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Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



The Journal of Sex Research

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/hjsr20>

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Published online: 20 Aug 2014.

To cite this article: Arielle R. Deutsch & Wendy S. Slutske (2014): A Noncausal Relation Between Casual Sex in Adolescence and Early Adult Depression and Suicidal Ideation: A Longitudinal Discordant Twin Study, The Journal of Sex Research, DOI: [10.1080/00224499.2014.942413](https://doi.org/10.1080/00224499.2014.942413)

To link to this article: <http://dx.doi.org/10.1080/00224499.2014.942413>

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A Noncausal Relation Between Casual Sex in Adolescence and Early Adult Depression and Suicidal Ideation: A Longitudinal Discordant Twin Study

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Research on relations between casual sex and mental health is inconclusive; while some studies indicate casual sex may lead to more negative mental health (e.g., depression), other studies report no such relationship. Using a genetically informed approach, this study examined whether earlier casual sex (i.e., ever engaging in casual sex and number of casual sex partners) in adolescence has a causal influence on later mental health in young adulthood (i.e., depressive symptoms and suicidal ideation), as well as the reverse relationship (adolescent negative mental health on young adult casual sex) by exploiting the quasi-experimental nature of discordant-twin models. Multilevel models that measured within-twin and between-twin pair effects of adolescent casual sex were estimated, using 714 twins (357 twin pairs) from the sibling subsample of the National Longitudinal Study of Adolescent Health (Add Health). Results indicated that there was no causal relationship between casual sex in adolescence and higher levels of depressive symptoms or suicidal ideation in young adulthood, and these effects did not differ by gender. There were also no causal relations between adolescent depressive symptoms or suicidal ideation and casual sexual experience in young adulthood. Implications for ways to increase scientific rigor by using different methods (e.g., genetically informed analyses) are discussed.

Casual sexual behavior, that is, sexual behavior outside of a committed relationship (e.g., a broad spectrum of experiences including hookups, friends with benefits, casual dating partners), has become increasingly common among young people; studies have reported prevalences from as low as 14% (Eisenberg, Ackard, Resnick, & Neumark-Sztainer, 2009) to as high as 64% to 81% (Garcia & Reiber, 2008; Reiber & Garcia, 2010) in young adult samples, and as high as 70% to 85% in samples of adolescents (Grello, Welsh, Harper, & Dickson, 2003). There is a growing body of literature on the predictors of casual sexual behavior and the potential effects that casual sexual experiences may have on youth. Of particular interest to researchers are the negative health consequences, both physical (e.g., sexually transmitted infections [STIs]) and mental (negative psychological well-being). Casual sex is typically linked to risky sexual behavior and higher likelihoods of consequences such as STIs (e.g., Rogers, Miller, Miller, Zenilman, & Turner, 2002; van Empelen & Kok, 2006). However, the link between casual sex and negative psychological well-being is less straightforward, as

discussed in the next section, and a more rigorous test of the relationship between casual sexual behavior and mental health is needed.

Relations Between Casual Sex and Mental Health

The small body of research examining relations between casual sexual behavior and mental health is fairly inconclusive. Some cross-sectional studies report relations between engaging in casual sex in young adult populations and poorer psychological well-being (e.g., anxiety and depression [Bersamin et al., 2014]; depressive symptoms [Grello, Welsh, & Harper, 2006; Mendle, Ferrero, Moore, & Harden, 2013]; and lower self-esteem [Paul, McManus, & Hayes, 2000]). Others report no relationship between casual sex and poorer psychological well-being (e.g., depressive symptoms [Eisenberg et al., 2009; Monahan & Lee, 2008]; emotional reactions to hooking up [Owen, Rhoades, Stanley, & Fincham, 2010]). Longitudinal studies examining casual sex and mental well-being are also mixed. For example, Fielder and Carey (2010) documented that, at least for women, casual sex increased depressive symptoms one year later, although a follow-up study (Fielder, Walsh, Carey, & Carey, 2014) reported no cross-lagged relationship between depressive symptoms and casual sex behavior.

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Still other studies demonstrated that the relation between casual sex and mental health may be dependent on prior mental health (Owen, Fincham, & Moore, 2011) or contextual reasons for having a casual sexual experience (e.g., self-motivated, autonomous reasons versus externally controlled, nonautonomous reasons; Vrangalova, 2014).

While these longitudinal studies examined “general” casual sexual experiences and later psychological well-being, studies examining psychological well-being after specific casual sexual experiences (typically emotional reactions, and not broader negative mental health) are also mixed. Some studies reported the majority of their samples as having positive attitudes toward their most recent casual sexual experience (e.g., Lewis, Granato, Blayney, Lostutter, & Kilmer, 2012), while others documented the majority of their samples reporting having regret after their last casual sexual experience (e.g., Fisher, Worth, Garcia, & Meredith, 2012). However, most of these studies highlight that the sexual experience context (e.g., quality of sexual experience, level of alcohol intoxication) often shapes emotional outcomes after the experience. Given these mixed results in both longitudinal and cross-sectional studies, it is evident that more research is needed to further explore the relation between mental health and casual sex, especially because it appears that directionality (i.e., whether psychological distress leads to casual sex or vice versa) remains unresolved.

The hypothesis that casual sex leads to negative mental health consequences has tenuous theoretical support. The interest in examining this relation seems to stem in part from a broader societal expectation that casual sex is inherently damaging (Eisenberg et al., 2009). For example, Sandberg-Thoma and Kamp Dush (2014) used life course theory to argue that casual sex may be at odds with emerging adults’ desire to form long-term relationships, which in turn may cause depression or suicidal ideation. However, this argument failed to detail how such conflict could lead to decreased mental health. Vrangalova (2014) used self-determination theory to propose how autonomy in casual sexual experiences may be an important moderator for the relation between casual sex and well-being. However, many other studies (e.g., Bersamin et al., 2014; Fielder et al., 2014; Fielder & Carey, 2010; Owen et al., 2011) used previous empirical studies but little theory in proposing this hypothesis. This lack of theoretical foundation increases the difficulty in explaining the mixed findings provided by the overall body of literature.

There is more theoretical rationale for exploring how the relation between casual sexual experiences and mental health may differ by gender. Overall, men report higher rates of casual sex (e.g., Owen et al., 2011; Townsend & Wasserman, 2011). Previous studies indicate that casual sex can lead to higher distress in women than in men (Fielder & Carey, 2010; Grello

et al., 2006), although others have reported no gender differences (Sandberg-Thoma & Kamp Dush, 2014). Researchers theorize that casual sexual experiences may lead to different outcomes for men and women for a variety of reasons. The sexual strategies theory in evolutionary psychology, which details differences in men’s and women’s dating and sexual relationship preferences, proposes that men and women will have different reactions to a casual sexual experience (Bradshaw, Kahn, & Saville, 2010; Garcia & Reiber, 2008). Researchers focusing on social norms propose that, due to the double standard, women will receive more negative social feedback about their casual sexual behavior compared to males (Crawford & Popp, 2003).

Genetically Informed Models of the Relations Between Casual Sex and Mental Health

Both casual sexual behavior and negative mental health indicators (e.g., depression, anxiety, suicidal ideation) are influenced by a variety of genetic and environmental factors. Harden (2014) reviewed the literature on the genetic underpinnings of adolescent sexual behavior and argued that behavior genetic studies provide unique insights into the underlying mechanisms of adolescent sexuality. Behavior genetic studies can also account for potential correlated risk factors between casual sexual behavior and mental health (e.g., genetic influence, familial environment). Discordant-twin modeling is a particularly useful quasi-experimental approach that allows researchers to get closer to inferring causality (McGue, Osler, & Christensen, 2010) by examining whether twins discordant for an “exposure” differ on later outcomes. One previous cross-sectional study using this method has indicated a potential causal relation between casual sex and depressive symptoms, although directionality could not be established (Mendle et al., 2013). When monozygotic twins differ from each other in casual sexual behavior in adolescence, differences in their mental health probably cannot be attributed to genetic confounds. In addition, when monozygotic and dizygotic twins differ from their cotwins in casual sexual behavior, differences in their mental health probably cannot be attributed to their shared familial environment (e.g., socioeconomic status, family structure, family relationships). Finally, multi-level modeling allows for simultaneous examination of within-twin-pair comparisons (Twin A compared to Twin B within a twin pair) and between-twin-pair comparisons (Twin Pair 1 compared to Twin Pair 2). While within-twin-pair comparisons allow for “pulling apart” the unique influence that casual sexual behavior may have on mental health, controlling for shared genetics and family environment, between-twin-pair comparisons allow for examining if there are any latent (unmeasured) genetic or family environment influences

that may be shared by both casual sexual behavior and mental health. That is, if both twins within a twin pair engage in more casual sexual behavior compared to other twin pairs, are they both more likely to have more negative mental health outcomes?

Current Study

The purpose of this study was to extend previous research examining the relation between casual sexual behavior and mental health by using a genetically informed, discordant twin approach. In particular, we used a similar design to Sandberg-Thoma and Kamp Dush (2014), as this allowed us to use the same data set (National Longitudinal Study of Adolescent Health [Add Health]). We expanded on Sandberg-Thoma and Kamp Dush's study in two ways: First, we examined a longitudinal effect of casual sexual experience rather than a cross-sectional effect (i.e., examining predictor and outcome at the same wave of data) by measuring casual sexual behavior in adolescence and negative mental health (specifically depressive symptoms and suicidal ideation, as in Sandberg-Thoma and Kamp Dush) in early adulthood. Second, we used the genetically informed subsample to control for genetic and shared familial environment effects. We examined whether casual sexual behavior (ever having had a casual sexual experience, and number of casual sexual partners) in adolescence had a potentially causal influence on both depressive symptoms and likelihood of suicidal ideation in young adulthood. Conversely, we also tested whether suicidal ideation and depression in adolescence was a potentially causal influence on engaging in casual sex in young adulthood. Finally, as examined in Sandberg-Thoma and Kamp Dush (2014), as well as others (e.g., Bersamin et al., 2014), we tested whether the relations between casual sex and negative mental health differed by gender. Based on previous findings within the casual sexual behavior literature indicating a relation between casual sexual behavior and negative mental well-being, we hypothesized that casual sexual experience in adolescence would be significantly associated with depressive symptoms and suicidal ideation in young adulthood. As in Sandberg-Thoma and Kamp Dush (2014), we also examined the reverse relationship, expecting there to be a significant association between depressive symptoms and suicidal ideation in adolescence, and casual sexual experience in young adulthood. Finally, we also examined whether these relationships were moderated by gender.

Method

Participants

The present analysis drew on data from Waves I and III of the sibling subsample of the in-home sample of Add Health. The Add Health data set is based on a

sample of 80 high schools (and their feeder middle schools) selected with unequal probability, and stratified by enrollment, region, urbanicity, type of school, and racial/ethnic mix to be representative of U.S. schools (Blum et al., 2000). A representative sample of youth in these schools was selected and supplemented with several special subsamples to increase the number of adolescents from particular ethnic groups. Students in grades 7 through 12 at the Wave I in-home survey, collected in 1994–1995, were followed up three times: in 1996 (Wave II), in 2000–2001 (Wave III), and in 2008 (Wave IV). The sibling subsample, which includes 784 monozygotic and dizygotic twin pairs (Harris, Halpern, Smolen, & Haberstick, 2006) at Wave I, was used for this analysis. The study sample was restricted to monozygotic and dizygotic same-sex twin pairs who completed both Wave I and Wave III and had reported no incidence of childhood sexual abuse (see Waldron et al., 2008, for the impact of childhood sexual abuse on genetic influences on sexual behavior). The final sample included 714 twins (357 twin pairs).

Measures

Demographic and control variables. To determine race, adolescents were asked: “What is your race? You may give more than one answer” and “Are you of Hispanic or Latino origin?” Race was coded as White/European American (1), Black/African American (2), Latino/a (3), Asian American (4), Native American (5), and Other (e.g., biracial) (6) to examine a broad (e.g., omnibus test) effect of race. To measure family structure, families with two biological or adoptive parents (coded 1) were contrasted with all other family structures (0). Gender (boys = 1; girls = 2) and age measured in years at Wave I were also included. Financial hardship was measured through parents' responses to three questions about their family's economic circumstances at Wave I: “Last month, did you or any member of your household receive: Aid to Families with Dependent Children? Food stamps? A housing subsidy or public housing?” Each item was coded as 0 (no) or 1 (yes), and the three items were summed to yield a total score ranging from 0 to 3. Zygosity was coded as 0 (monozygotic twins) or 1 (dizygotic twins).

Depressive symptoms. Depressive symptoms were measured at Wave I and Wave III using items from the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977). Questions were included only if they were asked at both Waves I and III; the measure consisted of the sum for nine items (Wave I $\alpha = .78$; Wave III $\alpha = .81$). Participants were asked to indicate how often they had experienced depression symptoms within the past seven days, coded 0 (*never*) to 4 (*every day*), with a higher score indicating higher levels of depression.

Suicidal ideation. Suicidal ideation was measured at Waves I and III with one binary item asking if the participant had seriously thought about committing suicide within the past 12 months, coded as 0 (no) or 1 (yes).

Wave I casual sex behavior. Wave I casual sex behavior was measured with a single item: "Since January 1, 1994, with how many people, not including romantic relationship partners, have you had a sexual relationship?" This item was used to create two variables: a dichotomous casual sex experience variable was coded such that respondents who reported one or more partners were coded as 1 (had casual sexual experience) and those who did not answer this question (if they had previously indicated never having had a sexual relationship with any person), were coded as 0 (no casual sexual experience). This variable was also recoded into a number of casual sexual partners count variable, where participants who reported 1 to 12 partners were coded as such, and those who reported more than 12 partners were coded as having had 12 partners.

Wave III casual sex behavior. Participants were asked to list every romantic and sexual relationship partner over the past five years and were then asked a series of questions about each partner. For every relationship reported, participants were asked if they had had "sexual relations" with this partner (defined as vaginal, anal, or oral sex). Participants were also asked, if they specified this relationship was not a current or former marriage, to best describe the relationship "at the present time." Descriptors were as follows: *Dating partner exclusively*, *Dating partner frequently but not exclusively*, *Dating partner once in a while*, or *Only having sex with partner*. Relationships for which the respondent reported having had sexual relations, where the partner was not a former or current marital partner, and that they described as "only having sex with partner" were then categorized as a "casual sexual relationship." A dichotomous variable was created such that individuals who reported having had at least one casual sexual relationship in the past five years were coded as 1 (had casual sexual experience) and those who did not (both participants who reported no casual sexual relationships and those who reported no relationships at all) were coded as 0. A count variable was also created in which all casual sexual relationships were summed.

Analytic Plan

Multilevel logistic regression models were used to predict the binary Wave III casual sexual experience status and suicidal ideation outcomes, a multilevel negative binomial regression was used to predict the Wave III number of sexual partners, and a multilevel linear regression model was used to predict the Wave

III depressive symptoms outcome. As in Sandberg-Thoma and Kamp Dush (2014), separate models were estimated for the "ever engaged in a casual sexual relationship" and number of casual sexual partner variables, due to high collinearity between the two variables. Models were estimated with Mplus using type twolevel random complex. This allows for multilevel models with random intercepts, accounting for the weighting and clustering of complex data. Multilevel modeling has previously been used as a technique to examine discordant twins (see Deutsch et al., 2013), such that the individual twin (within twin pair/Level 1) is nested within the twin pair (between twin pair/Level 2). Both Level 1 and 2 variances are estimated, along with a random intercept. The interpretation of the Level 1 and 2 parameters depends on the method used to center the Level 1 predictor (Enders & Tofghi, 2007). All models used group-mean centering to examine within-twin and between-twin effects. When the Level 1 predictor is group-mean centered (individual twin casual sexual behavior subtracted by the average casual sexual behavior of the twin pair), the Level 1 and Level 2 predictors represent the direct within-twin-pair (comparison against cotwin) and between-twin-pair (comparison against other twin pairs) effects.

When examining discordant twins, the within-twin (Level 1) effect examines the individual effect (i.e., the unique experience) of the predictor for a twin compared to his or her cotwin. Thus, within twin pairs, if one twin engages in casual sexual relationships in adolescence while his or her cotwin does not, it would be expected, based on the hypotheses, that this twin will have a higher rate of depression or be more likely to report suicidal ideation compared to his or her cotwin in early adulthood. Between twin pairs, if both twins within the twin pair, on average, report more casual sexual experiences in adolescence compared to other twin pairs, it would be expected, based on hypotheses, that both twins within the twin pair, on average, would have higher levels of depression or report more suicidal ideation in early adulthood, compared to other twin pairs. All predictors were examined for potential interactions with zygosity; an interaction with zygosity would indicate that any model effect operates differently for monozygotic and dizygotic twins, indicating that there may be differences in the ways that genes and shared environment explain relations between model variables and outcomes. There were no significant interactions between zygosity and ever having had a casual sexual experience at Wave I for any of the models.

Results

Descriptive Statistics

Table 1 displays means and standard deviations for all variables and percentages for categorical variables, as well as the average discordance (average difference between twins) and percent of concordance (percent of

Table 1. Means and Standard Deviations, or Percentages for Categorical Variables, for All Variables, Average Twin Discordance, and Percentage Concordant for Twin-Pair Comparisons

Variable	Mean (SD)/Percentages for Categorical Variables	Average Twin Discordance	Concordant Twin Pairs (%)
Depressive symptoms Wave I	5.76 (4.06)	3.64	20.83 ^a
Depressive symptoms Wave III	4.54 (4.05)	3.49	34.68 ^a
Had suicidal ideations Wave I	8.94%	N/A	73.76
Had suicidal ideations Wave III	5.71%	N/A	69.93
Had casual partner at Wave I	21.63%	N/A	76.51
Had casual partner at Wave III	16.10%	N/A	76.88
Number of casual partners Wave I	0.43 (1.35)	0.64	61.37
Number of casual partners Wave III	0.36 (1.10)	0.63	65.54
Age	15.54 (1.62)	N/A	N/A
Had sex at Wave I	33.11%	N/A	N/A
Financial hardship	.23 (.59)	N/A	N/A
Gender			
Male	50.34%	N/A	N/A
Female	49.66%	N/A	N/A
Zygosity			
Monozygotic	26.80%	N/A	N/A
Dizygotic	74.20%	N/A	N/A
Family status			
Two parents	57.60%	N/A	N/A
Other	42.40%	N/A	N/A
Race			
European American	57.27%	N/A	N/A
African American	24.24%	N/A	N/A
Latino/a	5.50%	N/A	N/A
Asian American	4.00%	N/A	N/A
Native American	1.50%	N/A	N/A
Biracial/other	7.49%	N/A	N/A

^aConcordance for scoring within the same quartile; quartile defined by full range of scores.

twin pairs that report the same answers) for model variables (depressive symptoms, suicidal ideation, casual sexual experience, and number of casual sexual partners). Table 2 displays correlations between study variables.

Discordant Twin Models

Casual sexual experience. Table 3 displays unstandardized logistic regression coefficients and odds ratios

for predicting having a casual sexual experience in the past five years (i.e., at Wave III) based on Wave I casual sexual experience, depressive symptoms, and suicidal ideation. Contrary to hypotheses, the within-twin (Level 1) effects of suicidal ideation and depressive symptoms were not significant, although the effect of having had a casual sexual experience in adolescence did have a causal effect on having a casual sexual experience in young adulthood. However, the between-twin (Level 2)

Table 2. Correlations Between Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1) Depressive symptoms Wave I	—												
2) Depressive symptoms Wave III	.36*	—											
3) Suicidal thoughts Wave I	.33**	.13**	—										
4) Suicidal thoughts Wave III	.11**	.25**	.11**	—									
5) Casual sexual partner status Wave I	.12**	-.04	.03	-.01	—								
6) Casual sexual partner status Wave III	.02	-.03	.02	.03	.15**	—							
7) Number of casual partners Wave I	.14**	.02	.03	.02	.69**	.08**	—						
8) Number of casual partners Wave III	.02	-.06	.02	.05	.15**	.73**	.08*	—					
9) Age	.02	-.07*	-.01	-.07*	.25**	-.02	.14**	-.01	—				
10) Gender	.16**	.12**	.08*	.01	-.08*	-.09**	-.07*	-.08*	-.07*	—			
11) Zygosity	.01	-.02	.05	.02	.03	-.03	.01	-.01	.07*	-.04	—		
12) Financial hardship	.10**	.09**	.01	.03	-.05	-.01	.01	.01	-.08*	.10**	-.01	—	
13) Family status	-.14**	-.08*	.01	-.02	-.11**	-.03	.09*	-.05	.01	-.05	-.06	-.34**	—

* $p < .05$. ** $p < .01$.

Table 3. *Unstandardized Estimates and Odds Ratios of a Multilevel Logistic Regression Model Predicting Having a Casual Sexual Partner and the Number of Casual Sexual Partners at Wave III*

Variable	Any Casual Sex		Number of Casual Sexual Partners	
	Unstandardized Estimate (95% CI)	Odds Ratio (95% CI)	Unstandardized Estimate (95% CI)	
Gender (ref = male)	−0.31 (−0.85–0.22)	0.73 (0.43–1.25)	−.50 (−0.97–0.01)	
Age	0.24* (−0.40–0.08)	0.79 (0.67–0.92)	−.27* (−0.41–0.09)	
Race (ref = White)	−0.01 (−0.18–0.15)	0.99 (0.84–1.16)	−.03 (−0.17–0.11)	
Ever had sex Wave I (ref = no sex)	0.43 (−0.30–1.16)	1.53 (0.74–3.18)	.69 (0.04–1.34)	
Household status (ref = non–two-parent household)	−0.48 (−0.99–0.02)	0.62 (0.37–1.02)	−.51 (−1.00–0.01)	
Hardship	−0.22 (−0.20–0.17)	0.80 (0.54–1.19)	−.24 (−0.67–0.18)	
Zygosity (ref = monozygotic twins)	−0.22 (−0.76–0.32)	0.80 (0.47–1.38)	−.29 (−0.81–0.23)	
Within-twin depressive symptoms Wave I (Level 1)	0.08 (−0.02–0.17)	1.08 (0.98–1.18)	.34 (−0.49–1.17)	
Within-twin suicidal ideation Wave I (Level 1) (ref = no suicidal ideation)	0.12 (−0.95–1.18)	1.13 (0.39–3.27)	.65 (−0.08–0.31)	
Within-twin ever had casual sex partner Wave I (Level 1) (ref = no casual sexual partner)	0.97* (0.17–1.77)	2.64 (1.18–5.87)	.12 (−0.23–1.53)	
Between-twin depression Wave I (Level 2)	−0.36 (−1.30–0.57)	0.69 (0.27–1.77)	−.19 (−1.11–0.73)	
Between-twin suicidal ideation Wave I (Level 2)	1.11 [^] (0.09–2.14)	3.03 (1.09–8.50)	.96 (−0.23–2.14)	
Between-twin ever had casual sex partner Wave I (Level 2)	1.19* (0.20–2.17)	3.29 (1.22–8.78)	.04 (−0.19–0.26)	

[^] $p < .08$. * $p < .05$.

effects of having had a casual sexual experience at Wave I and contemplating suicide at Wave I approached significance, indicating that on average twin pairs who contemplated suicide or who had casual sexual experiences at Wave I had higher odds of engaging in a casual sexual experience at Wave III. In addition, interactions between gender and Wave I within-twin (Level 1) depressive symptoms, suicidal ideation, and casual sexual experience effects were tested. There were no significant interactions between gender and within-twin depressive symptoms ($b = 0.07$, $p > .05$), gender and within-twin suicidal ideation ($b = 0.57$, $p > .05$), or gender and within-twin casual sexual experience ($b = 0.42$, $p > .05$). In addition, depressive symptoms and suicidal ideation at Wave I did not predict number of sexual partners at Wave III. There were no significant interactions between

gender and within-twin depressive symptoms ($b = 1.10$, $p > .05$), gender and within-twin suicidal ideation ($b = 0.53$, $p > .05$), or gender and within-twin number of casual sexual partners ($b = 0.22$, $p > .05$).

Depressive symptoms. Table 4 displays the unstandardized coefficients for predicting Wave III depressive symptoms based on Wave I casual sexual experience, number of casual sexual partners, and depressive symptoms. Contrary to hypotheses, neither the within-twin Level 1 effect of casual sexual experience nor the number of sexual partners predicted depressive symptoms in early adulthood, although the within-twin Level 1 effect of casual sexual experience approached significance. The between-twin effects of casual sexual experience and the number of casual sexual partners

Table 4. *Unstandardized Estimates of a Multilevel Linear Regression Model Predicting Level of Depressive Symptoms at Wave III*

Variable	Unstandardized Estimate (95% CI)	
	Any Casual Sex	Number of Casual Sexual Partners
Gender (ref = male)	0.08 (−0.52–0.68)	0.32 (−0.33–0.97)
Age	−0.15 (−0.32–0.02)	−0.20 (−0.38–0.02)
Race (ref = White)	0.26* (0.07–0.44)	0.21* (0.04–0.38)
Household status (ref = non–two-parent household)	−0.29 (−0.82–0.24)	−0.09 (−0.65–0.46)
Financial hardship	−0.38 (−0.14–0.90)	0.50 (−0.06–1.06)
Zygosity (ref = monozygotic twins)	0.31 (−0.25–0.86)	0.43 (−0.14–1.00)
Within-twin depressive symptoms Wave I (Level 1)	0.29** (0.20–0.38)	0.32** (0.22–0.40)
Within-twin ever had casual sex partner Wave I (Level 1) (ref = no casual sex partner)	−0.80 [^] (−1.55–0.05)	—
Within-twin number of sex partners Wave I (Level 1)	—	−0.19 (−0.51–0.13)
Between-twin depression Wave I (Level 2)	0.42** (0.32–0.53)	0.42** (0.31–0.53)
Between-twin ever had casual sex partner Wave I (Level 2)	−1.05 (−2.12–0.03)	—
Between-twin number of sex partners Wave I (Level 2)	—	0.01 (−0.03–0.04)

[^] $p < .08$. * $p < .05$. ** $p < .01$.

Table 5. *Unstandardized Estimates and Odds Ratios of a Multilevel Logistic Regression Model Predicting Ever Having Had Suicidal Thoughts at Wave III*

Variable	Any Casual Sex			Number of Casual Sexual Partners		
	Unstandardized Estimate (95% CI)	Odds Ratio (95% CI)		Unstandardized Estimate (95% CI)	Odds Ratio (95% CI)	
Gender (ref = Male)	−0.03 (−0.79–0.73)	0.97 (0.45–2.07)		−0.01 (−0.78–0.76)	0.99 (0.46–2.13)	
Age	−0.19 (−0.45–0.07)	0.83 (0.64–1.07)		−0.19 (−0.43–0.05)	0.83 (0.65–1.05)	
Race (ref = White)	−0.09 (−0.36–0.18)	0.91 (0.70–1.19)		−0.09 (−0.36–0.18)	0.91 (0.70–1.20)	
Household status (ref = non–two-parent household)	−0.43 (−1.23–0.37)	0.65 (0.29–1.45)		−0.34 (−1.14–0.46)	0.71 (0.32–1.59)	
Financial hardship	0.27 (−0.30–0.85)	1.31 (0.74–2.33)		0.28 (−0.31–0.87)	1.32 (0.73–2.39)	
Zygosity (ref = monozygotic twins)	−0.10 (−1.16–0.97)	0.91 (0.31–2.63)		−0.14 (−1.24–0.96)	0.87 (0.29–2.61)	
Within-twin suicidal thoughts Wave I (Level 1) (ref = no suicidal ideation)	−0.28 (−1.84–1.27)	0.75 (0.16–3.56)		−0.30 (−1.82–1.21)	0.74 (0.16–3.37)	
Within-twin ever had casual sex partner Wave I (Level 1) (ref = no casual sex partner)	−0.58 (−0.99–2.15)	1.78 (0.37–8.59)		—	—	
Within-twin number of sex partners Wave I (Level 1)	—	—		0.20 (−0.17–0.57)	1.22 (0.84–1.76)	
Between-twin suicidal ideation Wave I (Level 2)	2.92** (1.50–4.33)	18.54 (4.48–75.94)		2.93** (1.38–4.47)	18.73 (3.97–87.35)	
Between-twin ever had casual sex partner Wave I (Level 2)	−0.66 (−2.27–0.95)	0.52 (0.10–2.59)		—	—	
Between twin number of sex partners Wave I (Level 2)	—	—		0.12 (−0.21–0.46)	1.13 (0.81–1.58)	

** $p < .01$.

were also not significant. Gender was also examined as a modifying variable; there were no significant interactions between gender and the within-twin effect of having a casual sexual experience at Wave I ($b = 1.22$, $p > .05$), nor the within-twin effect of the number of casual sexual partners at Wave I ($b = -.68$, $p > .05$).

Suicidal ideation. Table 5 displays the unstandardized coefficients for predicting Wave III suicidal ideation based on Wave I casual sexual experience, number of casual sexual partners, and suicidal ideation. Contrary to hypotheses, neither within-twin casual sexual experience nor number of casual sexual partners predicted Wave III suicidal ideation. When gender was examined as a modifying variable, there were no significant interactions between gender and within-twin casual sexual experience ($b = 1.36$, $p > .05$) and number of casual sexual partners ($b = .76$, $p > .05$) at Wave I.

Post Hoc Analysis for Examining Models in Adolescence

Due to the large time lag (six years) between Wave I and Wave III, we were interested in examining the relationship between casual sex and mental health within a shorter time period. We therefore replicated the previous models using Wave II outcomes (depressive symptoms, suicidal thoughts, and casual sexual experience), which has a time lag of one year. It should be noted that this sample did not include any participants who were in grade 12 at Wave I (final $n = 774$), due to the nature of the Add Health data design, so the sample is slightly different than the one in which we used Wave III outcomes. Wave II depressive symptoms were not predicted by within-twin casual sexual experience ($b = -0.57$, $p > .05$) or number of sexual partners at

Wave I ($b = 0.04$, $p > .05$). These relationships were not moderated by gender (casual sexual experience: $b = -1.09$, $p > .05$; number of sexual partners: $b = -0.02$, $p > .05$). Similarly, Wave II suicidal ideation was not predicted by Wave I within-twin casual sexual experience (OR = 0.77, $p > .05$) or number of casual sexual partners (OR = 0.98, $p > .05$), and neither relationship was moderated by gender (casual sexual experience: OR = 0.36, $p > .05$; number of casual sexual partners: OR = 1.17, $p > .05$). Engaging in casual sex at Wave II was not predicted by Wave I depressive symptoms (OR = 1.06, $p > .05$) or suicidal ideation (OR = 1.73, $p > .05$), and these results were not moderated by gender (depressive symptoms, OR = 0.85, $p > .05$; suicidal ideation, OR = 1.49, $p > .05$). Similarly, Wave II number of sexual partners was not predicted by Wave I depressive symptoms ($b = 0.58$, $p > .05$) or Wave I suicidal ideation ($b = 0.15$, $p > .05$). In addition, there was also no moderation of the relations between Wave I depressive symptoms ($b = -1.39$, $p < .05$) or suicidal ideation ($b = 1.57$, $p > .05$) and Wave II number of sexual partners by gender. Full results for these models are available upon request.

Discussion

The purpose of this study was to examine the relations between casual sexual behavior and mental health using a genetically informed, discordant-twin design. Using Sandberg-Thoma and Kamp Dush (2014) as the basis for our model, we tested (a) whether depressive symptoms and suicidal ideation in adolescence would lead to a higher likelihood of engaging in casual sex in young adulthood, (b) whether engaging in casual sex in adolescence (any casual sex and number of casual

sex partners) would lead to higher levels of depressive symptoms and a higher likelihood of suicidal ideation in young adulthood, and (c) whether these pathways were moderated by gender. By controlling for familial context (i.e., genetic vulnerability and shared familial environment) we were able to implicate potential causality by comparing twins within twin pairs, as well as test for latent shared familial context effects by comparing twins between twin pairs. Our results were largely unresponsive of any causal relationships; only an interaction between within-twin Wave I depressive symptoms and Wave II (adolescence) number of sexual partners was significant; this interaction disappeared when examining Wave III (young adulthood) number of sexual partners. Overall, the results indicate there may be a modest causal relation between earlier depressive symptoms in adolescence and more casual sexual partners in adolescence, particularly for boys, but that casual sexual behavior does not seem to cause later psychological distress, as measured by depressive symptoms and suicidal ideation.

Although previous research exploring the relation between casual sexual experience and mental health has been mixed, this may be due in part to differences in study designs (i.e., cross-sectional versus longitudinal), and differences in the measurement of casual sex and mental health. We attempted to mitigate this by using a previous study (Sandberg-Thoma and Kamp Dush [2014], that also used the Add Health data set) as a basis for our current study, using the same operational definitions for casual sexual experience (sexual experience with a nonromantic, nondating partner) and mental health (depression and suicidal ideation). We built on this previous study by using a genetically informed, discordant twins approach. Using twin studies, we are able to account for potential shared familial influences via genes and shared familial upbringing, both of which contribute to sexuality (e.g., Lyons et al., 2004; Mustanski, Viken, Kaprio, Winter, & Rose, 2007), as well as potential genetic or shared familial relations that explain both sexuality and mental health. For example, Mendle and colleagues (2013) used a discordant-twin model to examine depression and casual sex cross-sectionally, indicating that depression and sexual activity (in both romantic and nonromantic contexts) were related to each other via a shared familial (genetics and shared environment) context. However, besides the difference in the approach, there was also a difference in the temporal informativeness of the models; Sandberg-Thoma and Kamp Dush used Wave III reports of casual sexual experience as a predictor variable for both Wave III suicidal ideation and “change” in depressive symptoms from Wave I to Wave III. Our current study used Wave I casual sexual experience as a predictor variable, thereby establishing the temporal precedence of earlier casual sex leading to later mental health. Due to the potentially ambiguous nature of the way in which casual sex could influence mental

health, or vice versa, it is imperative that future studies, when possible, test rigorous models that allow for specific examination of the directionality of the relations.

Our first research question examined whether adolescents with poorer mental health were more likely to engage in casual sex in young adulthood. Contrary to hypotheses, neither adolescent suicidal ideation nor depressive symptoms were causally related to engaging in casual sex as young adults. Post hoc analyses indicated that these findings held for earlier depressive symptoms and suicidal ideation in adolescence and the number of sexual partners one year later. Findings that depressive symptoms are not related to later casual sexual behavior is supported by other researchers (Fielder et al., 2014; Owen et al., 2011). These results are contrary to the relation between suicidal ideation and casual sexual behavior found in Sandberg-Thoma and Kamp Dush (2014). Due to the quasi-experimental nature of the study, our results highlight the utility of discerning between results that can and cannot be causally inferred.

The second research question examined whether casual sex in adolescence leads to depressive symptoms or suicidal ideation in young adulthood. Although the within-twin effect of ever having casual sex approached significance ($p < .08$), there were no significant within-twin effects for ever having had a casual sexual experience, nor the number of sexual partners, for either outcome, indicating relations between earlier casual sex in adolescence and later negative mental health (or at least depressive symptoms and suicidal ideation) are non-causal. Between-twin effects of casual sex were also not significant. This indicated that there was no latent familial context effect (shared family environment or genes) that could account for a relationship between adolescent casual sex behavior and later young adult mental health (e.g., there was no underlying mechanism shared by both adolescent casual sex and later young adult mental health driving a relationship between the two variables). The lack of association between earlier casual sex and later mental health has been supported by previous longitudinal studies (Fielder et al., 2014; Monahan & Lee, 2008). In addition, these results were supported by the adolescent-only models, which controlled for the possibility that casual sex may have a more short-term, but not long-term, effect on mental health. While replication is needed (particularly regarding the marginally significant effect of any casual sexual experience on later depressive symptoms), this may be one of the most robust studies indicating a lack of relationship between earlier casual sex and later mental health, due to the quasi-experimental longitudinal design and control for genetic and familial confounds. In addition, it is possible that other aspects of poor psychological adjustment (e.g., low self-esteem, feelings of loneliness) may be impacted by earlier casual sex. Furthermore, this study did not take into account other

factors that might influence such a relationship, such as the context of the casual sexual experience (e.g., casual acquaintance, stranger), the quality of the experience (e.g., pleasurable, painful), or the attitudes one has toward relationships and casual sex (e.g., positive or negative). For example, Lewis and colleagues (2012) documented that positive or negative emotional reactions to hookups were related to the attitudes that young adults had toward hooking up but not to the behavior itself. Such contextual variables may be important to examining if and under what conditions casual sexual behavior may be damaging to later mental health.

Finally, there were no gender differences between men and women for any of the models, contrary to some previous studies (Fielder & Carey, 2010; Grello et al., 2006) but supported by others (Bersamin et al., 2014; Eisenberg et al., 2009). Hypotheses involving gender differences seem to be predicated on women facing double standards/more negative social feedback for casual sex behavior compared to men (e.g., Eisenberg et al., 2009; Fielder & Carey, 2010; Sandberg-Thoma & Kamp Dush, 2014), or through unfulfilled desire to have a more meaningful relationship beyond a casual sexual experience (e.g., Grello et al., 2006). It is possible that negative social feedback or unfulfilled desire mediate a causal relationship between casual sex experience and later mental health. For most studies examining gender differences (including this study), the underlying mechanisms by which casual sexual experiences may increase later negative mental health are left unexplored. Just as previous attitudes toward casual sex can influence emotional reactions to hookups (Lewis et al., 2012), specific social feedback or pre-casual sex expectations may be a driving force behind gender differences.

Limitations and Implications

While this study has strengths, such as the nationally representative data set and the rigorous, genetically informative design, it does have limitations. There is a large time-gap between Waves I and III (six years), and it is possible that there may be a stronger relation between psychological well-being and casual sex when examining these variables within shorter time intervals; changes in attitudes toward casual sex over the six-year period also may have influenced results. Although models were tested that included a shorter interval of time between waves (one year), this was a time period when the participants were still adolescents; different results may have been found if we had been able to examine the participants when they were young adults. Second, due to the complexity of the statistical analyses, it is possible that the models were underpowered; a larger sample may have yielded more significant results. Another limitation is the implicit assumption of equivalence of “exposures” (similarity in ages of casual

sexual experiences) within and between twin pairs. Limited contextual information about participants’ casual sexual experiences preclude our ability to test this assumption. Another limitation is the focus on a “sexual relationship” to define casual sex behavior; more specific questions that would examine differences between penetrative and nonpenetrative sex (Fielder & Carey, 2010; Owen et al., 2011), and differences between casual sex partners (e.g., casual acquaintance, strangers, friends) may have provided more detailed findings. Similarly, we were not able to assess the amount of coercion or unwantedness within these sexual experiences. Research indicates that the amount of autonomy within casual sexual experiences can influence later mental health outcomes (e.g., Vrangalova, 2014), and discerning between casual sexual experiences in which there was and was not coercion may have yielded different results. Finally, it must be noted that while the quasi-experimental nature of the discordant-twin design allows for within-twin effects to be potentially causal, it is also possible that other unmeasured unique environmental effects on casual sexual behavior and mental health could explain this relationship.

Limitations within this study can be addressed in future studies using similar techniques (i.e., genetically informed methods). Particular emphasis could be placed on differences in casual sex partnership and sexual behavior, as well as variance in time difference between exposure (engagement in casual sex) and negative mental health. However, this research may benefit most from testing specific mechanisms that facilitate a possible relation between casual sex and mental health. Given the dubious nature of the relationship between casual sex and mental health, understanding the mechanisms by which this might happen will allow researchers to better understand why there is such large variability in findings. Given the lack of any such mechanism proposed and the results of the more rigorous studies failing to observe a connection (e.g., longitudinal studies such as Monahan & Lee, 2008; Fielder et al., 2014), one logical conclusion that must be considered is that casual sex may have a minimal effect, if any, on later mental health.

Over the past 20 years, sex researchers have produced a substantial body of literature on casual sex. The quality of these studies has varied, making it difficult to draw conclusions. The casual sex and mental health research is a good example: Due to differences in methodology, including potential methodological flaws, the body of literature so far is inconclusive. Increasing scientific rigor, for example, including genetically informed samples, or examining various contexts that could influence the relation between mental health and casual sex, may clarify the relation (or lack thereof) between these two variables. Sex research can help better inform the public and policymakers about sexual health and sexuality. However, if the evidence base is built on methodologically weak studies, this may limit its utility. Given the

large cultural shift and societal preoccupation focusing on more casual (or at least premarital) sex (e.g., Garcia, Reiber, Massey, & Merriwether, 2011), research on the consequences of casual sex is timely. This is of importance for informing not only sex researchers but also the general public in order to move toward an increasingly more sexually healthy society.

Funding

This research used data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from grant P01-HD31921 for this analysis.

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