Figure 2). Gender moderated these effects. Women in the Physical class as adolescents had a higher than average probability of marriage, whereas men in this class had lower than average probability of marriage. For individuals in any class in adolescence, women were more likely to have married than men, with one exception; men in the Private class as adolescents were more likely to have married by young adulthood than women in the same class. Individuals in the Private and Physical classes had higher probabilities of cohabitation, whereas those in the No Relationship and Waiting classes had lower probabilities (Figure 1). Men in the Low-Involvement class were more likely than average to have cohabited, whereas women in the Low-Involvement class were less likely.

Discussion

In this paper we examined latent classes of late adolescent sexual and romantic experiences among 16–18-year-old adolescents, and how these classes were associated with young adult sexual health and relationship outcomes. We found that about a third of adolescents had not engaged in a romantic relationship in the past 18 months, and those who had a relationship could be described by five latent classes. These classes were similar to those described by Crissey (2005), with one exception: instead of a group dating class, we found a class marked by commitment and sexual behaviors, but not public dating. This difference is likely due to the older age of our sample: group dating may be more normative earlier in adolescence (Connolly & McIsaac, 2011). Although we uncovered distinct classes of behaviors, adolescents were not evenly distributed among these classes. About 60% of adolescents, and nearly 90% of those in relationships, belonged to one of two classes. The largest class was adolescents who reported all relationship behaviors studied, and the next largest class for those in a relationship included all behaviors except genital touching and sexual intercourse. This suggests that there is a normative pattern of relationships among late adolescents, which involves both dating and expressions of love and commitment, and may or may not include sexual behaviors. This is consistent with theories of romantic relationships, which suggests that late adolescence is marked by relationships in which individuals become more emotionally connected to their romantic partner than they were at earlier ages (Connolly & McIsaac, 2011).

Although the two largest relationship classes were similar in terms of dating patterns and commitment, they differed on every baseline covariate analyzed. These findings are also consistent with research that suggests that sexually active adolescents differ from those who have not had sex on factors including race/ethnicity, socio-economic status, substance use, depressive symptoms, religiosity and educational factors (Zimmer-Gembeck & Helfand, 2008). Despite these differences during adolescence, these classes looked relatively similar on adult relationship status outcomes. For example, both had high rates of marriage and relatively low rates of cohabitation. However, individuals in the Waiting class as adolescents had fewer lifetime sexual partners and lesser odds of contracting an STI. This suggests some long-term advantages of abstaining from sex as an adolescent. However, these associations may be due to third variables, such as demographic characteristics or personality, and future work in this area is merited.

Although our results clearly demonstrate patterns of normative behaviors in adolescent relationships, our LCA approach also allowed us to find evidence for less typical patterns of behaviors and their future outcomes. First, in both this study and other research (Crissey, 2005), a class emerged that was comprised of individuals who reported being in a relationship but had a low probability of engaging in any particular romantic or sexual behaviors. Individuals in this Low Involvement class in adolescence have lower rates of marriage than those in the Waiting and Intimate classes, and also report relatively few sex partners. This suggests that their dating, sexual experiences and union formation may be delayed due to not having a traditional romantic relationship in late adolescence. Another small class, Private, was similar to the Intimate class, but with a much lesser likelihood of going on dates, particularly group dates. Outcomes of the Private class indicate a lesser

likelihood of marrying, greater likelihood of cohabiting, and a greater number of lifetime sexual partners. Individuals in the Private class are more likely to be Black; outcomes of this class parallel racial/ethnic differences in relationship outcomes such as marriage (Teachman, Tedrow, & Crowder, 2000), and suggest the possibility of racial or ethnic differences in norms about the social aspects of romantic relationships. Finally, a third small class, Physical, was marked by a low likelihood of reporting love or identifying as a couple, and was associated with concurrent problem behaviors. These individuals had a higher number of partners in young adulthood and higher rates of sexually transmitted infections. These findings suggest that involvement in an adolescent relationship that involves sexual behaviors without commitment or love may be associated with negative relationship and health outcomes in adulthood.

Finally, consistent with past research (Carver et al., 2003), about one-third of adolescents reported no relationship in the past 18 months. In adolescence, these individuals look similar to those in the Waiting class on most covariates, and these two classes are also similar on measures of sexual health in adulthood. However, they were less likely to have married by the young adult interview. This suggests that adolescents who were not in a relationship may marry later than similar individuals in a romantic relationship, but do not experience other negative relationship outcomes compared to other groups. This lesser likelihood of marriage in young adulthood suggests that these individuals may be less oriented toward relationships in both adolescence and young adulthood. It is also possible that these individuals get used to being single, or see benefits of this status, and thus their earlier behaviors influence their later decisions.

One difference between the latent class models in this study and prior research (e.g. Crissey, 2005) is that we included an indicator of non-relationship sex in addition to the variables assessing behaviors within relationship. However, although about a quarter of participants reported non-relationship sex in the past year, there was no class that consisted solely of non-relationship sexual intercourse, and there was no class in which individuals had a more than 50% probability of engaging in non-relationship sex. Instead, nearly half of individuals in the three classes marked by intercourse and genital touching within a relationship reported non-relationship sex in the past 18 months. This suggests that adolescents are unlikely to engage in solely non-relationship sexual behavior, but also that individuals who have sex in romantic relationships are also likely to have sex outside of a relationship at some point. This is consistent with prior work (Grello, Welsh, & Harper, 2006; Manning, Longmore, & Giordano, 2005) suggesting that instances of non-relationship sex are relatively common among adolescents. Thus, programs focusing on sexual risk behavior should address risks and preventive strategies relevant to both relationship and non-relationship sexual behaviors for all adolescents.

As a whole, these findings provide some evidence for continuities in relationships from adolescence to young adulthood. Individuals in classes marked by love, commitment, and social dating were more likely to marry and less likely to cohabit, suggesting that these individuals may value close relationships and the importance of conventional social ties in both adolescence and young adulthood. Individuals who were not sexually active in this adolescent relationship had fewer sexual partners and lesser odds of STIs in young

adulthood. These continuities may exist for several reasons. First, individuals may learn about relational styles in an early relationship and carry these over to later relationships (Ainsworth & Bowlby, 1991). Thus, early relationship behaviors are reinforced, and thus similar behaviors could persist in young adulthood. Second, third variables, such as personality or attitudes, may influence both adolescent and young adult relationships. For example, an individual may be less sociable generally, which makes them less interested in a committed relationship in both adolescence and young adulthood. Finally, adolescent relationships may indirectly predict young adult relationships through other factors (Caspi et al., 1989). For example, sexual behaviors in a relationship may be associated with lower educational attainment or pregnancy, which could affect future relationships (Edin & Reed, 2005; Hofferth et al., 2001). Because these diverse pathways are all supported by these results, we cannot say decisively whether patterns of associations are direct, mediated through other pathways, or a result of third variables. Thus, this study suggests that adolescent romantic relationship class membership is a marker for young adult relationship outcomes, and future research can determine more precise pathways that could account for this association. New techniques for causal inference with latent class exposures are beginning to appear in the methodological literature (e.g., Kang & Schafer, 2010; Schuler, Leoutsakos, & Stuart, 2014) and may be a means to better understand the process underlying these associations in the future. Regardless of the exact causal pathways, this study suggest that adolescent sexual and romantic behaviors may serve as markers for predicting young adult outcomes. LCA can be a means of identifying individuals at greater risk for the purpose of adaptive or tailored interventions (Lanza & Rhoades, 2013), and information from this study could be used to identify individuals who could use additional sessions on relationship skills or safe sexual behavior in a sexuality education program.

We found a number of gender differences in these associations. Female adolescents were more likely to report the most typical pattern of behavior (Intimate class), whereas men were overrepresented in the No Relationship and Low-Involvement classes. This could be due to female adolescents having older partners, and thus engaging in more serious relationships at a younger age. It is also possible that male and female adolescents interpret and report on their relationships differently. Women are socialized to view relationships as more important than men are (Rose & Rudolph, 2006) and thus may feel a desirability bias toward reporting more serious relationships. Future studies could use dyadic data to better understand how male and female adolescents interpret the same relationship. In addition, we found differences in the links between latent class membership and young adult outcomes. For example, although male and female adolescents were equally likely to be in the physical class, men in the physical class as adolescents reported low rates of marriage, whereas women had higher than average rates of marriage. Male and female adolescents could have different reasons for engaging in this type of physical and social relationship without emotional commitment. Due to sexual double standards that discourage sexual behavior and stress the importance of relationships for women (Crawford & Popp, 2003), female adolescents may engage in sexual behaviors to strengthen intimacy, whereas men may be more motivated to engage in purely sexual relationships. Future research, including studies of dyads, is necessary to better understand these gender differences.

This study has several limitations. As with all longitudinal studies, there was some attrition that could have influenced the results, although we attempted to minimize these issues by using survey weights. The measures may miss some important facets of relationship and sexual experiences, both in adolescence and young adulthood. For example, we have no measures of relationship quality, communication or conflict in adolescence, and have limited measures of sexual behaviors outside of a relationship. The adolescent measures represent a snapshot in time. We only examined one adolescent relationship, which may not be representative of their entire relationship and sexual experiences. In addition, it is possible that some adolescents were involved in relationships or sexual behaviors shortly after their data were collected, and these relationship could have impacted their adult outcomes. We did not take into account the timing of events, only whether they occurred; future research could gain a better understanding of how adolescent behaviors are associated with future marriage and cohabitation by examining their association with early, normative and later timing of marriage. In addition, our measure of STIs was based on self-report, and thus we do not have information about undiagnosed STIs. We included lifetime measures of our sexual health outcomes, and thus we do not have information about when individuals had sex with these partners or acquired an STI, and cannot rule out if they occurred prior to the adolescent relationships studied. Because the number of sexual minority adolescents in the sample was relatively small, we did not examine differences by sexual orientation. Future research should examine patterns of sexual and romantic experiences among sexual minority adolescents, as well as further examining relationship patterns among racial/ethnic minority adolescents. Finally, we only examined relationships and sexual experiences in late adolescence; future research could examine differences in class membership throughout different stages of adolescence.

Despite these limitations, this study contributes to the literature in several ways. It used a nationally representative, longitudinal sample, which enabled us to examine class differences by race/ethnicity and to see how adolescent behaviors predict young adult outcomes. We used a methodological approach that examine sexual and romantic experiences and their outcomes holistically, which enabled us to identify key patterns of co-occurrence of sexual and romantic experiences in ways that are difficult with traditional analytic approaches. For example, we found that the combination of being in a relationship and engaging in sexual behaviors but not being in love was associated with poorer relationship outcomes, a nuanced finding that was impossible in studies that focused on only whether relationships or intercourse occurred. Our findings suggest that there are two normative relationship pattern for adolescents; both are marked by both social dating and commitment, with one including and one not including sexual behavior. A smaller number of adolescents engage in atypical relationships, and these individuals are more likely to be racial/ethnic minorities. We also found that class membership in adolescence predicted young adult outcomes. Although results are nuanced, adolescents in physical relationships without love or commitment have poorer sexual health and relationship outcomes, whereas adolescents in committed relationships who have not had sex generally have healthy adult outcomes.

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Figure 1.

Estimated lifetime number of sexual partners and proportion of lifetime STI infection in young adulthood, stratified by adolescent romantic relationship class. No Rel. = No Relationship, Low-Inv. = Low Involvement. Horizontal lines mark the gender-specific average on each outcome.

Figure 2.

Estimated proportions ever married and ever cohabited with a non-marital partner in young adulthood, stratified by adolescent romantic relationship class. No Rel. = No Relationship; Low-Inv. = Low Involvement. Horizontal lines mark the gender-specific average on each outcome.

Table 1

Fit Statistics for LCA Models of Adolescent Sexual and Relationship Experiences with One through Eight Latent Classes

# of Classes	G ²	AIC	BIC	CAIC	aBIC	Entropy
1	34111.58	34141.58	34236.46	34251.45	34188.79	1.00
2	2564.90	2626.90	2822.97	2853.97	2724.46	1.00
3	930.05	1024.05	1321.31	1368.31	1171.96	0.89
4	433.06	559.06	957.51	1020.51	757.32	0.91
5	300.86	458.86	958.50	1037.50	707.47	0.92
6	209.13	399.13	999.97	1094.97	698.10	0.93
7	178.84	400.84	1102.87	1213.87	750.16	0.92
8	167.65	421.65	1224.87	1351.87	821.32	0.92

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; CAIC = consistent Akaike information criterion; aBIC = adjusted Bayesian information criterion.

Table 2

Latent Class Prevalence and Item-Response Probabilities for Six Class Model of Sexual and Relationship Experiences

Indicators	Item-Response Probabilities					
	Class 1: No Relationship 33%	Class 2: Waiting 22%	Class 3: Intimate 38%	Class 4: Private 3%	Class 5: Low-Involvement 3%	Class 6: Physical 2%
Group dating						
Yes	0.00	0.86	0.86	0.00	0.45	0.49
No	0.00	0.14	0.14	1.00	0.55	0.51
No relationship	1.00	0.00	0.00	0.00	0.00	0.00
Dyadic dating						
Yes	0.00	0.95	0.99	0.30	0.50	0.64
No	0.00	0.05	0.00	0.70	0.50	0.36
No relationship	1.00	0.00	0.00	0.00	0.00	0.00
Considered a couple						
Yes	0.00	0.97	0.99	0.89	0.50	0.26
No	0.00	0.03	0.01	0.11	0.50	0.74
No relationship	1.00	0.00	0.00	0.00	0.00	0.00
Said, "I love you"						
Yes	0.00	0.77	0.96	1.00	0.26	0.13
No	0.00	0.23	0.04	0.00	0.74	0.87
No relationship	1.00	0.00	0.00	0.00	0.00	0.00
Early physical activity						
Yes	0.00	0.99	1.00	0.92	0.38	0.87
No	0.00	0.01	0.00	0.08	0.62	0.13
No relationship	1.00	0.00	0.00	0.00	0.00	0.00
Touching						
Yes	0.00	0.52	0.99	0.81	0.02	1.0
No	0.00	0.48	0.01	0.19	0.98	0.00
No relationship	1.00	0.00	0.00	0.00	0.00	0.00
Sexual intercourse						
Yes	0.00	0.01	0.93	0.65	0.06	0.51
No	0.00	0.99	0.07	0.35	0.94	0.49

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		Class 1: No Relationship 33%	Class 2: Waiting 22%	Class 3: Intimate 38%	Class 4: Private 3%	Class 5: Low-Involvement 3%	Class 6: Physical 2%
Indicators		<i>Item-Response Probabilities</i>					
Non-relationship sex	No relationship	1.00	0.00	0.00	0.00	0.00	0.00
	Yes	0.14	0.10	0.43	0.43	0.29	0.42
	No	0.86	0.90	0.57	0.55	0.71	0.58

Table 3
Sexual and Relationship Experiences Latent Class Prevalence as a Function of Gender and Race/ethnicity

	Class 1: No Relationship	Class 2: Waiting	Class 3: Intimate	Class 4: Private	Class 5: Low-Involvement	Class 6: Physical
Gender						
Male	38%	23%	31%	3%	3%	2%
Female	29%	23%	42%	2%	2%	2%
Race/ethnicity						
White	30%	26%	36%	3%	3%	4%
Black	37%	11%	30%	16%	3%	3%
Hispanic	40%	22%	27%	6%	4%	2%
Asian	51%	18%	29%	1%	0%	1%
Other	30%	21%	29%	15%	4%	2%

Odds Ratios and Confidence Intervals Showing Associations Between Risk and Protective Factors and Class Membership

Table 4

	Class 1: No Relationship	Class 2: Waiting	Class 3: Intimate	Class 4: Private	Class 5: Low-Involvement	Class 6: Physical	Change in 2* LL
Heavy episodic drinking	0.28* [0.23–0.34]	0.27* [0.19–0.38]	REF	0.64 [0.33–1.24]	0.61 [0.34–1.07]	2.55* [1.16–5.58]	130.09***
Marijuana use	0.34* [0.26–0.44]	0.19* [0.11–0.32]	REF	0.84 [0.33–2.13]	0.82 [0.41–1.65]	2.76* [1.46–5.21]	84.60***
Depression	0.84* [0.77–0.92]	0.75* [0.67–0.85]	REF	1.05 [0.77–1.43]	1.20 [0.59–1.71]	1.00 [0.58–1.71]	18.62**
Religiosity	1.34* [1.22–1.47]	1.61* [1.43–1.82]	REF	1.05 [0.77–1.43]	1.26 [0.96–1.65]	0.82 [0.58–1.15]	85.19***
Grades	1.17 [0.98–1.40]	1.40* [1.11–1.76]	REF	0.49* [0.36–67]	0.88 [0.63–1.24]	0.67 [0.32–1.38]	108.43***
Early Sex	0.24* [0.18–.32]	0.10* [.06–.16]	REF	2.47* [1.17–5.21]	0.63 [.32–.1.25]	2.05 [0.85–4.91]	224.74***

Note: LL = log likelihood; REF = reference class; Odds ratios reported in brackets.

* $p < .05$,

** $p < .01$,

*** $p < .001$.