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Concordant and discordant alcohol, tobacco, and marijuana use as predictors of marital dissolution

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Abstract

Objective—This study examined concordant and discrepant alcohol, tobacco, and marijuana use among couples to determine whether they predicted marital separation/divorce over nine years.

Method—The study recruited 634 couples as they applied for their marriage license and assessed them at that time, and re-assessed them with mailed questionnaires at their 1st, 2nd, 4th, 7th, and 9th anniversaries. Approximately 60% of the men and women were European-American, and approximately 1/3 were African-American. The frequency of drinking to intoxication and binge drinking (more than 5 drinks in an occasion) were assessed, as were the use of cigarettes and marijuana. At each assessment, each member of the couple was asked about the occurrence of marital separations and divorce.

Results—Bivariate analyses indicated that tobacco and marijuana use, whether discrepant or concordant, were associated with marital disruptions. However, discrepant heavy drinking was associated with disruptions but concordant heavy drinking was not. Concordant and discordant marijuana use were not associated with divorce when analyses controlled for alcohol and tobacco use. Concordant and discordant tobacco use was not associated with divorce when analyses controlled for sociodemographic and personality factors. However, discrepant alcohol use was related to divorce after controlling for the other substances in one analysis and after controlling for the sociodemographic factors in a separate analysis.

Conclusions—Tobacco and marijuana use were related to divorce through their associations with other variables. However, results suggested that discrepant alcohol use may lead to marital disruptions and should be addressed with couples seeking marital treatment.

Keywords

Marriage; Divorce; alcohol use; tobacco; marijuana

There is a common sense appeal to the notion that alcohol and drug use are important sources of marital problems and divorce, with most of the literature focusing on alcohol problems and alcoholism. In early studies of divorce, the husbands' alcohol use was a frequent reason given for the breakup of the marriage (Levinger, 1966). More recently, Amato and Previti (2003) found that drinking or drug use was the third most cited reason for divorce with 14% of women and 5% of men reporting this reason. Further, among couples presenting for marital therapy, heavy drinking, particularly among the men, is very prevalent and alcohol is often cited as a source of problems and disagreements (Halford & Osgarby, 1993). General population studies often find that rates of heavy drinking, alcohol problems, and alcohol diagnoses are higher among individuals who are separated or divorced (Cahalan, Cisin, & Crossley, 1969; Hilton, 1991; Hasin, Stinson, Ogburn, & Grant, 2007), although these findings are sometimes stronger for males than females (e.g. Clark & Midanik, 1982; Hilton, 1991). Studies of alcoholics consistently suggest that the rates of divorce and separations are considerably higher among alcoholics than among individuals in the general population. In addition, married alcoholics typically score lower on measures of marital functioning than do control samples (Marshall, 2003). These findings, coupled with the observation that alcoholics tend to have rates of marriage similar to the general population, have led to the assumption that alcoholics are comparable to nonalcoholics at the time of marriage and the years of heavy alcohol consumption and alcohol problems take their toll on the relationship, leading to deterioration and ultimately, a divorce.

Despite its common sense appeal, direct support for the hypothesis that excessive and problem drinking lead to divorce is, in fact, difficult to find. Much of the research linking alcohol and separation or divorce is cross-sectional in nature (e.g. Hilton, 1991), raising the possibility that the association may be due, at least in part, to other factors that may lead to both excessive drinking and marital instability. Several behavioral genetics studies utilizing different approaches have found evidence for a shared genetic risk for alcohol disorders and divorce (Dick et al, 2006; Osler et al., 2008; Prescott and Kendler, 2001). This genetic risk may be reflected to some extent in personality factors that have been separately linked to divorce and excessive drinking. For example, Humbar, Donnellan, Iacono, and Burt (2010) found that the personality factors of negative emotionality and constraint were correlated with marital distress for both men and women. Similarly, Lavner and Bradbury (2010) found that maladaptive personality characteristics (high neuroticism, high hostility, low self esteem) and chronic stress characterize men and women with substantial declines in marital satisfaction over the first 4 years of marriage. Negative emotionality (i.e neuroticism), constraint, hostility, and stress have been shown to be prospectively predictive of adverse alcohol outcomes (Elkins, King, McGue, & Iacono, 2006; Johnson & Pandina, 2000, Leonard & Homish, 2008, Rutledge and Sher 2001). Moreover, South, Krueger, and Iacono (2011) recently found that both internalizing and externalizing psychopathology predicted marital distress, but that alcohol and substance use disorders did not have a unique predictive value after controlling for these general psychopathology factors. Clearly, some, if not all, of the association between alcohol and substance use and divorce may be the result of these psychopathology/personality factors that are predictive of both.

The cross-sectional association between alcohol and divorce might also, to some extent, reflect a process in which marital deterioration and divorce leads to increased drinking and

drinking problems. Prospective evidence is quite conclusive that the transition from married to divorced status is associated with an increased level of drinking, drinking problems and dependence (with the exception of women ending their marriage with a problem drinking husband (Smith, Homish, Leonard, & Cornelius, 2012). For example, across four years of marriage, Leonard and Homish (2008) found that marital satisfaction protected both husbands and wives against the occurrence of alcohol problems. Moreover, Temple, Fillmore, Hartka, Johnstone, Leino, and Motoyoshi (1991) conducted a meta-analysis of 12 longitudinal studies conducted in the United States, Canada, and Europe and found that divorce led to increased alcohol consumption per occasion among the younger members of the cohorts, and for both men and women. Bachman, Wadsworth, O'Malley, Johnston, and Schulenberg (1997) examined the Monitoring the Future data and followed a cohort across the transition to divorce. Divorce led to an increase in the percentage of heavy drinking and to an increase in alcohol use to premarital levels.

There is some evidence for the potentially deleterious influence of substance use on marital relationships. Several cross-sectional studies have retrospectively examined ages of substance use disorders and age at divorce to create a longitudinal perspective. Kessler, Walters, and Forthofer (1998) analyzed data from the National Comorbidity Study, and found that a substance use diagnosis predicted a divorce at a later age for both men and women after controlling for a number of sociodemographic and family variables. Breslau and colleagues (2011) utilized a similar methodology in a large cross-national study and found that both alcohol and drug use disorders increased the odds of divorce, although only abuse diagnoses were significant after controlling for the other mental disorders. Finally, one of the only truly longitudinal studies was conducted by Collins, Ellickson, and Klein (2007) who analyzed data from a RAND sample of adolescents that were re-assessed at ages 23 and 29. Approximately 23% of the sample had married by age 23, and 22% of these had divorced by age 29. There were significant bivariate relationships between divorce and frequency of alcohol intoxication, marijuana use, and hard drug use, however only the frequency of alcohol intoxication was significant in the multivariate model.

One of the key limitations in most of these studies of substance use and divorce has been the focus on the substance use of one member of the couple and the absence of information regarding the substance use of the other member of the couple. Several studies by Leonard and colleagues have assessed both members of the couple. This work has found that discrepant patterns of husband and wife drinking are predictive of marital dissatisfaction cross-sectionally (Mudar, Leonard, & Soltysinski, 2001) and longitudinally (Homish & Leonard, 2007). In addition, Homish, Leonard, Kozlowski, and Cornelius (2009) found that both discrepant alcohol and smoking behavior were independently predictive of declines in marital satisfaction, and that discrepancies on both smoking and alcohol acted synergistically to predict very large declines in marital satisfaction. In a subsequent paper, Homish, Leonard, and Cornelius (2008) found that the use of illegal substances by either partner was associated with poor marital satisfaction but that discrepant use was not more deleterious than congruent use.

It seems reasonable to suggest that, inasmuch as discrepancies in substance use predict declines in marital satisfaction, they should also predict divorce. Two studies have examined

this. Ostermann, Sloan, and Taylor (2005) examined a sample of couples who were in their mid-50s, and who had been married an average of 27 years. Over five assessments spanning eight years, they observed that 4.1% of the couples separated or divorced, and found that discrepant drinking patterns at one time point were predictive of separation or divorce by the next assessment. More recently, Torvik, Roysamb, Gustavson, Ildstad, and Tambs (in press) assessed nearly 20,000 couples residing in one county in Norway. At the baseline assessment, men and women in this sample had an average age of 52 and 49, respectively. Using registry data, they were able to follow couples for 15 years, and approximately 7.4% of the couples divorced over this time. They found that discordant drinking increased the likelihood of divorce, but that concordant heavy drinking did not.

Although these two studies do support the hypothesis that discordant heavy drinking, but not concordant heavy drinking, is predictive of separation and divorce, there are several limitations in both of these studies. Both studies focused on samples that were in their late 40's and early 50's at the initial assessment. Inasmuch as the average age of first marriage was the late 20's in the United States and Norway for individuals in these cohorts, more than half of all divorces would have occurred by the time of the initial assessment. For example, in the case of the Ostermann, et al study (2005), 4.1% of their sample separated or divorced in the eight years of observation, in contrast to the estimates that 50% of U.S. marriages end in divorce. Second, neither study specifically examined the frequency of heavy drinking. Ostermann, et al (2005) used the average drinks per day, which combines both frequency and quantity, while Torvik et al (in press) used frequency of drinking and whether the person reported having felt "influenced by alcohol on any occasion" over the past two weeks and whether there was a period in their life in which they drank "excessively or at least a bit too much." Finally, while both studies were able to control for sociodemographic factors, neither was able to control for personality factors that have been shown to predict both excessive drinking and marital disruptions.

The purpose of this study was to examine husband and wife alcohol, marijuana, and cigarette use as predictors of divorce among couples in their first marriage. Couples for this study were participants in a six wave study of newlywed couples from the time of marriage through their ninth anniversary. At each wave, comprehensive information regarding alcohol, marijuana, and cigarette use was collected, as was information regarding personality and marital functioning. We hypothesized that the discrepant use of alcohol, cigarettes, and marijuana by husbands and wives would influence the likelihood of divorce. By starting with newlywed couples, we were able to trace the likelihood of divorce over nine years. In examining these hypothesized relationships, we utilized the frequency of heavy drinking episodes to define concurrent/discrepant drinking and controlled for a number of stable distal characteristics that have been linked independently to alcohol consumption and divorce.

Method

Participants

Participants for this report were involved in a longitudinal study of marriage and alcohol involvement. All participants were at least 18 years old, and could read, write, and speak in

English. Couples were ineligible for the study if they had been previously married. The current analyses are based on 634 couples. At the initial assessment, the average age of the men [mean (SD)] was 28.7 (6.3) years and the average of the women was 26.8 (5.8) years. The majority of the men and women in the sample were European American (husbands: 59%; wives: 62%). About one-third of the sample was African American (husbands: 33%; wives: 31%). The sample also included small percentages (less than 5%) of Hispanic, Asian, and Native American participants. In terms of education, 36% of men and 32% of women had a high school degree or less, 30% of men and 31% of women had some college or trade school, and 34% of men and 38% of women were college graduates. Most were employed at least part-time (husbands: 89%; wives 75%). Consistent with other studies of newly married couples (e.g., Chadiha, Veroff, & Leber, 1998; Crohan & Veroff, 1989; Orbuch & Veroff, 2002; Tallman, Burke, & Gecas, 1998), many of the couples were parents at the time of marriage (38% of the husbands and 43% of the wives) and were living together prior to marriage (70%). The Institutional Review Board of our university approved the research protocol.

Procedures

After applying for a marriage license, couples were recruited for a 5–10 minute paid (\$10) interview. The interview covered demographic factors (e.g., race, education, age), family and relationship factors (e.g., number of children, length of engagement), and substance use questions (e.g., tobacco use, average alcohol consumption, times intoxicated in the past year). Recruitment occurred over a 3-year period from 1996–1999. For interested individuals who did not have time to complete this interview, a telephone interview was conducted later that day or the next day ($N = 62$). Less than 8% of individuals approached declined to participate. We interviewed 970 eligible couples.

Couples who agreed to participate were given consent forms and identical questionnaires to complete at home and asked to return them in separate postage paid envelopes (Wave 1 Assessment). Participants were asked not to discuss their responses with their partners. Each spouse received \$40 for his or her participation. Only 7% of eligible couples refused to participate. Those who agreed to participate, compared to those who did not, were more likely to have lower incomes ($p < .01$) and the women were more likely to have children ($p < .01$). No other differences were identified. Of the 887 eligible couples who agreed to participate (13 of the original 900 did not marry), data were collected from both spouses for 634 couples (71.4%). The 634 couples are the basis for this report. Couples who returned the questionnaires were more likely to be living together compared to couples who did not return the questionnaires (70% vs. 62%; $p < .05$) and more likely to be European American. No other sociodemographic differences existed between the couples who responded compared to those who did not. Average past year alcohol consumption did not differ between couples that returned the questionnaires and those who did not. Husbands in non-respondent couples consumed 6 or more drinks or were intoxicated in the past year more often than husbands who completed the questionnaire; however, these differences were small.

At the couples' first, second, fourth, seventh, and ninth wedding anniversaries (Waves 2, 3, 4, 5, 6), they were mailed questionnaires similar to those they received at the first assessment. As with the first assessment, they were asked to complete the questionnaires and return them in the postage paid envelopes. Each spouse received \$40 for his or her participation at each wave. We maintained 90%, 86%, 84%, 79%, and 71% of couples at Waves 2, 3, and 4, 5, and 6, respectively. Husbands who participated in the sixth assessment were more likely to be white than those who did not ($p < 0.05$), but did not differ based on other sociodemographic or substance use variables (heavy drinking, marijuana use, smoking status). Wives who participated in the sixth assessment were slightly older and were more likely to be white compared to wives who did not participate ($p < .05$). Wives who did not complete the sixth assessment did not differ on any other variables compared to wives who did complete the sixth assessment.

Measures

Marital status—Current marital status was assessed at each wave by asking respondents whether they were married to their original partner, separated from their original partner, divorced from their original partner, or widowed from their original partner. For the current study, the outcome of interest was defined as either divorce from the original partner, or separation for at least one year. This was assessed in the questionnaires but also through phone contacts whenever possible with those who did not return their questionnaires.

Heavy alcohol use—Heavy drinking was defined as drinking six or more drinks at one time or drinking to intoxication. The frequency of these two behaviors was assessed using response options from one to nine, corresponding to a frequency range of “Did not drink this amount in the past year,” to “every day.” A single frequency variable was created in which each respondent was given the maximum score from these two items. Based on these frequency variables, a binary heavy drinking variable was created based on the top tenth percentile, separately for husbands and wives. For husbands, those who engaged in heavy drinking at least two to three times per month were considered heavy drinkers; for wives, those who engaged in heavy drinking at least once per month were considered heavy drinkers. Finally, a single categorical variable was created with the following four categories: 1) neither the wife nor the husband was a heavy drinker, 2) discrepant heavy drinking- husband heavy, 3) discrepant heavy drinking-wife heavy, and 4) concordant heavy drinking.

Marijuana use—Each year's survey included the following item to assess marijuana use: “In the past year, how often have you used marijuana or hashish (e.g., pot, weed, reefer, hash, hash oil, grass)?” The response options ranged from one to seven, corresponding to frequencies of “Not at all,” to “More than once a week.” For the current study, a dichotomous variable was created based on whether the respondent reported any marijuana use during the past year. A categorical variable was then created with the following four categories: 1) neither wife nor husband used marijuana, 2) discrepant marijuana use- husband uses, 3) discrepant marijuana use, wife uses, and 4) concordant marijuana use.

Cigarette smoking—Smoking was assessed at each wave by asking respondents whether they currently smoke cigarettes. This question was followed by an assessment of smoking frequency, with response options ranging from one to eight (“A few cigarettes or less” to “2 packs or more”). A binary variable was created for the current study, based on whether the respondent reported any frequency of current smoking. A categorical variable was then created with the following four categories: 1) neither wife nor husband smoked, 2) discrepant smoking-husband smokes, 3) discrepant smoking-wife smokes, and 4) concordant smoking.

Depression—Depressive symptomatology was measured at baseline using the Center for Epidemiologic Studies-Depression Scale (CES-D) (Radloff, 1977). This scale assesses depressive symptomatology with 20 items, each with ranked options from zero to three. Scores on each item were averaged to create a depression scale variable ranging from zero to three.

Antisocial personality—Antisocial personality was measured at baseline using 28 items from Zucker and Noll’s antisocial behavior checklist (Zucker & Noll, 1980). This scale measures the frequency of both childhood and adult antisocial behaviors on a four-point scale (one = never, four = often or more than ten times). Scores were averaged to create a scale variable ranging from one to four.

Sociodemographic covariates—Sociodemographic information was collected during the brief courthouse interview. The following variables were assessed as covariates in the current study: husband and wife age, employment status, race/ethnicity, education, and status of parenthood at the time of marriage.

Analyses

Discrete time hazard regression modeling was the primary analytic tool used in this study (Singer & Willett, 2003). All analyses were carried out using Stata 12.1 (StataCorp, 2011). First, a life-table was constructed to assess the pattern of divorce or separation among the overall sample, over the time-course of the study. A logistic regression model was then calculated with divorce/separation as the outcome and each discrete time point entered as a dummy variable. Two additional models, one with time as a single linear variable and the other with time as a quadratic term were calculated and compared to the fully-discrete model with a chi-square test of the log-likelihood differences. The fully-discrete model fit the divorce/separation data significantly better than the other two models ($p < 0.001$), and was thus used in further analyses.

In the following regression models, all predictor variables were lagged by a time of one. We calculated two series of models. In the first series, estimates for substance use categories were unadjusted for sociodemographics, antisocial personality, and depression. Each substance use variable was entered into a separate model, and then a fourth model was calculated including all substance use variables as predictors. In the second series of models, each substance use variable was included in a model that was adjusted for sociodemographic covariates, antisocial personality, and depression. Finally, we developed an overall model

that included substance use variables that were significant in the second series of models, and also included only the significant sociodemographic and substantive covariates.

Results

Descriptive analyses

Frequency and mean statistics for the variables of interest in this study, categorized by time point, are displayed in Table 1. Overall, substance use tended to decline with time in this sample. At baseline, at least one spouse was classified as a heavy drinker in 21% of couples, at least one spouse used marijuana in 36% of couples, and at least one spouse smoked in 45% of couples. These percentages declined to 13%, 18%, and 35%, respectively by the fifth assessment. Discrepant heavy drinking ranged from approximately 16% at wave 1 to 11% at wave 5, with approximately twice as many discrepant-husband heavy couples as discrepant-wife heavy couples. For marijuana use, discrepant use ranged from about 21% at wave 1 to 13% at wave 5, with a similar gender difference. Discrepancy with respect to smoking was relatively stable across the waves, with 23% discrepant at wave 1 and 20% at wave 5. Although there were more discrepant smoking-husband smokes than discrepant smoking-wife smokes couples, the gender difference was not as striking as for heavy drinking and marijuana use. Results from the lifetable analyses, describing the pattern of marital dissolution in this sample, are displayed in Table 2. The divorce rate increased from wave 2 to wave 4, from 5% to 11%, and then declined through wave 6, to 8%. The percent of couples married at the end of each time interval declined to 65% by wave 6.

Survival analyses: Substance use categories

In the first step of the discrete time survival analyses, we calculated unadjusted divorce odds ratios for each substance use variable separately (Table 3, models 1–3). Relative to non-heavy drinking couples, risk of divorce was greater among discrepant heavy drinkers, irrespective of whether the husband or wife was the heavy drinker (Model 1), while concordant heavy drinkers were not at significantly increased risk ($p > 0.05$). Both discrepant and concordant marijuana users, and discrepant and concordant smokers, were at increased risk of divorce relative to the non-using couples for each of these substance use variables ($p < 0.05$). In the second step of analyses, these odds ratios were recalculated, adjusting for the other two substance use variables (Table 3, model 4). The odds ratios for discrepant heavy drinkers-wife heavy (OR = 1.84, 95% CI = .97, 3.39), discrepant smokers-husband smokes (OR = 1.80, 95% CI = 1.09, 2.97), discrepant smokers-wife smokes (OR = 2.59, 95% CI = 1.50, 4.47) and concordant smokers (OR = 2.50, 95% CI = 1.63, 3.84) remained statistically significant ($p < 0.05$), while the odds ratios for marijuana use were no longer significant ($p > 0.05$).

For the third step, separate models were calculated for each substance, adjusting for sociodemographic covariates, antisocial personality, and depression (Table 4, models 5–7). Discrepant heavy drinkers-wife heavy were the only substance using category of couples that were at significantly increased risk of divorce (OR = 2.00, 95% CI = 1.03, 3.87). The final model included only the significant sociodemographic covariates, antisocial personality, depression, and discrepant heavy drinking. Discrepant heavy drinkers-wife

heavy remained a significant predictor in this model, and discrepant heavy drinkers-husband heavy was marginally significant ($p < .06$). Further analyses showed that the hazard risk for discrepant heavy drinkers-wife heavy and discrepant heavy drinkers-husband heavy were not significantly different. The cumulative hazard functions for divorce based on heavy drinking category are displayed in Figure 1.

Discussion

These results provide a more nuanced and refined examination of the impact of husband and wife substance use on marital stability. It has been common to simply link one partner's heavy drinking to marital disruptions and to ignore the potential influence of the partner and the configuration of partner drinking. Moreover, while socio-demographic factors have been sometimes considered, factors such as other substance use, antisocial behavior, and depression have not. In the current study, we controlled for these factors and found that a discrepant pattern of heavy drinking was a significant predictor of marital separations and divorce, but that a concordant pattern was not predictive. Moreover, this pattern was significant and robust when the wife was the heavy drinker, but was marginal when the husband was the heavy drinker.

Considered independently, heavy alcohol use, smoking, and marijuana use were all associated with subsequent separations and divorce. Unlike drinking, for which only discrepant use was predictive, both concordant and discrepant smoking and marijuana use were predictive of divorce. When all three substances were considered together, the association between marijuana and divorce was not significant, suggesting that any influence of marijuana could be attributed its association with alcohol and smoking. Smoking's influence, while slightly diminished when all three substances were considered, remained significant. However, neither concordant nor discrepant smoking patterns were significant when sociodemographic factors, depression, and antisocial behavior were controlled. These findings suggest that while smoking and marijuana use are bivariate predictive of divorce, their influence is attributable to other factors and not causally related.

In contrast to smoking and marijuana use, discrepant, but not concordant heavy drinking was predictive of divorce. It remained significant when significant sociodemographic and personality covariates were included in the model, extending the findings of Osterman et al (2005) and Torvik et al (in press). There are several potential explanations for these findings. One possibility is that discrepant drinking may be related to other underlying individual difference factors that are responsible for the marital disruption. However, we were able to control for two major factors, depression and antisociality, as well as socioeconomic factors that might be responsible. Similarly, it is possible that marital dissatisfaction may have resulted in discrepant drinking patterns, and that the marital dissatisfaction was the critical aspect of the marital disruption. However, previous research has demonstrated that controlling for marital satisfaction at the preceding assessment, discrepant drinking was longitudinally predictive of lower satisfaction (Homish & Leonard, 2007). Another possibility is that discrepant heavy drinking may reflect a socializing pattern in which husbands and wives maintain somewhat separate social networks, and are less likely to socialize together as a couple. Kearns and Leonard (2004) found that husbands and

wives with interdependent social networks (overlap between husband's and wife's friends, and socializing with their partner and their partner's friends) had higher marital satisfaction than couples with less interdependent networks.

There are also explanations that focus more specifically on the drinking that occurs in these couples. One such explanation is that there are a number of negative experiences that occur due to heavy drinking and that these experiences may entail costs to the relationship, either directly (e.g. intoxicated violence) or indirectly (e.g. failure to be promoted at work, health problems). In the context of a heavy drinking couple, each may be more tolerant of these costs insofar as their own drinking may also entail costs to their partner. An alternate explanation is that discrepant drinking patterns are likely to reflect different contextual patterns of consumption in which many drinking events involve drinking apart from the partner, while concordant drinking is more likely to involve drinking with one's partner. Drinking in these different contexts is likely to have different implications for the relationship (Homish & Leonard, 2005; Levitt & Cooper, 2010). In particular, Levitt and Cooper (2010) examined drinking and relationship processes in a daily report study and found that drinking with one's partner on one day was associated with increased intimacy the following day, while drinking apart from one's partner was associated with reduced intimacy and increased negative relationship events for women. Further research is needed to disentangle these possible explanations.

Our findings also provide suggestive evidence that discrepant patterns characterized by a heavy drinking wife may be more robustly related to separation and divorce than those characterized by a heavy drinking husband. This would be consistent with perspectives which suggest that women's heavy drinking may be problematic because it is viewed by men as violating gender roles regarding appropriate behavior for women (e.g. Leigh, 1995; Levitt and Cooper, 2010) and with the findings reported by Torvik et al. (in press). However, it is important not to over-interpret this inasmuch as the findings for both groups had quite similar risks when only drinking was considered (Model 1), and when only significant covariates were included in the model (Model 8). Discrepant couples-husband heavy were non significant only in analyses that included a number of non significant control variables. Moreover, analyses directly comparing the two groups did not reveal any significant or marginal differences.

Although not a specific focus of this paper, it is worth noting that both wife antisocial behavior and husband depression were associated with risk for divorce. Leonard and Homish (2008) observed a similar effect in that wife antisocial behavior was longitudinally predictive of her alcohol problems, but husband antisocial behavior was not predictive of his alcohol problems. Similarly, husband depression was predictive of husband alcohol problems, but wife depression was not predictive of her alcohol problems. These findings are somewhat counter-intuitive in that antisocial problems are usually viewed as more of a problem with men, with depression is viewed as more of a problem with women. It may be that this pattern of results occurs primarily because it is not normative. That is, because antisociality is less typically perceived as an issue in women, it is viewed by the husband as more problematic when it does occur. A similar case could be made regarding depression in men. There have been studies linking antisocial personality disorders and divorce (e.g.

Whisman, Tolejko, & Chatav, 2007), as well as depression and divorce (e.g. Kessler, Walters, & Forthofer, 1998). However, because few studies of marriage and divorce have included antisocial behavior and depression, as well as information from both husband and wife, it is difficult to determine the validity of this explanation.

From a clinical perspective, this study, and the studies by Ostermann et al (2005) and Torvik et al (in press) indicate that discrepant patterns of heavy drinking may be critical areas to address with couples presenting for marital treatment. Over the course of nine years, nearly 50% of couples with discrepant heavy drinking patterns divorced, while the rates for other couples were approximately 30%, suggesting that over time, these effects can be quite large. Moreover, while the results do not indicate an increased likelihood of divorce among couples with concordant heavy drinkers, clinicians should not assume that other aspects of family functioning are optimal. In addition, this research suggests the possibility that factors that reduce drinking in one member of a concordant drinking couple, such as pregnancy, employee interventions, or treatment, could have an adverse impact on the couples' relationship, and should be discussed in treatment. Finally, although our data did not support any potential causal relationship between tobacco and marijuana use and divorce, these may serve as useful markers to explore lifestyle differences in couples that may result in disrupted relationships.

It is important to consider a number of limitations in evaluating this research. Our definitions of discrepant substance use patterns were based on dichotomous decisions regarding frequency of heavy drinking for alcohol and use vs. non use for marijuana and cigarettes. These decisions were based, in part, on findings from our earlier studies (Homish, et al, 2009; Mudar, et al, 2001). They were also based on maintaining sufficient sample sizes for each of the different couple groups. As a consequence, our study can not specifically address concordant vs. discrepant abstinence for alcohol, nor differences in the extent of use among cigarette or marijuana users. It is also important to recognize that this study addresses concordant vs. discrepant patterns of use, but does not address concurrent use. Couples may maintain concordant patterns of use, but may rarely if ever use the substance with their partner. Homish and Leonard (2005) found that, with respect to alcohol, concordant couples who did not typically drink together had lower marital satisfaction than concordant couples who did drink together. The different implications of discrepant-concordant patterns of use vs. concurrent-non concurrent usage for the other substances requires further research.

In addition to these definitional considerations, other limitations of our study should be noted. Our sample was generally consistent with the characteristics of the geographic area; with approximately 1/3 African-American and 60% European-American, there were very few couples of other ethnic background in our sample. Whether our results can be generalized to other ethnic samples requires further research. While our effective response rate was quite good for a population based study of couples, approximately 1/3 of couples either refused to participate or did not complete the first assessment, and there were some small, but significant differences between those who participated and those who did not. Inasmuch as our findings are based on longitudinal analyses and the differences between participants and non-participants were small, we believe that this would have little impact on the generalizability of the findings. Similarly, while we were able to follow up and assess

most of the couples, it was not always possible to ascertain whether a couple was still married. If we did not have information regarding the marital status, the couple was considered to be married. This may have created a conservative bias to the extent that divorced/separated couples were incorrectly classified as married. Finally, in assessing drinking patterns, we used the last data point at which both the husband and wife completed the drinking and substance use assessment. In some instances, this time point may have preceded the time of separation or divorce by several years, either because of the time of the scheduled follow-up or because we discovered their divorce in one of our phone contacts after one or both had stopped completing questionnaires. This potentially might have weakened the relationship between substance use and separation/divorce, but would have been unlikely to produce such a relationship.

In summary, this study provides further evidence supporting the view that discrepant patterns of heavy drinking have a detrimental impact on the course of marriage. Moreover, it supports the view that concordant heavy drinking is not necessarily detrimental to marital satisfaction and marital stability. It is important to recognize that this does not mean that the marriages of concordant heavy drinkers are free of conflict. Nor does this suggest that other aspects of individual functioning, such as health problems due to drinking, or family functioning, such as economic stability or parenting behaviors, are not adversely impacted. Moreover, it raises the possibility that this pattern of heavy drinking may be reinforced by the stable marital relationship that it maintains, a feature that could prove an impediment to intervening with individuals in the couple concerning their alcohol use.

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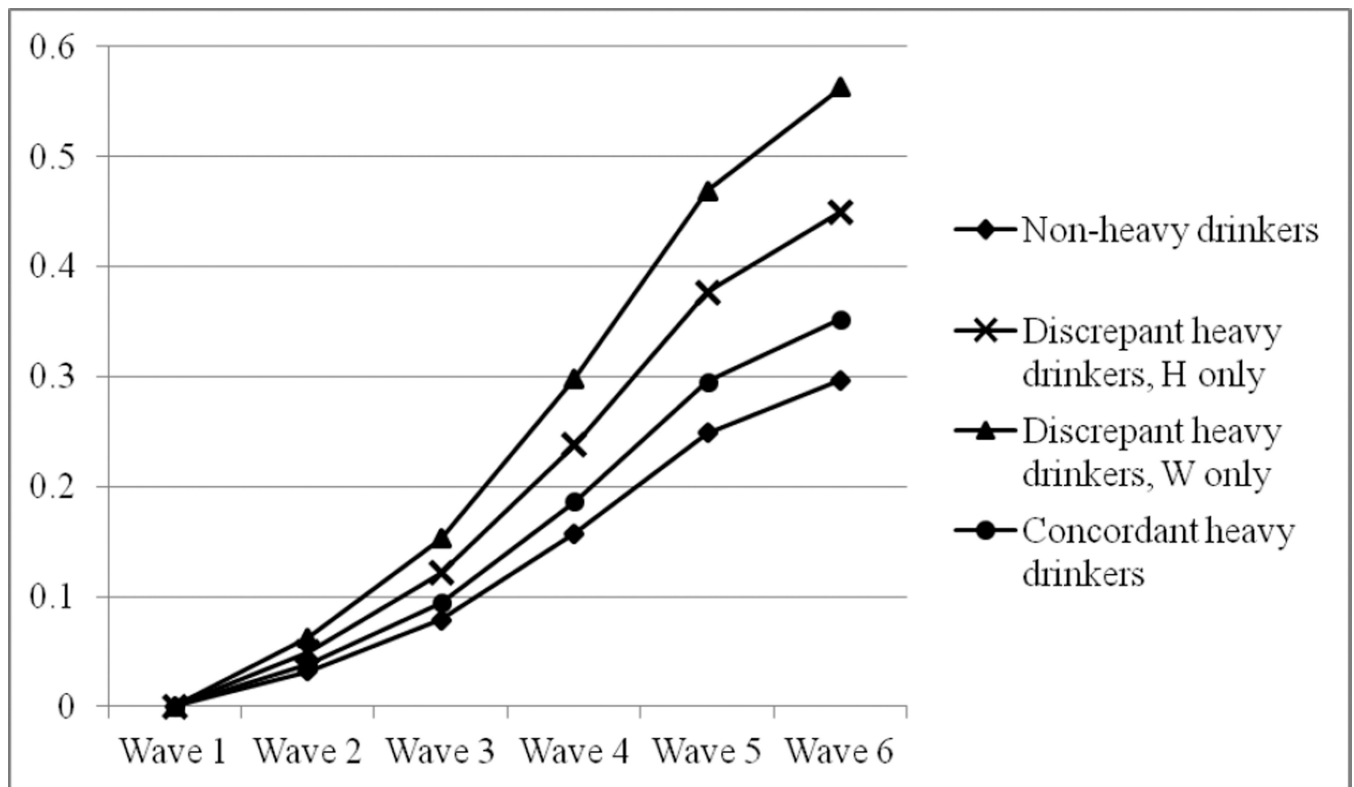


Figure 1. Cumulative hazard functions for heavy drinking categories. Fitted hazard estimates

calculated using the formula: $\frac{1}{1+\theta(-\hat{a}_j)}$, where \hat{a} = the adjusted logit estimate for each time point j . H = Husband, W = Wife. Estimates adjusted for husband education, wife current employment, husband and wife parental status at time of marriage, husband and wife antisocial personality, and husband and wife baseline depression. All covariates were mean centered. The difference between discrepant heavy drinkers, W only, and non-heavy drinkers was significant ($p < 0.05$). The difference between discrepant heavy drinkers, H only, and non-heavy drinkers was significant at trend level ($p < 0.10$).

Table 1
Descriptive Statistics for Substance Use, Antisocial Personality, and Depression Across Waves 1–5.

	Wave 1 (n = 634)	Wave 2 (n = 573) ^a	Wave 3 (n = 521)	Wave 4 (n = 442)	Wave 5 (n = 371)
Heavy drinking					
Neither	79.24%	82.45%	86.56%	88.41%	87.13%
Discrepant, H only	10.21%	9.47%	7.08%	6.67%	8.09%
Discrepant, W only	5.77%	5.52%	4.01%	3.77%	2.57%
Concordant	4.78%	2.56%	2.36%	1.16%	2.21%
Marijuana use					
Neither	64.09%	73.57%	77.59%	76.59%	82.29%
Discrepant, H only	13.34%	11.44%	10.85%	12.43%	8.57%
Discrepant, W only	7.58%	5.33%	4.25%	4.62%	4.00%
Concordant	14.99%	9.66%	7.31%	6.36%	5.14%
Smoking					
Neither	55.45%	60.75%	62.09%	64.72%	65.31%
Discrepant, H only	14.36%	12.82%	14.22%	12.54%	11.07%
Discrepant, W only	8.75%	8.09%	7.58%	7.58%	9.23%
Concordant	21.45%	18.34%	16.11%	15.16%	14.39%
Antisocial personality [mean (SD)] ^b		---	---	---	---
Husband	1.54 (0.38)				
Wife	1.37 (0.27)				
Depression [mean (SD)] ^c		---	---	---	---
Husband	1.49 (0.42)				
Wife	1.62 (0.49)				

Note : Wave 6 statistics not included in this table because substance use variables were lagged by a time of one in all analyses.

^a Sample sizes for wave 2 through wave 5 exclude those who previously divorced as well as those censored from the study.

^b Antisocial personality scores ranged from 1–4.

^c Depression scores ranged from 0–3.

Table 2

Life Table Describing the Pattern of Divorce in this Sample of Newly Married Couples

Anniversary (t_j)	Time interval (years)	Number					Proportion		
		Married at the beginning of the time interval	Divorced or separated during the time interval	Censored at end of time interval	Married at beginning of the time interval who divorced during the time interval $\hat{h}(t_j)$	Married at the end of the time interval $\hat{S}(t_j)^a$	Divorced or separated at the end of time interval $H(t_j)^b$		
0	[-1,0)	0	---	---	---	1.0000	0.0000		
1	[0,1)	634	34	27	0.0536	0.9464	0.0536		
2	[1,2)	573	40	12	0.0698	0.8803	0.1197		
4	[2,4)	521	57	22	0.1094	0.7840	0.2160		
7	[4,7)	442	45	26	0.1018	0.7042	0.2958		
9	[7,9)	371	28	52	0.0755	0.6510	0.3490		

^aSurvival function calculated using the indirect method: $\hat{S}(t_j) = \hat{S}(t_j - 1)[1 - \hat{h}(t_j)]$

^bCumulative hazard function calculated as the inverse of the survival function $\hat{H}(t_j) = 1 - \hat{S}(t_j)$

Table 3

Risk of Divorce for Substance Use Categories: Estimates Unadjusted for Sociodemographics, Antisocial Personality, and Depression

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Heavy drinking		---	---	
Neither	Ref.			Ref.
Discrepant, H	2.31 (1.44, 3.71)**			1.44 (0.95, 2.44)
Discrepant, W	2.60 (1.42, 4.77)**			1.84 (0.97, 3.49) ⁺
Concordant	1.95 (0.81, 4.70)			1.13 (0.45, 2.85)
Marijuana use	---		---	
Neither		Ref.		Ref.
Discrepant, H		1.89 (1.20, 2.98)**		1.42 (0.88, 2.30)
Discrepant, W		2.09 (1.12, 3.90)**		1.43 (0.75, 2.75)
Concordant		1.92 (1.16, 3.19)**		1.23 (0.71, 2.13)
Smoking	---	---		
Neither			Ref.	Ref.
Discrepant, H			2.35 (1.48, 3.71)**	1.80 (1.09, 2.97)**
Discrepant, W			2.82 (1.67, 4.77)**	2.59 (1.50, 4.47)**
Concordant			2.99 (2.01, 4.45)**	2.50 (1.63, 3.85)**

Note: Estimates based on logistic regression and adjusted for discrete time points.

⁺ p < 0.10,

* p < 0.05,

** p < 0.01,

*** p < 0.001

Table 4

Risk of Divorce Based on Substance Use Categories: Estimates Adjusted for Sociodemographics, Antisocial Personality, and Depression

	Model 5 OR (95% CI)	Model 6 OR (95% CI)	Model 7 OR (95% CI)	Model 7 OR (95% CI)
Heavy drinking		---	---	
Neither	Ref.			Ref.
Discrepant, H only	1.52 (0.92, 2.53)			1.57 (0.95, 2.61) ⁺
Discrepant, W only	2.00 (1.03, 3.87) [*]			2.02 (1.04, 3.92) [*]
Concordant	1.25 (0.50, 3.10)			1.20 (0.49, 2.98)
Marijuana use	---		---	NS
Neither		Ref.		
Discrepant, H		1.33 (0.81, 2.21)		
Discrepant, W		1.37 (0.71, 2.67)		
Concordant		1.19 (0.89, 2.07)		
Smoking	---	---		NS
Neither			Ref.	
Discrepant, H			1.33 (0.82, 2.17)	
Discrepant, W			1.52 (0.86, 2.69)	
Concordant			1.37 (0.87, 2.17)	
Antisocial personality ^a				
Husband	1.19 (0.75, 1.89)	1.08 (0.67, 1.75)	1.08 (0.67, 1.73)	NS
Wife	2.57 (1.35, 4.88) ^{**}	3.13 (1.67, 5.88) ^{***}	2.78 (1.49, 5.18) ^{**}	2.33 (1.29, 4.18) ^{***}
Depression ^b				
Husband	1.67 (1.12, 2.50) [*]	1.72 (1.14, 2.59) [*]	1.68 (1.13, 2.51) [*]	1.66 (1.13, 2.42) [*]
Wife	0.95 (0.65, 1.39)	0.96 (0.65, 1.40)	0.99 (0.69, 1.44)	NS
Education				
Husband				
> High school	Ref.	Ref.	Ref.	Ref.
High school	1.94 (1.31, 2.69) ^{**}	2.00 (1.39, 2.88) ^{***}	1.90 (1.33, 2.71) ^{***}	1.93 (1.36, 2.74) ^{***}
Wife	NS	NS	NS	NS
> High school				
High school				
Current employment				
Husband				
Employed	NS	NS	NS	NS
Unemployed				
Wife				
Employed	Ref.	Ref.	Ref.	Ref.
Unemployed	1.70 (1.17, 2.47) ^{**}	1.71 (1.18, 2.49) ^{**}	1.63 (1.12, 2.36) [*]	1.76 (1.22, 2.55) ^{**}
Baseline parental status				

	Model 5 OR (95% CI)	Model 6 OR (95% CI)	Model 7 OR (95% CI)	Model 7 OR (95% CI)
Husband				
Parent	Ref.	Ref.	Ref.	NS
Non-parent	1.73 (1.09, 2.75)*	1.90 (1.19, 3.05)**	1.84 (1.16, 2.92)**	
Wife				
Parent	Ref.	Ref.	Ref.	Ref.
Non-parent	1.83 (1.12, 2.98)*	1.74 (1.06, 2.86)*	1.65 (1.01, 2.69)*	2.62 (1.80, 3.83)***

Note: Estimates based on logistic regression and adjusted for discrete time points. NS = Non-significant for sociodemographic covariates ($p > 0.10$) and therefore dropped from the model.

⁺ $p < 0.10$,

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.

^a Antisocial personality scores ranged from 1–4.

^b Depression scores ranged from 0–3.