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A Prospective Study of Mutual Influence for Substance Use among Young Adult Marital Dyads

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Abstract

The purpose of this two-wave longitudinal study was to specify, test, and evaluate an actor–partner interdependence model (APIM) with young adult marital dyads to test husbands' and wives' mutual influences on each other's substance use. Prospective data were collected from young adults and their spouses at baseline and 5 years later. Data from 237 dyads were used to test spouses' interdependence on alcohol use, alcohol problems, and marijuana use with the APIMs. Marital partners had significant effects on each other's substance use, though the patterns were different contingent on the outcome referenced. Husbands' alcohol use significantly predicted wives' alcohol use and alcohol problems. Wives' alcohol use and marijuana use significantly predicted husbands' alcohol use, alcohol problems, and marijuana use. For these young adult dyads, partner influences were indicated for both spouses, but more pervasive influences were indicated from wives-to-husbands than the reverse.

Keywords

Young adult marital dyads; actor-partner interdependence model; alcohol; marijuana

Ample evidence has indicated that alcohol and other substance use (e.g., marijuana use) are similar (i.e., significantly correlated) for young adult dating, cohabiting, and marital partners (Derrick & Leonard, 2016; Rhule-Louie & McMahon, 2007). Questions related to the processes by which this similarity occurs have been addressed by recent research. For example, selection and socialization interpersonal processes have been hypothesized as mechanisms that at least partially explain dyadic similarity in substance use among romantic partners. In terms of selection effects (e.g., assortative mating), higher alcohol use or problem drinking is more likely among marital partners than a random mating model would suggest (Leonard & Eiden, 1999; Windle, 1997), and similar findings have been indicated for marijuana use (Yamaguchi & Kandel, 1993; 1997).

By contrast, socialization effects (which represent a mutual or reciprocal influence model) have been demonstrated in prospective research on partner influences, though findings have differed contingent on the substance outcome under investigation. Importantly, research on partner influences for different substances have varied with regard to duration of marriage

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(e.g., newlyweds, married four-years), statistical model used for analyses, definition of alcohol variables (e.g., alcohol involvement, heavy drinking, problem drinking), and dyadic versus single-reporter methods. Given this variation, the following tentative findings have been supported. For alcohol use, among newlyweds, husbands' influence on wives has been stronger than the reverse (Leonard & Mudar, 2003); among those in longer duration marriages (> 4 years), wives' influence on husbands has been stronger than the reverse (Leonard & Mudar, 2004; Windle & Windle, 2014). For heavy episodic (or binge) drinking, dating partners have comparable partner influences (Mushquash et al., 2013); for marriages of about four years, wives' influence on husbands has been greater than the reverse (Leonard & Homish, 2008; Leonard & Mudar 2004); for longer duration marriages, no significant partner effects were indicated for heavy episodic drinking (Windle & Windle, 2014). For alcohol problems, there have been bidirectional influences across a four-year interval (Leonard & Homish, 2008). For marijuana use, wives' influence on husbands has been stronger than the reverse for those in the first year of marriage (Leonard & Homish, 2005) and in a stable marriage across a six-year period (Yamaguchi & Kandel, 1997).

In pursuing possible reciprocal socialization influences among dyadic partners, the actor–partner interdependence model (APIM; Cook & Kenny, 2005; Kenny & Ledermann, 2010) has often been adopted. For distinguishable dyads, such as heterosexual married couples, the APIM provides estimates for effects that are attributable to stable characteristics of a person (the actor) and effects that are attributable to the partner's impact while statistically controlling for dyadic non-independence (Cook & Kenny, 2005; Leonard and Mudar, 2004).

Study Hypotheses

In the current study, an APIM analytic strategy was used to model simultaneously the mutual influences of 1) alcohol use, 2) alcohol problems, and 3) marijuana use with a young adult sample of marital dyads. With a few exceptions (e.g., Homish, Leonard, Kozlowski, & Cornelius, 2009; Merline, Schulenberg, O'Malley, Bachman, & Johnston, 2008), most previous studies of partner influences have included single substances (e.g., either alcohol or marijuana); this study included three indicators of substance use in a single APIM model. The study hypotheses were as follows: First, we hypothesized that there would be both statistically significant actor and partner effects for husbands and wives. Second, because one's prior behavior is often the strongest predictor of one's subsequent behavior, we hypothesized that the actor effects would be significantly larger than the partner effects. Third, as our brief review of previous partner-effects research indicated, findings have differed with respect to the magnitude of partner effects across the course of marriage and for different substances (Derrick & Leonard, 2016). Based on the findings indicating greater wives-to-husbands effects in longer-term relationships (Leonard & Mudar, 2004; Leonard & Homish, 2008; Windle & Windle, 2014; Yamaguchi & Kandel, 1997) and because the average length of marriage for the marital dyads at our initial wave (Wave 6) was a little over three-years and at our follow-up (Wave 7) was almost seven and-one-half years (see Table 1), we hypothesized that wives' influence on husbands would be of greater magnitude than the reverse for alcohol and marijuana use.

Method

Participants

The data used in this study were collected from young adults at Waves 6 and 7 as part of a larger, seven-wave, 23-year prospective study focused on risk factors for adolescent and young adult substance use and mental health (see Windle & Wiesner, 2004). The first four waves of the study, with six-month intervals, occurred during adolescence. The study design and focus shifted during Waves 5–7 (Wave 5, ages 23.5 yrs.; Wave 6, 28.5 yrs.; Wave 7, 32.5 yrs.) in that assessments occurred at three 5-year intervals, the focus shifted from adolescence to the transition from adolescence to young adulthood, and personal interviews, rather than group-administered in-school surveys, were conducted with each participating member. At Waves 6 and 7, if participants were married, their spouses were invited to participate. The target population for this study included those marital dyads who participated at both Waves 6 and 7 ($N=237$ dyads). At Wave 6, 306 marital dyads participated, but at Wave 7, 69 participants were excluded because one of the members did not participate (77.4% retention rate). Based on the data collected from the target participant who did participate at Wave 7, 66 of the 69 dyads were still married and attrition comparisons with the remainder of the participating dyads indicated that there were no statistically significant differences for Wave 6 sex, age, income, alcohol use, marijuana use, stressful life events, depression, or partner conflict. As such, we concluded that minimal systematic differences existed between the retained sample used in the current study relative to the original dyad sample. This study was reviewed and approved by the Institutional Review Board of the University at Buffalo. Signed informed consent was obtained from participants before each wave of assessment.

For the 237 marital dyads, ages at Wave 6 were 28.52 years ($SD = 1.92$) for wives and 30.04 years ($SD = 2.95$) for husbands. Average level of educational attainment (i.e., number of years of schooling completed) for wives was 16.14 years ($SD = 2.14$) and for husbands was 15.60 years ($SD = 2.45$). The vast majority of participants identified as non-Hispanic white (wives, 98.6%; husbands, 97.6%), and most husbands were employed full-time (93.6%), whereas 62.9% of wives were employed full-time, 17.3% part-time, 13.1% were full-time homemakers, 5.1% were unemployed and not looking for work, and 1.7% were unemployed and looking for work. The average length of marriage at Wave 7 was 7.46 years ($SD = 0.95$), and average family income at Wave 6 was 7.45 (0.95), with a score of 7=\$40,000-\$54,999 and 8=\$55,000-\$89,999.

The prevalence of alcohol and marijuana use for this sample were highly comparable to national data for same year estimates (data collected in 2012) of same-age groups for the Monitoring the Future Studies (MtF; Johnston, O'Malley, Bachman, Schulenberg, & Meich, 2013) and the National Survey of Drug Use and Health (NSDUH; Substance Abuse and Mental Health Services Administration, 2013), though there were differences in the time-windows referenced that prohibit exact comparisons. At Wave 7, use of alcohol in the last six-months for our sample was 90.1% for males and 81.8% for females; for the MtF, the annual prevalence of alcohol use was 87.2%; for the NSDUH, last 30-day prevalence of alcohol use was 62.2%. For our sample, use of marijuana in the last six-months was 5.5%

for females and 9.5% for males; for the MtF, the annual prevalence of marijuana use was 14%; for the NSDUH, last 30-day prevalence of marijuana use was 5.3%.

For the limited amount of missing data (overall less than 2%), missing values were estimated using full information maximum likelihood estimation.

Procedure

At Waves 6 and 7, one-on-one interviews were conducted either in the subjects' homes or at the investigators' host institute. Each marital partner was interviewed separately. Each subject was paid \$40 per wave to complete an interview that lasted approximately 2 hours. Computer-assisted personal interviews were used to collect data.

Measures

Sociodemographic variables—Participants were asked about their age, number of years of education completed, family income, length of marriage, if they had children how many they had, and other status indicators (e.g., occupational status).

Alcohol use—Alcohol use was measured with a standard quantity–frequency index (QFI) that assessed consumption of beer, wine, and distilled spirits in the past 6 months (Armor and Polich, 1982). Respondents were asked how often they usually had each beverage in the last 6 months (1 = *never* to 7 = *every day*) and, when they had the beverage, on average how much they usually drank (10-point scale from 1 = *none* to 10 = *more than 8 cans, bottles, or glasses, depending on the beverage*). We derived a QFI score for average ounces of ethanol consumed per day, with a QFI of 0.5 oz. of ethanol equal to 1 drink. We used a 6-month window to derive these scores to increase the probability of capturing drinking patterns that could be missed using a shorter time window (e.g., last 30 days). The 6-month window also corresponded with the one used to measure alcohol problems.

Alcohol Problems Index (API)—Thirteen items were used to assess a range of undesirable consequences of drinking alcohol during the previous six months (Windle & Windle, 2017). Items measured experiences during, or as a consequence of, alcohol use in the domains of work, interpersonal conflict, compulsive drinking style, and loss of behavioral control. Items were scored as “0” for zero alcohol problems and “1” for one alcohol problem. Scores could range from 0 to 13. High internal consistency estimates (alpha .80), concurrent validity, and construct validity for the API have been reported in other studies (Windle & Windle, 2005; 2017).

Marijuana use—Marijuana use included the self-reported frequency of using marijuana during the last 6 months with a 7-point Likert scale that ranged from “*never used*” to “*used every day*”.

Statistical analyses plan

The APIM was specified, estimated, and evaluated using Mplus (Muthén & Muthén, 1998–2012). The two-wave model specification included the simultaneous estimation of actor effects (or estimates associated with within-person stability across time), partner effects (or

estimates of cross-lagged effects of partner's substance use at occasion t-1 on other partner's substance use at occasion t), and correlations among wives' and husbands' residual scores for alcohol use, alcohol problems, and marijuana use. The adequacy of fit for the specified models was determined by conventional goodness-of-fit cut-offs (Browne & Cudeck, 1993; Hu & Bentler, 1999; Steiger, 1990).

Results

The correlation matrix used for the APIM is provided in Table 1. The specified model consisted of wives' and husbands' respective ages and education levels, family income, having children, and length of marriage as covariates predicting Wave 6 substance use factors (alcohol use, alcohol problems, marijuana use) for wives and husbands, respectively. Actor effects were modeled as autoregressive coefficients (i.e., t-1 on t), and cross-lagged effects corresponded to partner effects. Residuals of the equations at each occasion of measurement for wives' and husbands' substance use factors were allowed to correlate to accommodate the non-independence of the dyadic unit (Cook and Kenny, 2005). Results from the APIM are provided in Table 2 and Figure 1 and, based on multiple fit indexes, provided a plausible fit to the data, $\chi^2(60) = 85.01$, $p = .04$; CFI = .98, RMSEA = .042 (.018-.061); SRMR = .06. For ease of presentation, only significant effects were provided in Figure 1. As expected, the actor effects (stability coefficients) were statistically significant for both husbands and wives across the two waves of measurement. Several partner effects were also statistically significant, and partner effects from wives to husbands were more consistent than the reverse. Wives' alcohol use and marijuana use significantly predicted husbands' alcohol use, alcohol problems, and marijuana use. However, for the partner effects from husbands to wives, only husbands' alcohol use significantly predicted wives' alcohol use and alcohol problems.

To test if cross-lagged partner effects would differ statistically, with stronger effects indicated for the wives-to-husbands' coefficients, we specified and estimated two partner-symmetry models in which the cross-lagged partner coefficients were constrained to equivalence between Wave 6 and Wave 7. The first model imposed three equality constraints for wife-to-husband and husband-to-wife primary paths (e.g., alcohol use-to-alcohol use) for alcohol use, alcohol problems, and marijuana use. The chi-square difference test for the constrained model and the model presented in Figure 1 indicated a significant decrement in statistical fit, $\chi^2(3) = 19.96$, $p < .001$. The second model imposed nine equality constraints for wife-to-husband and husband-to-wife for both primary and secondary paths (e.g., alcohol use-to-marijuana use). Again, the chi-square difference test indicated a significant decrement in statistical fit, $\chi^2(9) = 18.67$, $p < .05$ relative to the model presented in Figure 1. Thus, our findings indicated asymmetric relationships for partner effects, with husbands' alcohol use significantly influencing wives' alcohol use and alcohol problems and wives' alcohol use and marijuana use significantly influencing husbands' alcohol use, alcohol problems, and marijuana use.

Discussion

Findings from the APIM supported our first two hypotheses of greater actor stability in substance use, with smaller magnitude partner effects. In addition, supportive of our third hypothesis, husbands' and wives' influences on their spouse's substance use were asymmetrical. That is, our findings indicated that wives' alcohol use and marijuana use had a greater influence on husbands' alcohol use, alcohol problems, and marijuana use, while husbands' influence on wives was limited to husbands' alcohol use on wives' alcohol use and alcohol problems. These findings are consistent with some prior research findings regarding asymmetric effects among marital dyads, especially for other substances such as marijuana (Leonard & Homish, 2005; Yamaguchi & Kandel, 1997) and alcohol problems (Leonard & Homish, 2008). They are also consistent with findings from studies that have investigated marriages of several years' duration versus newlywed studies (Leonard & Homish, 2008; Leonard & Mudar, 2003; Merline et al., 2008); at Wave 6 the average length of marriage was a little over three-years and at Wave 7, our sample was married, on average, almost seven-and one-half years. The difference was not exactly five years due to variation in the between individual interval assessments and rounding errors for the "years married" variable at each occasion of measurement.

In the marital dyads literature, partner selection and socialization effects have been conceptualized as important factors that affect stability and change of alcohol and other substance use (Derrick & Leonard, 2016; Merline et al., 2008). For the current sample of young adult marital dyads, the initial partner selection effects likely occurred prior to our data collection and thus were part of a dyadic process that was not evaluated in the specified APIM. However, with regard to socialization effects, social influences (i.e., partner effects) associated with the roles of wives may account, at least in part, for our findings that wives had a greater impact on their husbands' alcohol use, alcohol problems, and marijuana use than husbands had on their wives' behaviors. For example, although husbands' influence on the post-marital environment may be stronger during the newlywed phase (Leonard & Mudar, 2003), it is possible that wives may be more influential in structuring the longer-term post-marital environment by selecting the couples' social outlets, such as choosing friends and acquaintances with whom to spend leisure time, with these choices, in turn, influencing higher (or lower) levels of substance use and associated problems (Derrick & Leonard, 2016). Changes in other social roles (e.g., parenting) may also impact social activity options and substance use. In this study, having a child was associated with lower alcohol use and alcohol problems for wives (but not husbands), but it did not alter the pattern of partner influences.

This study has limitations that merit consideration when interpreting the findings. First, the sample was not a representative sample but rather was predominantly white and middle class, and had, on average, relatively high educational attainment. Therefore, our findings may not generalize to broader, more representative populations. Second, the data were collected by means of self-reports, which may have introduced mono-method bias that may have affected the resulting findings. Third, the 5-year measurement intervals may have masked considerable changes in substance use behaviors that occurred during the intervening periods; a more intensive longitudinal design with shorter intervals between

measurement occasions may have yielded more dynamic patterns of changes in substance use.

In summary, marital partners in young adulthood manifested an asymmetric pattern of mutual influence. Husbands' alcohol use significantly predicted increases in wives' alcohol use and alcohol problems. However, more pervasive prospective effects were indicated for wives' alcohol use and marijuana use on husbands' substance use and alcohol problems. These findings advance the literature on marital dyads and substance use in two important ways. First, when studying marital (or romantic) dyads, future research would benefit by including the mutual influences of multiple substances and associated problems rather than exclusively focusing on partner influences for a single substance. Tests of symmetrical and asymmetrical influences should also be investigated to facilitate broader conclusions about the strength and directionality of partner influences for different substances and across stages of relationships (e.g., dating, newlyweds, longer-term marriages). Second, preventive interventions and couples' treatments may be further informed by these findings in recognizing how couples mutually influence each other's substance use behaviors, and that the dynamics of couples as a unit of bidirectional influences are important in understanding and attempting to alter higher levels of substance use and associated problems among marital couples.

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SUBSTANCE USE DYADS

19

Figure 1.

Actor-partner interdependence model for marital dyads' alcohol use, alcohol problems, and marijuana use. W = wife; H = husband. * $p < .05$; ** $p < .01$; *** $p < .001$. For ease of presentation only significant path effects are provided in the figure.

Correlation Matrix, Means, and Standard Deviations for Actor–Partner Interdependence Models for Alcohol Use, Alcohol Problems, and Marijuana Use

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Children	1.0																		
2. Y6 Age	.15 ^a	1.0																	
3. S6 Age	.16 ^a	.17 ^b	1.0																
4. Y6 Ed	-.15 ^a	.21 ^c	-.00	1.0															
5. S6 Ed	-.40 ^c	-.07	.04	.30 ^c	1.0														
6. Y6 Income ^I	.10	.03	.02	-.01	.15 ^a	1.0													
7. Years Married	.01	.02	.01	.02	.00	-.06	1.0												
8. Y6 QFI	-.05	.02	-.01	-.05	-.04	-.07	.02	1.0											
9. S6 QFI	-.31 ^c	.02	.01	.11	.11	-.04	.03	.38 ^c	1.0										
10. Y6 AP	-.04	-.00	.03	-.02	.00	-.04	.02	.53 ^c	.20 ^b	1.0									
11. S6 AP	-.19 ^b	.07	-.00	.03	.12	-.04	.17 ^b	.17 ^b	.52 ^c	.13 ^a	1.0								
12. Y6 MIU	-.04	.16 ^a	-.08	-.11	-.16 ^a	-.03	.03	.20 ^b	.12	.13 ^a	-.02	1.0							
13. S6 MIU	-.02	.02	-.09	-.12	-.11	-.02	.00	.13 ^a	.13 ^a	.09	-.01	.63 ^c	1.0						
14. Y7 QFI	.07	.07	.04	-.00	-.04	-.04	-.02	.73 ^c	.26 ^c	.39 ^c	.04	.19 ^b	.21 ^c	1.0					
15. S7 QFI	.02	.08	.07	-.04	-.06	-.05	-.04	.29 ^c	.38 ^c	.15 ^a	.28 ^c	.02	-.01	.32 ^c	1.0				
16. Y7 AP	.02	-.03	.09	-.05	-.04	-.04	.00	.46 ^c	.24 ^c	.58 ^c	.05	.13	.19 ^b	.60 ^c	.27 ^c	1.0			
17. S7 AP	-.01	.08	.03	.03	.04	-.04	.01	.19 ^b	.36 ^c	.03	.46 ^c	-.00	-.02	.17 ^b	.55 ^c	.14 ^a	1.0		
18. Y7 MIU	-.06	.14 ^a	-.04	-.07	-.14 ^a	-.01	-.05	.21 ^c	.23 ^c	.12	.01	.81 ^c	.65 ^c	.22 ^c	.12	.19 ^b	.08	1.0	
19. S7 MIU	-.08	.01	-.07	-.09	-.06	.00	-.00	.12	.19 ^b	.08	.01	.57 ^c	.90 ^c	.16	.07	.19 ^b	.01	.73 ^c	1.0
<i>M</i>	0.55	30.04	28.52	15.60	16.14	7.45	7.46	2.89	2.59	1.42	0.67	2.35	2.32	2.88	2.59	1.22	0.66	2.35	2.32
<i>SD</i>	0.50	2.95	1.92	2.45	2.14	0.95	2.59	0.27	0.12	4.17	1.85	0.04	0.01	0.32	0.12	2.87	3.37	0.05	0.02

Notes: Y6=Young Adult, Wave 6; S6=Spouse, Wave 6; Y7=Young Adult, Wave 7; S7=Spouse, Wave 7; QFI=Quantity-Frequency Index; AP=Alcohol Problems; MIU= Marijuana Use; Children= Children at Wave 6 (0=0) (1=1).

^I Income categories: 1=less than \$6,000 to 8=\$55,000 or more.

$100 > d_c$
 $; 10 > d_q$
 $; 50 > d_b$

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Table 2
Results from Full Actor—Partner Interdependence Model with Wave 6 Husbands' and Wives' Substance Use Predicting W7 Husbands' and Wives' Substance Use

Wave 6 Substance Use Predictors	Wave 7 Substance Use Outcomes					
	Husbands' Alcohol Use	Wives' Alcohol Use	Husbands' Alcohol Problems	Wives' Alcohol Problems	Husbands' Marijuana Use	Wives' Marijuana Use
Husbands' Alcohol Use	.71*** ^f	.19**	.18**	.14*	.01	-.04
Wives' Alcohol Use	.03	.26***	.13*	.14*	.14**	.11**
Husbands' Alcohol Problems	.02	-.01	.48***	-.11	-.02	.00
Wives' Alcohol Problems	-.10	-.11	-.11	.37***	-.05	-.03
Husbands' Marijuana Use	-.04	-.00	-.10	.01	.66***	.02
Wives' Marijuana Use	.13*	-.06	.17**	-.05	.23***	.88***

^f Standardized Regression Coefficients are presented.

Note: The Wave 6—Wave 7 substance use stability is represented by standardized regression coefficients on the diagonal.

* $p < .05$;

** $p < .01$;

*** $p < .001$