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Longitudinal Effects of Health-Harming and Health-Protective Behaviors within Adolescent Romantic Dyads

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Abstract

Most models exploring adolescent health behavior have focused on individual influences to understand behavior change. The goal of the current study was to assess the role of adolescent romantic partners on the expression of health behavior. Our sample utilized two waves of data from the US National Longitudinal Study of Adolescent Health (1994, 1996), which included 80 romantic dyads (160 individuals). A longitudinal multilevel analysis was conducted. We assessed individual and romantic partner health-harming behaviors (i.e., delinquency, alcohol use, smoking, and marijuana use), health-protective behaviors (i.e., physical activity, physical inactivity, sleep patterns, seatbelt use, and contraception motivations), as well as the role of gender and age. Participants average age was 16 years at baseline. We found evidence for partner similarity and partner influence with the majority of health-harming behaviors. Specifically, partner influence was evident for smoking and alcohol use with partner influence approaching significance for marijuana use. We found limited evidence for partner similarity and partner influence for health-protective behaviors. The importance of assessing romantic dyads was evident in these data. Interventions focusing on health-harming behavior for adolescent populations are important public health goals. It is recommended that future intervention efforts with adolescent health-harming behaviors should target not only peers, but also consider the role of romantic partners.

Keywords

USA; adolescence; health behavior; romantic couples

Engagement in romantic relationships during adolescence has been noted to be of particular developmental significance (Furman & Simon, 2006). When the impact of romantic partner influence on health behavior has been studied, health-harming behaviors (e.g. substance use, risky sexual behavior and delinquency) have primarily been the focus, rather than health-protective behavior (see Fortenberry, 2003 for exception). To address this gap, the present

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study examines both health-harming and –protective behaviors among adolescent romantic dyads using a longitudinal design.

Dyadic Influences on Adolescent Health Behavior

A useful perspective for assessing the role of partner similarity and influence can be found in the actor-partner interaction model (APIM; Kenny, 1996). This model has been developed in order to clarify individual and dyad influences on behavior, and the model is particularly well suited to study romantic relationships. This is similar to the peer influence literature, in which dyadic interactions can be assessed when a “best” or “closest” friend is identified (Jaccard et al., 2005).

Two approaches to understanding within-dyad influences on behavior have been described within the APIM model. One focuses on the manner in which individuals are selected into specific relationships, called assortative mating or a tendency to form unions with similar others (Kenny, 1996). In the current study, we will focus on the second mechanism of dyadic influence on behavior; direct partner influence (Kenny, 1996). This perspective suggests two mechanisms by which each partner influences the expression of health behaviors (partner influence and mutual influence; Kenny, 1996). Partner influence is an indication that one partner’s behavior or characteristic directly affects the other partner (e.g. frequent alcohol use by one partner could be associated with more frequent alcohol use by the other partner). Mutual influence is an indication that each member’s characteristics or behaviors affect those of their partner (e.g. partners in a mutually alcohol-abstinent dyad reinforce each other’s efforts to avoid alcohol use at a party).

Extant Research on Romantic Partners and Health Behavior

Several studies have assessed the role of romantic partners in health-harming behaviors such as aggression and interpersonal violence (Cleveland et al., 2003; Herrera et al., 2011; Kim & Capaldi, 2004; Taylor et al., 2000). A recent research review focused on problem behavior (i.e. antisocial and substance use behavior) in adolescent romantic relationships (Rhule-Louie & McMahon, 2007). These studies have found that antisocial behavior between partners (including married couples) evidence moderate to large correlations (Du Fort et al., 2002). More recent research has explored partner similarity regarding popularity, physical attraction, and depressive symptoms among early adolescent romantic partnerships (Simon et al., 2008). In a study assessing adolescent romantic dyad similarity of health-related behavior in adolescent romantic dyads, substantial within-dyad concordance was found (Fortenberry, 2003). Dyads concordant for health-harming behaviors (e.g., cigarette smoking, regular alcohol use, marijuana use) reported lower rates of condom use, used less reliable forms of contraception, and used drugs/alcohol prior to sex, when compared to dyads concordant for low health-harming behaviors. Hence, the risk profile of adolescent romantic dyads impacted the sexual risk behavior expressed within the dyad.

Based on our review of the literature, few studies have explored the role of adolescent romantic relationships on engagement in health-protective behaviors (see Fortenberry, 2003 for exception). However, romantic partner influences on health-protective behavior have been assessed in adult populations (see Lewis et al., 2006 for review). Among adults, both longitudinal and cross-sectional research have found romantic partners influence health-protective behavior (Lewis & Rook, 1999). Furthermore, interventions to influence a spouse’s behavior (such as improved diet or decrease smoking) also influence the partner’s health behavior (Sexton, 1987). Thus, while the literature exploring the role of romantic partners on health-protective behavior is lacking for the adolescent time period; there is evidence that romantic partners influence health-protective behavior within adult

populations. Hence, in the current study, we will explore both health-harming and –protective behavior.

Gender and Age Effects

Both theoretical and empirical justifications exist for the consideration of gender and age in the expression of health behavior within romantic relationships. Gender may be particularly important as a moderator in the expression of problem behaviors in adolescent romantic relationships (Rhule-Louie & McMahon, 2007). For instance, some evidence exists indicating female health-harming behavior may be more influenced by romantic relationships than male health-harming behavior (Moretti et al., 2004). However, research has also demonstrated that females influence male partner behavior (Homish & Leonard, 2006). The "marriage effect," for instance, has found that males with positive marital interactions are less likely to develop or continue risky health behaviors (Harford et al., 1994). Very little data exists exploring the role of gender on health-protective behavior within adolescent romantic relationships exist and, given conflicting findings, gender is a potentially important moderator.

As youth age, they are more likely to be involved in romantic relationships (Shulman, 2000). Romantic relationships are characterized by increasing intimacy over time (Furman & Wehner, 1997). Not only is the individual's age important in the involvement and expression of romantic relationships, the age of the romantic partner is an important consideration since significant proportions of adolescent partnerships are characterized by age differences of two or more years (Kaestle et al., 2002). Evidence suggests that having older boyfriends is associated with increased problem behavior for young women (Young & d'Arcy, 2005) and specifically with minor deviance or delinquent behavior (Haynie, 2002). Halpern and colleagues (2007), using data from Add Health, found that when older male partners were partnered with young females (under age 15), significant increases in multiple risk behavior (i.e. substance use and sexual risk behavior) were noted in the young women. In a study of junior high youth, there was a significant association among risky behavior (smoking, alcohol use) and approval of sexual behavior for young women (Royer et al., 2009). Hence, both gender and age are important aspects that may impact the health behavior within romantic partnerships.

Summary

The current study represents an attempt to understand longitudinal individual and romantic partner influence on both health-harming and health-protective behavior within adolescent dyads. This study is novel and builds upon significant limitations evident in extant research in a number of ways including (a) the application of the APIM conceptual and analytic approach to the study of romantic partners, a critical future direction highlighted by Little and Card (2005); (b) examination of both health-harming and health-protective behaviors; (c) longitudinal investigation of the impact of romantic partners on adolescent health behavior, as opposed to sole reliance on cross-sectional methods (e.g., Fortenberry, 2003) in which partner influence can be implied but not directly assessed. Collectively, these aspects of the current study will provide a better understanding of how romantic partners influence both health-harming and -protective behavior within adolescent dyads in longitudinal fashion.

Few studies have been conducted on the role of adolescent romantic partners on health-protective, as opposed to health-harming, behavior. In the adult romantic relationship literature, partners clearly impact health-protective behavior. Similar to the adult romantic relationship literature, we focus our analysis on adolescent romantic relationships that remain stable over time (at least 18 months) in anticipation that partner influence is evident.

Specific hypotheses for this study included the following:

1. Partner similarity will be evident for health-harming behavior but not evident for health-protective behavior.
2. Romantic partners' influence will be stronger for health-harming than health–protective behavior.
3. Male health-harming behavior will predict an increase in female health-harming behavior over time.
4. Older, male partners' health-harming behavior will predict an increase in female health-harming behavior over time.

Methods

Study Description

IRB approval for this study was received through Indiana University-Purdue University Indianapolis. The sample of adolescent dyads was drawn from Waves 1 and 2 from the National Longitudinal Study of Adolescent Health (Add Health) which has been described in detail elsewhere (see Udry & Bearman, 1998). Eighty schools were selected across the US to complete self-report questionnaires on a single day with over 90% of all students enrolled. In-School questionnaires and In-Home interviews were conducted in 1994 and 1995. At that time 83,135 adolescents completed the In-School questionnaire and 20,745 adolescents completed the In-Home interviews. Wave 1 adolescents, who were not seniors during Wave 1, were assessed one year later (14,738) resulting in a 88.2% Wave 2 response rate (Udry, 1998).

Within the romantic relationship section of the in-home questionnaire, the participant was asked if they had "had a special romantic relationship with any one" in the last 18 months. The participant was asked to identify up to three separate romantic relationships over the last 18 months. Items relating to the nature of their relationship(s) were asked. After the relationship section was completed, the participant was asked to search the directory of their school to highlight the name of their identified partner(s). If a partner in the school was identified, a code created a link between the dyads. Hence, partnerships identified by the participant could be matched to the nominated partner's completed data.

For the purposes of this study, we assessed only reciprocated romantic relationships. Reciprocated relationships indicate that both members of the dyad identified each other as a romantic partner. We chose to use reciprocated dyad members in order to study romantic relationships that were maintained over time (with the understanding that if partners influence health behavior, this impact may be more noted in longer-term adolescent romantic relationships) and to increase our confidence that the relationship(s) existed, since it is possible to identify more than one romantic partner in this database. Individuals who were in more than one romantic relationship were retained in the order that they were reported, which is a similar procedure used by other researchers utilizing the romantic partner database (Haynie et al., 2005).

Participants

At Wave 1, 374 adolescent dyads (748 individuals) were identified in reciprocated romantic relationships at Wave 1. At Wave 2, 80 dyads (160 individuals) continued to be in reciprocated partnerships. Although our choice of focusing on the eighty dyads who continued to be in a relationship at both Waves 1 and 2 resulted in a lower number of participants, partner behavior was the focus of the analysis.

The age range of participants was 12 to 19 years (Male mean = 16.1; Female mean = 15.1), with 89% of participants self-identifying as White and 8% self-identifying as Black. Differences between the In-Home sample (7,398 individuals with complete data at Waves 1 and 2), baseline reciprocated romantic dyad sample (748 individuals in 374 dyads) and the longitudinal romantic dyad sample (160 individuals in 80 dyads) on Wave 1 variables will be discussed in the sample comparison section.

Measures

Delinquency—A measure of delinquency consisted of 15 dichotomous (yes, no) items (alpha coefficient = .82). A spectrum of minor to more serious delinquent behaviors was assessed over the last 12 months. These included lying to parents or guardians, damage property, painting graffiti, fighting, theft, and selling drugs. An example of an item is “In the past 12 months, how often did you deliberately damage property that did not belong to you?”

Alcohol—Alcohol use was measured with three items that were totaled (alpha coefficient = .89). The participants were asked to indicate the number of days over the past 12 months that they have used alcohol, drank 5 or more drinks in a row, and gotten drunk or “very, very high” on alcohol. An example of an item is “During the past 12 months, on how many days did you drink alcohol?”

Smoking—Cigarette smoking was assessed with two items (alpha coefficient = .78) that were totaled. The first asked “During the past 30 days, on how many days did you smoke cigarettes?” and the second asked “During the past 30 days, on the days you smoked, how many cigarettes did you smoke each day?”

Marijuana—Marijuana use was assessed with a single item (“During the past 30 days, how many times did you use marijuana?”; range 0 – 100).

Physical activity—Activity level was assessed with three items exploring how often they roller-bladed or bicycled, played sports, or completed other exercise activities such as jogging or dancing. Adolescents indicated the number of times they engaged in these activities in four categories (0; 1–2; 3–4; and 5 plus times per week). The three items were totaled as a scale (alpha coefficient = .85).

Physical inactivity—Inactivity was assessed as a single item measuring amount of television viewing (“How many hours in a week do you watch television?”). The continuous response to this item was used.

Sleep—Participants indicated the number of hours of sleep they received in one evening (“How many hours of sleep do you usually get?”). Total number hours of sleep were used as a continuous measure.

Seatbelt use—Use of seatbelt over 1 week period of time was also assessed with a continuous, single-item (“How often do you wear a seatbelt when you are riding in or driving a car?”; 5-point Likert scale from “never” to “always”).

Contraception—The participants were also asked a number of questions related to their motivations to use birth control. Responses were summed as a scale (8 items, alpha coefficient = .90). Item examples included “It is easy for you to get birth control” and “In general, birth control is too much of a hassle to use” (reverse-scored). The items were scored along a 5-point Likert continuum (“strongly agree” to “strongly disagree”).

Statistical Analyses

The statistical analysis is divided into three sections. First, we compared (via ANOVA) the In-Home sample (7,398 individuals) to the baseline reciprocated romantic dyad sample (748 individuals) and to the longitudinal romantic dyad sample (160 individuals) by gender on the measures used in this study. We then describe the means, standard deviations, and within dyad similarity, as assessed by intraclass correlation, of the 80 dyads at Waves 1 and 2. Lastly, we conducted separate multilevel analyses (by individual and dyad levels) on each of the health-harming and –protective behaviors. In the following analysis section we will describe techniques we employed to control for the Add Health data collection scheme (i.e. sampling weights) and the multilevel analysis.

Appropriate sampling weights were created for the schools, individual adolescents, as well as a dyad specific sampling weight (Chantala, 2001; page 4). Given the complex sampling design, we used the SUDAAN statistical software procedure PROC MULTILOG (Chantala & Tabor, 1999) to correct for design effects and unequal probability of selection of dyads. The design variables, error terms and correlation structure of the data are automatically incorporated by SUDAAN (see Chantala & Tabor, 1999 for overview). We then utilized SAS PROC MIXED to analyze the data.

Conducting a multilevel analysis allows examination of observations or data points that are “nested” within a specific structure. In the current analyses, the “nesting” is of individuals within a specific romantic relationship. Hence, a strength of utilizing multilevel models for dyadic data is that the nesting procedure allows for the assessment of both individual (actor) and dyadic influences on the outcome. In sum, 160 individuals provided data from 80 dyads.

We used several dyad variables from Wave 1 data that were derived from the individual measures as recommended by Campbell and Kashy (2002). Below we describe the main effects, interactions and provide an example with alcohol use. Main effects explored include Actor/Partner behavior, Gender and Actor/Partner age. A significant Actor behavior effect indicates that an individual’s behavior predicts their own future behavior. A significant Partner behavior effect indicates the romantic partner’s behavior has an impact on the participant’s own behavior. For example, if Partner alcohol use is significant, then all participants’ alcohol use is higher at Wave 2.

Age interactions test the effect of actor and partner age on the relationship between Wave 1 and Wave 2 behavior. For instance, a significant Actor behavior X Actor age interaction indicates alcohol use at Wave 2 is significantly higher for older participants with increased Wave 1 alcohol use. If Partner behavior X Actor age is significant, then alcohol use at Wave 2 is significantly higher for older participants whose partner had a high Wave 1 alcohol score. A significant Actor behavior X Partner Age interaction indicates alcohol use at Wave 2 is significantly higher for participants with high Wave 1 alcohol use and an older partner. If a Partner behavior X Partner Age interaction is significant, then alcohol at Wave 2 is significantly higher for participants with an older partner with high alcohol use.

Gender interactions allow us to test differential effects of gender on the association between Wave 1 and Wave 2 behavior. For example, if the Actor X Gender interaction is significant, and the direction of the effect is negative, it would indicate that female Wave 2 alcohol use is lower when their male partners evidenced lowered alcohol use at Wave 1. The Dyad Similarity score is calculated as the absolute difference between the actor and partner scores. Higher scores indicate greater dissimilarity of behaviors between dyad partners. If there is a significant similarity effect, it would indicate that when the difference in alcohol use between the Actor and Partner at Wave 1 is quite high, then substance use that Wave 2 is increased. Dyad Interaction is obtained by calculating the product of actor and partner

scores. Accordingly, higher scores on this measure would indicate a greater effect of the dyad on the outcome. Hence, if the alcohol use Dyad Interaction is significant, it would indicate that Wave 1 Actor and Partner alcohol use synergistically predicts Wave 2 alcohol use.

In the analyses that follow, we have created a taxonomy of nested models (Singer & Willett, 2004). These models are created by analyzing the sequential deletion of predictor classes (main, gender and dyad effects), with an examination of the statistical significance of the predictors (which are standardized beta coefficients and are comparable within each behavior category) as well as changes in overall model fit at each step. Improvements in model fit were assessed by examination of the change in the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). Both assess the relative goodness-of-fit for a model and are useful when comparing alternative models with different sets of predictors (Singer & Willett, 2004), with smaller values for AIC and BIC indicating better model fit (see Raftery, 1995 for review of BIC and evaluation BIC value differences between models).

Sample Comparison

We compared the In-Home sample (7,398 individuals) to the baseline dyad sample (748 individuals) and to the longitudinal dyad sample (160 individuals) by gender on the measures used in this study. Significant differences were noted on race ($p = 0.009$), age ($p \leq 0.001$), alcohol ($p = 0.004$), smoking ($p = 0.03$), and inactivity ($p = 0.007$). Females in the longitudinal dyad sample were more likely to be white (Female, 92%) than the baseline dyad (Female = 76%) and In-Home samples (Female = 74%). The longitudinal dyad sample (Male = 16.1 years, Female = 15.1 years) and the baseline dyad sample (Male = 15.9, Female = 15.3) were older than the In-Home sample (Male = 15.2, Female = 14.8). Smoking was higher for males in the longitudinal dyad (mean = 10.2) and baseline dyad (mean = 10.8) samples compared to males in the In-Home sample (mean = 8.4). Alcohol use was higher for males in the baseline dyad sample (mean = 7.6) in comparison to the In-Home sample (mean = 6.7). Lastly, males in the longitudinal dyad group had a lower inactivity score (mean = 12.3) than males in the In-Home sample (mean = 16.2). No other differences were statistically significant.

Results

Partner Similarity

Table 1 presents the means, standard deviations, and intraclass correlations of romantic dyads for both Wave 1 and Wave 2. The intraclass correlation is a measure of dyad similarity (Kenny et al., 2006). At Wave 1, we found significant intraclass correlations for age (ICC = 0.68), delinquency (ICC = 0.21), alcohol (ICC = 0.38), and smoking (ICC = 0.60). No other intraclass correlations were significant at Wave 1. Alcohol (ICC = 0.54) and smoking (ICC = 0.58) remained significant at Wave 2; however, the intraclass correlations of delinquency was no longer significant.

We also calculated the intraclass correlation for birth control motivation with sexually inexperienced couples (47 couples at Wave 1, 37 couples at Wave 2). Birth control motivation for sexually inexperienced couples was significant at Wave 1 (ICC = 0.61, $p < 0.001$) and insignificant at Wave 2 (ICC = 0.16, $p = 0.29$; see Table 1).

Health-Harming Behavior Analysis

In the analyses that follow, change in model fit, as assessed by AIC and BIC, determined the final model (see Table 2). For instance, the main effect was the best model for delinquency based on fit indices. The fit indice values was reduced from the full to main effects model

(from 791.2 to 782.7 for AIC and from 795.9 to 787.4 for BIC) which was "strong" evidence for better fit (Raftery, 1995). Actor Wave 1 delinquency predicted Wave 2 delinquency (beta = 3.99; $p < .001$) indicating that Wave 1 individual delinquency predicted increased Wave 2 delinquency. A partner delinquency by actor age interaction was significant and negative, (beta = −0.15, $p < .01$) indicating that when partners had higher delinquency at Wave 1, individuals evidenced less delinquency at Wave 2 if their partner was older.

The best model for alcohol use at Wave 2 included the main and gender interaction effects. A reduction from the full to gender interaction model was notable for AIC (770.7 to 760.0) and BIC (775.5 to 764.7). Wave 2 alcohol use was significantly predicted by Wave 1 actor alcohol use (beta = 0.54, $p < 0.001$) and the interaction of partner alcohol use with gender (beta = 0.32, $p < .05$) was significant. Female Wave 2 alcohol use was higher when their partner had increased Wave 1 alcohol use.

The main effects model was the best fit for the prediction of Wave 2 smoking. The value of AIC was reduced (1215.6 to 1209.1), as was BIC (1220.3 to 1213.8). Smoking Wave 1 actor and partner behavior were significant predictors of Wave 2 smoking behavior (Actor beta = 0.68, $p < .001$; Partner beta = 0.22, $p < .001$). Hence, when an individual smoked at Wave 1, individuals were more likely to smoke at Wave 2. In addition, if the actors' romantic partner at Wave 1 scored high in the smoking scale, individuals were more likely to score high on the smoking scale at Wave 2.

The best-fitting model for marijuana included the main, gender and age interaction models. The fit for both the AIC (808.5 to 807.8) and BIC (817.3 to 816.6) decreased slightly when the age interactions were included with the main and gender models. Actor Wave 1 marijuana use predicted Wave 2 use (beta = 13.27, $p < .001$). The interactions of Actor and Partner marijuana use with both Actor and Partner age were significant (Actor X Actor age beta = 0.65, $p < 001$; Partner X Actor Age beta = −0.26, $p < .001$; Actor X Partner age beta = 0.28, $p < .001$; Partner X Partner age beta = 0.22, $p < .05$). These results indicate older actors and partners with increased marijuana use at Wave 1 had higher Wave 2 marijuana use. Additionally, when partners had higher marijuana use at Wave 1, individuals evidenced less marijuana use at Wave 2 if their partner was older. Lastly, when an actor had increased marijuana use at Wave 1, if their partner was older, individuals then evidenced higher marijuana use at Wave 2. An actor by gender interaction was significant and negative (beta = −0.93, $p < .001$) with female Wave 2 marijuana use being lower when their male partner had decreased marijuana use. Additionally, a partner by gender interaction was also significant (beta = 1.01, $p < .001$) with female Wave 2 marijuana use being higher when their male partner had increased Wave 1 marijuana use.

Health-Protective Behavior Analysis

The main effects model was the best fit for physical activity (see Table 3). AIC was reduced (655.8 to 644.3), as was BIC (660.6 to 649.1). The actor (beta = 0.41, $p < .001$) and age (beta = − 0.47, $p < .001$) effects were significant, indicating that high activity at Wave 1 predicted increased Wave 2 activity and when the actor was younger at Wave 1, they were more likely to have increased physical activity at Wave 2.

The gender interaction model was the best fit to the data for physical inactivity. The AIC was slightly reduced from 1241.0 to 1238.9, as was the BIC (1245.7 to 1243.6). Actor Wave 1 physical inactivity (beta = −3.44, $p < .01$) predicted Wave 2 inactivity. Hence, when actors are sedentary (high inactivity) at Wave 1, they are more likely to have a lower inactivity score at Wave 2. However, partner behavior is also significant (beta = 3.02, $p < .01$) in the opposite direction. This effect indicates that when partners are sedentary (high inactivity) at

Wave 1, then the actor is more likely to have a higher inactivity score at Wave 2. Additionally, an actor physical inactivity by actor age interaction was significant (beta = 0.24, $p < .001$), indicating that older actors who were physically inactive predicted greater inactivity at Wave 2. A partner physical inactivity by actor age interaction was also significant and negative, (beta = −0.19, $p < 01$) indicating older partners who were physically inactive predicted lower actor inactivity at Wave 2.

The main effect model was the best fit for sleep. The AIC was reduced (515.9 to 501.3), as was BIC (520.6 to 506.1). Only increased actor sleep at Wave 1 predicted Wave 2 increased sleep behavior (beta = 0.31, $p < .001$).

The gender interaction model was the best fit to the data for seatbelt use. The AIC was reduced from 415.9 to 401.2, as was the BIC (420.7 to 406.0). Wave 1 increased actor seatbelt use predicted Wave 2 increased seatbelt use (beta = 0.39, $p = 0.001$), as did gender (beta = − 1.95, $p < .001$) with females more likely to report Wave 2 seatbelt use. However, the actor seatbelt by gender interaction was significant (beta = 0.35, $p < .01$), indicating males were more likely to increase their seatbelt by Wave 2.

Lastly, contraception motivation was explored only for romantic dyads that indicated they were sexually active at Wave 1 (33 couples). When fit indices were compared between the main effect and the main effect with dyad interaction models, the main effect model was the best fit for the data. AIC was reduced from 378.6 to 372.0 and BIC was lowered from 382.0 to 375.8. Actor contraception motivation at Wave 1 predicted Wave 2 contraception motivation (beta = 0.12, $p < .01$) and partner motivation was marginally significant (beta = 0.43, $p < .08$). An actor by gender interaction was also marginally significant (beta = 0.53, $p < .06$) indicating that, at Wave 1, female actors were slightly more likely to evidence increased contraception motivation at Wave 2.

Discussion

The overall purpose of the present study was to explore the longitudinal impact of actor and romantic partner influences on health-harming and -protective behavior. Our first hypothesis speculated that partner similarity would exist for health-harming behaviors; this was true for the majority of health-harming behaviors. Consistent with the second hypothesis, we found evidence for partner influence for most health-harming behaviors. Evidence for a role of partner gender (study hypothesis 3) was found for male partner's influence on female partner's subsequent alcohol and marijuana. Lastly, age of partner (study hypothesis 4) was significant for delinquency, marijuana use and physical inactivity. Collectively, these data illustrate the complex ways by which health-related behaviors are enacted within the social context of romantic relationships. In the following sections, we will discuss these results in order to elaborate specific aspects of dyad influence including the role of romantic partner similarity and partner influence for health behavior.

Partner Similarity

The most effective way to study assortative mating is to assess individuals before they enter into romantic relationships. However, another way to gauge the compositional effect of romantic partners includes calculating partner similarity (Epstein & Guttman, 1984; Kenny et al., 2006). We found significant similarity (as evidenced by Wave 1 intraclass correlations) on specific health-harming behaviors. In particular, the intraclass correlation for smoking behavior at Wave 1 was quite high. Thus, smoking behavior may be quite important in partner selection, partner influence or some combination of both. Regardless, given the significant intraclass correlation, smoking behavior clearly warrants further

research attention within adolescent romantic relationships and future research focusing on selection and behavior influence mechanisms would be beneficial.

Intraclass correlations for the majority of health-protective behaviors were, for the most part, not significant. However, sexually inexperienced couples at Wave 1 did evidence significant similarity on birth control motivations. This effect may be partly explained by the content of the items, which assess ease of accessing birth control. Sexually inexperienced couple may lack a frame of reference of how difficult (or easy) it is to obtain birth control, hence, their responses are similar to each other. With sexually active couples, the decreased similarity may be due to the gender differences in ease of accessing contraception methods. For example, a prescription is needed for young women to obtain contraception, which necessitates discussions with adults regarding their sexual behavior. For young men, access to condoms necessitates purchasing them or obtaining them from health clinics. Clearly, this effect warrants attention and it is recommended that future research assess the developmental course of birth control motivation within adolescent romantic relationships.

Individual (Actor) Influence

We found that actor behavior predicted future health behavior and that actor behavior was stronger than partner behavior on the expression of health-harming behavior. Although this is not surprising (past behavior is the best predictor of future behavior), it does indicate the relative importance of romantic partnerships on health behavior. For instance, when partner behavior was significant for health-harming behavior (see discussion below) the standardized beta coefficients for partner behavior were lower than actor behavior. Hence, health-harming behaviors, although influenced by important social relationship such as romantic partners, are still primarily influenced by individual factors.

Partner Influence

We found a significant partner influence on the majority of health-harming behaviors. In general, the effect of romantic partners on future health-harming behavior was significant with the notable exception of delinquency. This is a surprising finding, given that a significant amount of research has focused on the transmissibility of antisocial behavior within romantic partners (Du Fort et al., 2002; Rhule-Louie & McMahon, 2007). Much of the previous research has been conducted with clinical or at-risk samples. Thus, the role of delinquency or antisocial behavior in partner influence may be more limited in a community or school-based sample rather than in a high-risk or clinic based sample. However, a recent study using Wave 3 data from Add Health found that being in a relationship with a partner with increased criminal behavior predicted increased criminal behavior for both males and females (Herrera et al., 2011). Thus, the impact of partnered aggressive and/or criminal behavior may become more pronounced during young adulthood. Clearly, research elucidating the role of romantic partner aggression and delinquent behavior developmentally from adolescence into young adulthood should be considered in the future.

There was limited significant romantic partner influence on health-protective behaviors, with the exception of physical inactivity. It should be noted, however, that the physical activity measure was not significant. There are clear differences in the behaviors assessed by the measures. Physical *inactivity* was quantified as the number of hours where television was watched while physical *activity* was a multiple item measure assessing how often the individual completed activities such as exercising, playing sports, or bicycling. Hence, it may be that the variation in physical inactivity was due to how the dyad spent their time, rather than engaging in more physical activity.

In general, health-protective behaviors do not appear to be influenced by adolescent romantic partnerships over time. This is in contrast to research with married adults (Wilson, 2002). Adolescent dating relationships, however, are clearly different than adult committed relationships. Our results indicate that the role of romantic partner influence on adolescent health-protective behavior is minimal, even with a longitudinal sample of adolescents in the same relationship for some time.

Gender and Age Interactions

Female partners were particularly influenced by their male partner's alcohol use. Specifically, when Wave 1 male partner's alcohol use was high, it predicted increased Wave 2 alcohol use for females. This finding is consistent with past research regarding the influence of gender on romantic partner behavior (see Introduction). Additionally, the partner marijuana by gender interaction approached statistical significance ($p < 0.06$) and was in the same direction as alcohol use (females increased Wave 2 marijuana use based on males Wave 1 marijuana use).

Smoking, delinquency, and health-protective behaviors did not evidence similar gender by partner interactions. As stated earlier, smoking may be a behavior on which actor and partners are particularly alike, which is true in the adult marriage literature (Homish & Leonard, 2005). Hence, partner influence may be limited when romantic partners are already similar on specific behaviors.

We also explored the role of age. For both delinquency as well as marijuana use, a partner by actor age interaction was evident. In both cases, the direction was negative indicating that when partners had higher delinquency or marijuana use at Wave 1, they evidenced less delinquency or marijuana use at Wave 2 if their partner was older. This may be an indication of "social control" where the older partner aided in dampening future health-harming behavior (Rhule-Louie & McMahon, 2007).

Limitations

The current findings must be interpreted in the context of the study's limitations. One limitation includes utilizing a select sample of adolescents and their romantic relationships. As described earlier, individuals in the current study were identified from the saturated school sample (2,526 participants) with 748 individuals identified as being in a romantic partnership and 160 individuals remaining in that same relationship at Wave 2. Although the number of participants was reduced at each sample selection point, we felt the 80 dyad sample was the most appropriate group to study in order to understand the possible partner influence on health behavior. This is important since the majority of studies exploring romantic partnerships on health-promoting behavior are from the adult literature. A second limitation is a loss of power due to the number of participants (80 dyads). This is particularly true when considering the effect of birth control motivation since we focused only on couples that were sexually active. A third limitation is the high possibility that romantic partners were not from the same school system, which would mean that data on that partnership was unavailable. Lastly, a measure of relationship duration exists within Add Health, however, over 30% of the individuals had this information missing (which is very similar to the rate reported by Cleveland et al, 2003), hence, it was not included in the analysis. Although the above are limitations to the current study, studying adolescent romantic dyads over time is rare in the research literature.

Future Directions

This study demonstrates the clear influence of romantic partners on health-harming behavior. We recommend that future research focus on understanding the interpersonal

mechanisms involved in adolescent health behaviors, such as the role of relationship closeness or intimacy on health behavior change. We also found gender interactions for health-harming behavior. Is this effect due to power differences within the romantic relationship? Additionally, the role of social and partner networks are important in both partner similarity and influence. Hence, network analysis related to both concepts could help elucidate the role and direction of partner influence over time. Lastly, assortative mating is an important area of future study. Research assessing adolescents prior to entry into romantic partnerships will be important in understanding the complex interaction of assortative mating and partner influence on adolescent health behavior.

Conclusion

The current study is the first to longitudinally measure both health-harming and-protective behaviors in adolescent romantic couples that remain together. It is anticipated that the current results can help guide future intervention efforts to include not only individual, but also romantic partner, behavior. For instance, couples-based interventions with adults have largely focused on the role of partner social support to leverage behavior change; the impact of these interventions have been, at best, mixed (Lewis et al., 2006). Lewis and colleagues (2006) highlight the fact that the relatively poor effect on couples-based interventions to increase health-promoting behavior may be due to the lack of understanding “intercouple mechanisms” (such as relationship closeness or intimacy) that influence health behavior. Similarly, by understanding the role of individual, romantic partner, and dyadic influences, it may be possible to develop more nuanced interventions that seek not only to leverage the partner to influence change, but also impact mechanisms of influence, such as relationship closeness or intimacy, to positively impact health behavior.

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Research highlights

- Adolescent romantic partners clearly impact the expression of health-harming behavior, such as smoking and alcohol use.
- Adolescent romantic partner influences were not noted with health-protective behavior.
- Future research should explore the impact of including romantic partners in health-harming intervention research.

Table 1

Means, Standard Deviations, and Intraclass Correlations of Romantic Dyads across Time.

Health-harming and -protective behavior	Wave 1			Wave 2		
	Male	Female	Correlation	Male	Female	Correlation
Age	16.60 (1.03)	15.91 (1.13)	0.68**			
Delinquency	4.41 (5.30)	2.78 (3.36)	0.21*	3.05 (4.66)	2.18 (2.77)	0.18
Alcohol	6.55 (4.11)	5.10 (2.57)	0.38**	6.40 (3.95)	4.80 (2.70)	0.54**
Smoking	10.22 (18.47)	7.28 (14.09)	0.60**	9.76 (15.94)	9.76 (15.94)	0.58**
Marijuana	6.52 (5.43)	5.62 (3.00)	−0.09	7.36 (5.37)	6.33 (3.11)	−0.14
Physical activity	4.03 (2.11)	3.16 (1.64)	0.14	3.55 (2.12)	3.11 (1.92)	0.13
Physical inactivity	12.36 (11.22)	12.97 (15.79)	0.16	14.16 (16.09)	11.02 (11.71)	0.02
Sleep	4.03 (2.11)	3.16 (1.64)	0.12	3.55 (2.12)	3.11 (1.92)	0.11
Seatbelt use	2.90 (1.24)	3.43 (0.80)	0.09	2.91 (1.32)	3.63 (0.67)	0.07
BC motivation-sexually active[1]	28.46 (4.70)	33.53 (5.76)	0.15	28.46 (5.84)	32.90 (6.04)	0.18
BC motivation-sexually inexperienced[2]	30.75 (8.52)	34.35 (9.91)	0.61**	30.59 (6.40)	32.86 (7.56)	0.16

*p < .05.

**p < .01.

[1]Birth control motivation was calculated for 33 sexually active partners at Wave 1 and 43 sexually active partners at Wave 2.

[2]Birth control motivation was calculated for 47 sexually active partners at Wave 1 and 37 sexually inexperienced partners at Wave 2.

Table 2

Multilevel Modeling to Test Wave 1 Actor and Partner Behavior on Health-Harming Behaviors at Wave 2

Model	Measures	Delinquency	Alcohol	Smoking	Marijuana
Main effects	Intercept	−3 .01 (−12.37,6.34)	−2.22 (−10.07,5.63)	19.75 (−9.00,48.51)	0.78 (−8.21,9.78)
	Actor behavior	3 .99 (1.79,6.19)***	0.55 (0.31,0.79)***	0.68 (0.55,0.80)***	−13.27 (−17.22, −9.31)***
	Partner behavior	0.01 (−0.09,0.10)	0.10 (−0.05,0.25)	0.22 (0.10,0.35)***	0.69 (−2.68,4.06)
	Gender	0.11 (−0.96,1.17)	−0.48 (−2.11,1.15)	−0.15 (−4.23,3.94)	0.22 (−0.92,1.36)
	Actor age	−0.16 (−0.78,0.46)	0.08 (−0.36,0.53)	−0.72 (−2.76,1.33)	0.08 (−0.52,0.68)
	Partner age	0.37 (−0.26,0.99)	0.14 (−0.31,0.58)	−0.35 (−2.40,1.69)	−0.12 (−0.73,0.48)
Age Interactions	Actor behavior X A age[1]	−0.06 (−0.18,0.05)	-	-	0.65 (0.44,0.86)***
	Partner behavior X A age[2]	−0.15 (−0.26, −0.04)**	-	-	−0.26 (−0.44, −0.07)***
	Actor behavior X P age[1]	-	-	-	0.28 (0.08,0.48)***
	Partner behavior X P age[2]	-	-	-	0.22 (0.02,0.42)*
Gender interactions	Actor behavior X gender	-	− 0.03 (−0.33,0.27)	-	− 0.93 (−1.45, −0.40)***
	Partner behavior X gender	-	0.32 (0.02,0.63)*	-	1.01 (0.48,1.53)***
Dyad interactions	Dyad similarity	-	-	-	-
	Dyad interaction	-	-	-	-

Note. Beta coefficients and 95% confidence interval reported; underline = p < .10,

* = p < .05,

** = p < .01,

*** p < .001;

[1] A age = Actor age,

[2] P age = Partner age

Table 3

Multilevel Modeling to Test Wave 1 Actor and Partner Behavior on Health-Protective Behaviors at Wave 2

Model	Measures	Physical activity	Physical inactivity	Sleep	Seatbelt use	Birth control motivation
Main effects	Intercept	10.64 (6.02,15.26) ***	7.14 (−36.86,51.14)	7.72 (3.80,11.64) ***	1.90 (−0.53,4.32)	7.57 (−24.02,39.17)
	Actor behavior	0.41 (0.27,0.56) ***	−3.44 (−5.74, −1.14) **	0.31 (0.17,0.45) ***	0.40 (0.17,0.62) ***	0.12 (−0.31,0.54) **
	Partner behavior	0.07 (−0.08,0.22)	3.02 (0.54,5.49) **	−0.02 (−0.16,0.12)	−0.08 (−0.22,0.07)	0.43 (−0.02,0.88)
	Gender	0.39 (−0.36,1.13)	−3.75 (−11.02,3.52)	−0.13 (−0.55,0.29)	−1.95 (−3.11, −0.79) ***	−9.60 (−31.67,12.46)
	Actor age	−0.47 (−0.81, −0.12) **	0.27 (−2.91,3.45)	−0.11 (−0.33,0.10)	0.08 (−0.07,0.23)	−0.04 (−1.62,1.53)
	Partner age	−0.10 (−0.45,0.24)	−0.32 (−2.61,1.98)	−0.05 (−0.27,0.16)	−0.04 (−0.19,0.11)	0.54 (−1.14,2.21)
Age interactions	Actor behavior X A age[1]	-	0.24 (0.10,0.39) ***	-	-	-
	Partner behavior X A age[2]	-	−0.19 (−0.35, −0.04) **	-	-	-
	Actor behavior X P age[1]	-	-	-	-	-
	Partner behavior X P age[2]	-	-	-	-	-
Gender interactions	Actor behavior X gender	-	0.27 (−0.05,0.59)	-	0.35 (0.08,0.63) **	0.53 (−0.04,1.09)
	Partner behavior X gender	-	0.21 (−0.09,0.51)	-	0.11 (−0.16,0.38)	−0.29 (−0.91,0.33)
Dyad interactions	Dyad similarity	-	-	-	-	-
	Dyad interaction	-	-	-	-	-

Note. Beta coefficients and 95% confidence interval reported, underline = p < .10,

* = p < .05,

** = p < .01,

*** p < .001;

[1] A age = Actor age,

[2] P age = Partner age