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Effects of Physical and Verbal Aggression, Depression, and Anxiety on Drinking Behavior of Married Partners: A Prospective and Retrospective Longitudinal Examination

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Abstract

In an ethnically diverse sample of 195 married couples, we conducted a latent factor growth analysis to investigate the longitudinal link (4 time points over 4½ years) between marital aggression (physical and verbal aggression self- and partner-reports) and individual internalizing symptoms (depression and anxiety) as they relate to trajectories of alcohol use among husbands and wives. Alcohol use was operationalized as a latent factor with self- and partner reports of problem drinking as measured by the Michigan Alcoholism Screening Test and the Alcohol Dependence Scale. Verbal aggression by husbands or wives, by itself, has no effect on their alcohol use over time. In conjunction with depression, however, verbally aggressive husbands do have elevated drinking levels. The effects of husbands' and wives' physical aggression on their own and their partners' drinking behavior were also significant. This study is one of the first to examine the change over time in alcohol use for marital partners as related to marital aggression and internalizing symptoms. Our results shed light on areas of marital functioning (aggression, internalizing, alcohol use) that have not been investigated in conjunction with each other in a longitudinal design. Aggr.

Keywords

marital aggression; problem drinking; depression and anxiety; latent factor growth modeling

INTRODUCTION

Alcohol problems represent a significant mental health problem in the United States. Data published by the Centers for Disease Control and Prevention (CDC) indicate that 12% of the population averages five or more drinks per drinking occasion [CDC, 2000]. Lifetime prevalence of alcohol abuse is 18% and alcohol dependence is 13% based on *Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition* (DSM-IV) criteria [Hasin et al., 2007]. Given that alcohol problems are associated with significant functional impairment, including job loss [Gill, 1994], injury and physical illness [Cherpitel, 2007], legal problems

[Valdez et al., 2007], and interpersonal problems [Doumas et al., 2007], it is critical that researchers identify the processes underlying the development of alcohol problems.

Marital aggression may be one important factor that contributes to the development of problem drinking. The link between alcohol and aggression is well established [Exum, 2006]. However, the bulk of research on the link between alcohol and aggression considers alcohol consumption as a causal factor for aggression, rather than the other way around [e.g., Barnwell et al., 2006; Parrott and Giancola, 2006; Pihl et al., 2003]. These studies have consistently found that alcohol use is associated with increased marital aggression, particularly when men abuse alcohol [Fals-Stewart, 2003; Graham et al., 2004]. Thus, the study of the effects of alcohol on marital processes is an important and fruitful avenue for research.

Nevertheless, the exclusive focus on this direction of relations represents a bias in the literature that has limited the understanding of relations between marital aggression and problem drinking, and is at odds with calls for the examination of more complex relations in the development of psychopathology [Burt et al., 2008; Cicchetti and Toth, 1997].

Therefore, research is also needed on the potential effects of marital aggression on increases in problem drinking over time. The purpose of this study is to address this gap.

Marital Aggression as a Predictor of Problem Drinking

Limited research has challenged the assumption of a unidirectional association between marital aggression and problem drinking, emphasizing the need for additional research. A longitudinal study of adolescents, however, found that the association between alcohol and interpersonal aggression is reciprocal: greater aggression led to increased drinking and increased drinking led to increased aggression [Huang et al., 2001]. In a longitudinal study examining bidirectional relations between marital aggression and substance use (including alcohol use), women's substance use was not found to predict increased risk of victimization over time, but victimization predicted increased substance use over time [Martino et al., 2005].

Testa et al. [2003] reported similar findings in a study of 724 women aged 18–24 who were currently in a heterosexual relationship: adult women's heavy drinking did not predict later experience of intimate partner violence 1 year later, but intimate partner violence predicted increases in heavy drinking in these same women over 1 year. Intimate partner violence was measured using items assessing minor violence, severe violence, and severe psychological aggression. Alcohol consumption was measured in terms of quantity and frequency of use. Keller et al. [2009] reported a study following 158 couples who had been in a relationship for an average of 13 years, and found that physical aggression (perpetrated by either the husband or the wife) predicted increases in both husbands' and wives' problem drinking over a 2-year period. This study was particularly innovative in that it included both self- and partner reports of marital aggression and problem drinking (which included symptoms of alcohol dependence and abuse), and used these multiple measures to model latent constructs.

Theoretical Rationale

From a theoretical standpoint, aggression within marital relationships may lead to increased drinking as a form of coping. The affect-regulation model of alcohol consumption [Cooper et al., 1995] proposes that drinking is motivated by a desire to reduce negative affect or to enhance positive affect. Similarly, the stressor-vulnerability model of alcohol use [Armeli et al., 2007; Maisto et al., 1999] proposes that those who believe that alcohol will have positive effects on their mood and behavior or who prefer avoidance coping strategies will be more likely to drink when they experience stress or negative affect. Individuals develop expectations for how alcohol will affect them. Some individuals have expectations that alcohol will reduce their feelings of worry or anxiety [Smith and Tran, 2007] or affect other moods [Connor et al., 2007].

Thus, people may manage interpersonal stress, such as that associated with marital aggression, via increased alcohol consumption. Several studies have found that a variety of coping motives (negative affect, expectancies that alcohol will reduce negative affect, and affect lability) are both directly and indirectly associated with increased alcohol problems [Cooper et al., 1995; Simons et al., 2005]. Although there is evidence that alcohol may be useful for improving mood [Van Tilburg and Vingerhoets, 2002], whether the alcohol consumption results in improved mood because of the pharmacological effects of alcohol or because of the expectancies themselves is a matter of controversy [Leonard et al., 2003].

Anxiety and Depression

Following the affect-regulation and stressor-vulnerability models, anxiety and depression should also be associated with increased alcohol problems. A substantial body of evidence supports this link. After excluding individuals with alcohol problems at baseline and controlling for gender, depression, conduct disorder, and other variables, social anxiety disorder predicted 4.5 greater odds of alcohol dependence 14 years later [Buckner et al., 2008]. Social phobia, panic attacks, and panic disorder are associated with increased risk for alcohol use disorders over a 4-year period [Zimmermann et al., 2003]. More general anxiety is also associated with risk for alcohol dependence over a 2-year period [Schmidt et al., 2007]. Data from a nationally representative sample indicate that 36% of individuals with generalized anxiety disorder self-medicate with alcohol or drugs, a practice that was associated with risk for substance use disorders [Bolton et al., 2006]. Several studies indicate that the association between anxiety and alcohol problems is mediated by expectations of anxiety reduction [e.g., Buckner et al., 2006; Ham et al., 2007; Stewart et al., 2006].

Numerous studies also support the link between depression and the development of alcohol problems. Symptoms of depression and alcohol problems are correlated [Buckner et al., 2007; O'Donnell et al., 2006], and this association appears stronger for women [Graham et al., 2007]. The prevalence of alcohol problems among those meeting criteria for major depression was found to be 32%, compared with 10% of those who were not depressed [Lukassen and Beaudet, 2005]. In individuals with both major depression and alcohol problems, the onset of major depression typically precedes the onset of the alcohol problem [Kuo et al., 2006]. In a study of adolescents who underwent treatment for alcohol use

disorders, those with depression averaged 19 days before relapse compared with 45 days for those without depression [Cornelius et al., 2004]. The association between depression and the development of alcohol problems also appears to be mediated by expectations of negative affect reduction [Nolen-Hoeksema and Harrell, 2002; Schuckit et al., 2006].

Depressive and anxiety symptoms are also associated with marital aggression. Trait anxiety in both husbands and wives predicts marital hostility (e.g., yelling, criticism) and, in turn, low marital satisfaction, over a 13-year period [Caughlin et al., 2000]. Depressive symptoms are associated with the use of hostility, insult, and threat in marital interactions [Coyne et al., 2002; Du Rocher Schudlich et al., 2004]. Intimate partner violence is associated with symptoms of depression and anxiety in young adult mothers [Leaman and Gee, 2008]. Among a group of women who had been arrested for domestic violence, their experience of violence perpetrated by their partners was associated with the risk for depression and posttraumatic stress disorder diagnoses [Stuart et al., 2006]. Although the majority of studies have examined women's symptoms, men who engage in marital violence have also been found to have high symptoms of depression and anxiety [Gavazzi et al., 1996], and men who have been the victims of domestic violence have been shown to have higher levels of depressive symptoms and suicide ideation [Fergusson et al., 2005].

Despite associations between marital aggression, depression, and anxiety, and the separate links between these variables and alcohol problems, few studies have examined interrelations between depression, anxiety, and marital aggression in the prediction of problem drinking over time. However, Lipsky et al. [2005] considered depression and alcohol problems in the prediction of marital violence. This cross-sectional study found that depressive symptoms and alcohol problems had independent additive effects on the risk for perpetrating marital violence. Interaction effects were not examined. Thus, whether symptoms of anxiety or depression moderate associations between marital aggression and the developmental course of alcohol problems remains an open scientific question.

It is possible that the link between marital aggression and drinking behaviors over time is especially strong in the context of anxiety or depression. For example, individuals coping only with marital aggression may be able to seek alternative and adaptive forms of coping rather than increased alcohol consumption; individuals struggling with marital aggression in the context of anxiety or depression may be too impaired to utilize alternative coping strategies and instead turn to drinking. One way of conceptualizing such a model is as a threshold model in which anxiety or depression lowers the threshold for alcohol consumption. Threshold models of marital violence, alcohol use, and antisocial personality [Fals-Stewart et al., 2005], and marital violence, alcohol use, and anger control or jealousy [Foran and O'Leary, 2008] have been proposed, although these focus on alcohol use as a cause of aggression.

Perceptions of Marital Aggression

Perceptions of marital aggression have been found to be important in prior research. For example, women report experiencing more aggression from their partners than men report perpetrating, and women report perpetrating more psychological aggression than their partners report experiencing [Panuzio et al., 2006]. Thus, including both husband and wife

reports of their own and their partners' physical and verbal aggression permits examination of how individuals might use drinking behavior to regulate their own aggressive behavior and their responses to perceptions of spousal behavior. Use of multiple informants also helps to avoid the possibility of underreporting owing to social desirability. Nonresponse on surveys owing to concerns about reporting illegal or offensive behavior may be particularly common in the context of domestic violence [Johnson et al., 2006].

This Study

The purpose of this study is to consider interrelations between marital aggression (physical and verbal), anxiety, and depression in the prediction of developmental trajectories of problem drinking. Consistent with the affect-regulation and stressor-vulnerability models of alcohol use, it is hypothesized that marital aggression will be associated with increasing levels of problem drinking over time. Thus, this study makes predictions that are based on a well-established conceptual framework but in the novel context of marital aggression. In doing so, it represents one of very few studies that have deviated from the almost universal tendency in the literature toward viewing the association between marital aggression and alcohol use as unidirectional, in which alcohol use causes aggression. The association between marital aggression and trajectories of problem drinking is expected to be stronger for those individuals suffering from symptoms of anxiety or depression. This study therefore addresses a critical gap in the literature on alcohol and aggression by considering aggression as a predictor of later drinking, while simultaneously examining other important factors (anxiety, depression) additively and interactively. Further, this study uses a multi-informant approach, obtaining both self- and partner reports of marital aggression and problem drinking.

METHOD

Procedures

Data in this paper are from a longitudinal (two-wave) study explicating pathways, vulnerability variables, and protective factors in the associations between family conflict, parental drinking problems, and children's adjustment, and only pertinent information is reported. One hundred and ninety-five ($N=195$) families were recruited from the community through newspaper advertisements that requested the participation of two-parent families with a child in the desired age range (6–12), and flyers posted in town and distributed to community schools and organizations. Twelve of the children recruited from newspaper advertisements were recruited through ads that, in addition to requesting participation of two-parent families with children in the desired age range, also asked for families that consumed alcoholic beverages (without any reference to amount); we ran a few such ads in our attempt to recruit families with potential drinking problems. A few of the families ($n=5$) were recruited from alcohol treatment centers. All families were told that we were interested in associations among parental alcohol consumption, family interactions, and children's emotions, and that we needed families across a wide range on these variables. Families willing to participate were given Wave 1 questionnaires that were completed by the mother and the father, which examined alcohol consumption, marital conflict, symptom distress, and demographics. The same families were asked to complete the same questionnaires 2.5

years later at Wave 2. All of the procedures for this study were approved by the IRB of the university and were completed in the PI's lab. Because of the unique structure of this data, we will address the parameterization of time for the growth modeling procedures and the use of retrospective data.

Parameterization of time—At Wave 1, spouses and partners were asked to respond to two alcohol use questionnaires for their own and their spouses' drinking behaviors for the past 12 months (current assessment at Wave 1, time =0) and at 2 years prior to that (retrospective assessment at Wave 1, time =-2). At Wave 2, 2½ years later, they reported on the same two alcohol use questionnaires for themselves and their spouses for the past 12 months (current assessment at Wave 2, time =2.5) and a year prior to that (retrospective assessment at Wave 2, time =1.5). When fitting growth models, the parameterization of time must correspond to the actual time period units, in this case “years” between assessments and retrospective assessments (time=-2_{Retro@Wave1}, 0_{Wave1}, 1.5_{Retro@Wave2}, 2.5_{Wave2}). In addition, the intercept for the growth model must be at the “actual” not the “retrospective” initial time point.

Retrospective data—Retrospective data collection of alcohol use has been used extensively [e.g., Gillespie et al., 2007; Schuckit et al., 2006] and been validated in many studies [Longnecker et al., 1992], both longitudinal and cross-sectional. The Longnecker et al. study indicated that after 1 year, respondents' (mean age =54 years) self-reports of alcohol intake in their remote (35 years prior) and recent (1 year prior) past were reliably reproducible (α s =.77–.84). More importantly, Windle [2005] used retrospective data on alcohol consumption for the 5-year period prior to entry to college to fit a latent growth model similar to the one we fit in our analysis. He also examined the test–retest reliability of these 5-year retrospective reports after 3 weeks and obtained reliability coefficients ranging from .82 to .91.

Participants

The sample for this study was composed of 195 couples. The mean age for wives was 37 years (SD =6.4) and for husbands was 39 years (SD =6.6). These couples had been married for an average of 16 years (SD =6). The sample was mostly European-American (67%); 27% were African-American, and the rest were small percentages of other ethnic groups (6%). Socioeconomic status (SES) encompassed the full range (1–5), with a mean of 3.96 (SD = 1.07), indicative of middle-class status [Hollingshead, unpublished manuscript].

Measures

Alcohol use—Both husband and wife completed the following two questionnaires for their own drinking behavior and their spouse's drinking behavior for 2 time periods (the past 12 months and at 2 years prior to that) at Wave 1 and similar time periods (the past 12 months and a year prior to that) at Wave 2 (2½ years later); each spouse was used as a collateral for the other's drinking behavior.

The Alcohol Dependence Scale [ADS; Skinner and Horn, 1984] provides a quantitative measure of the severity of alcohol dependence. The 25 items cover alcohol withdrawal

symptoms, impaired control over drinking, awareness of a compulsion to drink, increased tolerance to alcohol, and salience of drink-seeking behavior. The ADS is a widely used measure with established reliability and validity, and is predictive of DSM diagnosis [Ross et al., 1990; Skinner and Allen, 1982]. In this study, α reliabilities for wife report on self ranged from .85 to .95 and for report on spouse from .95 to .97; for husband report on self, α s ranged from .84 to .97 and for report on spouse from .77 to .91.

The Michigan Alcoholism Screening Test [MAST; Selzer, 1971] is a 25-item questionnaire designed to provide an effective screening for alcohol-related problems. It has excellent internal consistency and validity in classifying respondents as alcoholic or nonalcoholic [Selzer, 1971; Selzer et al., 1975], and it has good psychometric properties and effectiveness when completed by family members for each other's drinking behavior [McAuley et al., 1978]. In this study, α reliabilities for wife report on self ranged from .82 to .84 and for report on spouse from .84 to .86; for husband report on self, α s ranged from .82 to .87 and for report on spouse from .75 to .83.

Collateral reports for drinking problems indicated significant positive correlations between husbands' and wives' reports for each spouse's responses on the MAST and ADS for both the 1-year and the 2-year time frames. For husbands' drinking and wives' collateral reports, correlations ranged between .61 and .83 ($P < .001$) on the various measures. For wives' drinking and husbands' collateral reports, the coefficients ranged between .77 and .80 ($P < .001$) for the MAST and the ADS.

Marital conflict—Both husband and wife completed the Revised Conflict Tactics Scale—Couple Form (CTS-2) at Wave 1 [Straus et al., 1996]; items pertaining to threat or use of a knife or a gun were excluded as per the IRB. The CTS measures the intensity and the frequency of verbal and physical conflicts within the marital relationship, and has well-established reliability and validity [Straus and Gelles, 1990; Straus et al., 1996], and, in this study, estimates of internal consistency ranged from Cronbach α s of .71 to .95 for wives' and husbands' reports of verbal and physical aggression by the self and the spouse. Further, 26% of women and 14% of men reported the use of physically aggressive marital conflict tactics in the past year. Husbands' reports of their own verbal and physical aggression were correlated ($r = .55$, $P < .001$) at Wave 1, as were wives' ($r = .54$, $P < .001$).

Marital satisfaction—The Marital Adjustment Test [MAT; Locke and Wallace, 1959], a highly regarded scale, was completed by both the husband and the wife to obtain a marital satisfaction score. The scale is considered to be highly reliable and valid [Freeston and Plechaty, 1997], and in the current sample the α for wives was .84 and for husbands was .83.

Depression and anxiety—Wives' and husbands' depressive symptoms were assessed at Wave 1 with self-reports on the Symptom Checklist-90-Revised [SCL-90-R; Derogatis, 1983], which has established reliability and validity [Derogatis, 1983]. Wives and husbands rated the amount of distress experienced from 90 symptoms on a 5-point scale from 1 (*not at all*) to 5 (*extremely*). The depression and anxiety subscales were used in the present investigation. Husbands' reports of their own anxiety and depression were correlated ($r = .82$, $P < .001$) at intercept, as were wives' ($r = .80$, $P < .001$). However, for a better explication

of internalizing behaviors associated with marital aggression and alcohol consumption, anxiety and depression symptoms were examined separately. In this study, the α reliability for wives was .82 and for husbands was .98.

RESULTS

Univariate and Bivariate Analyses

Means and standard deviations for the predictors (CTS—physical and verbal, anxiety, depression) and outcomes (ADS, MAST: self- and other reports) were examined for distributional normality and bivariate linearity and are given in Table I. As a result, all variables were log transformed to decrease skewness. All distributions were unimodal.

Parameterization of Models

Figure 1 illustrates the latent factor growth model that was fit to determine growth in alcohol use for wives and husbands over 4 time periods (current and retrospective data collected at two waves) in which the intercept was centered at the Wave 1 data collection point: for this analysis the time at which the respondents were first contacted. Factor loadings were chosen such that they corresponded to the time point covered by each assessment (−2 for Time 1 retrospective assessment at Wave 1; 0 for Time 2 current assessment at Wave 1; 1.5 for Time 3 retrospective assessment at Wave 2; 2.5 for Time 4 current assessment at Wave 2). The latent factors at each time point for husband's drinking consisted of his scores on the ADS and the MAST as well as his wife's reports on the ADS and the MAST of his drinking. The metric for these latent variables was the metric of the MAST. The latent variables for the wife's drinking were constructed similarly. The correlations between the observed variables and their latent factors ranged from .77 to .97 for the husband's factors and from .63 to .86 for the wife's factors.

Because the measurement of time was arbitrary, after fitting the unconditional model, the age of the husbands and wives was added to the model and found not to be significant in predicting the intercepts and slopes [Singer and Willett, 2003]. Thus, on average, these models illustrate change in alcohol use for husbands from age 37 to 41.5 and for wives from age 35 to 39.5; for ease of presentation, fitted prototypical plots are shown for the average age across husbands and wives at each time point, ages 36, 38, 39.5, and 40.5 [Singer and Willett, 2003].

Latent variable growth models for husbands and wives were fit simultaneously in the same overall model to account for the nonindependence of the data. As is customary, the errors of the observed variables were allowed to covary across raters. For example, the errors for wives' report of their drinking on the ADS were correlated with the errors of their reports of their husbands' drinking on the ADS. To address the retrospective nature of the data collection procedures, the errors for all retrospective observed variables were allowed to covary across time points; for example, the errors for husbands' reports on the ADS at the first wave (Time 2) were allowed to covary with the errors of their retrospective reports on the ADS at 2 years prior to that (Time 1). A similar procedure was used for the errors of the data and retrospective data collected at the second wave (Times 3 and 4). In addition, in

order to fit growth models that contain latent variables, these latent variables, in this case husbands' and wives' reported drinking behavior, had to be constrained to be invariant over the 4 time periods, which covered 4½ years. This invariance insured that the constructs at each time point were equivalent. Therefore, the observed variables' (ADS, MAST) intercepts, variances, errors, and error covariances were tested for equivalence and constrained to be equal across like observed variables.

All models were fit with Mplus, which allows for the inclusion of respondents with missing data by using full information maximum likelihood (FIML) estimation [Muthén and Muthén, 1998], drawing on the theory in Little and Rubin [1987]. In FIML estimation with missing data, observations are sorted into missing data patterns, and each parameter is estimated using all available data for that particular parameter. Muthén and Muthén [2003] recommend that the amount of missing data be no more than 90% (i.e., that you have at least 10% coverage in the observed information matrix). In this study, the greatest loss of coverage was for husbands' ADS and MAST scores at Time 4 (only 45% coverage existed in the observed information matrix); for the rest of the variables, coverage ranged from 96 to 97% (for Times 1 and 2) and 55 to 60% (for Times 3 and 4), well within the guidelines. The retained couples ($n=113$) had lower scores than did the nonretained couples ($n=82$) on most of the ADS measures, the verbal CTS measures, and the SCL-90 anxiety and depression measures at Wave 1. The lower Times 1 and 2 scores for the couples who provided data at Times 3 and 4 insure that the growth in alcohol use for spouses and partners is most likely underestimated. But, because differences existed, we conducted a sensitivity analysis [Singer and Willett, 2003; Stevens, 1984] comparing the Mplus results for the full sample ($N=195$) and for the subsample with respondents who were not missing any data ($n=113$) to insure that the results of the latent growth model were valid; the results were comparable with only minor discrepancies; therefore, the full sample results are reported.

Model Fit

The first model fit was an unconditional linear growth model (a model with no predictors other than time). This linear model fit the data adequately ($\chi^2/df=3.2$, RMSEA =.10); adequate fit is indicated by RMSEA less than .10 and a χ^2/df ratio of less than 5 [Wheaton et al., 1977]. The addition of a quadratic term indicating acceleration/deceleration in the linear trajectory for growth in both husbands' and wives' latent variable factors was a significant improvement in fit ($\chi^2=56$, $df=13$, Critical $\chi^2=22$); therefore, growth in husbands' and wives' alcohol use was modeled as quadratic ($\chi^2/df=3.2$, RMSEA =.10). The parameter estimates of mean growth levels and the variances of the growth factors for husbands' and wives' unconditional quadratic latent variable growth model can be found in Table II. Figure 2 illustrates the fitted trajectories of a prototypical husband's and wife's alcohol use as self- and other reported on the latent factor. The prototypical plots for this unconditional model and the later conditional models (with predictors) are created by using the fitted equation for each growth model and entering substantively interesting values of the predictors (i.e., 1.5 standard deviations above and below the mean for a continuous variable or 0, 1 for a dichotomous variable) to calculate the fitted trajectories for different population groups [Singer and Willett, 2003]. For the unconditional model, on average, husbands ($M=(e^{\gamma_{Int}}-1)=1.8$ where $\gamma_{Int}=1.045$, $P<.001$) and wives ($M=(e^{\gamma_{Int}}-1)=0.96$ where $\gamma_{Int}=0.675$, $P<.001$)

are drinking at rather low levels and their drinking decreases and, for males, decelerates over time.

Significant variance in *all* of the growth parameters existed, which could be predicted by the substantive predictors: physical and verbal aggression, depression and anxiety, controlling for race and SES. Having significant variance in the quadratic growth factors is not common in quadratic growth models; thus, we had an opportunity to examine whether the acceleration or deceleration of alcohol use was related to our predictors.

A series of nested hierarchical models were fit testing whether SES and race (Step 1), husband's reports of aggression (physical and verbal) and his perceptions of his wife's aggression (physical and verbal), wife's reports of aggression (physical and verbal) and her perceptions of her husband's aggression (physical and verbal) (Step 2), and the husband's and wife's self-reports of anxiety and depression (Step 3) were significant predictors of change in alcohol use over time. Each set of predictors was retained if the χ^2 -test indicated that it was significant [Singer and Willett, 2003].

Including both the husband's and wife's reports of their own and their partner's physical and verbal aggression allowed us to determine how the wives and husbands might possibly be drinking in response to their own aggressive behavior and their responses to what they perceive as their spouses' aggressive behavior. Including self-reports of their own anxiety and depression allowed us to examine husbands' and wives' alcohol use in the context of their internalizing symptoms. We then included interactions between the internalizing (depression, anxiety) and externalizing (physical, verbal aggression) behaviors, retaining only those that were significant additions (Step 4).¹ Table III presents the models that were fit and their fit statistics. Table IV includes the unstandardized parameter estimates and standard errors of the mean levels of the growth parameters and effects of the predictors on them; these results are the ones customarily presented for latent variable growth models [Singer and Willett, 2003].

In most growth models, we are often able to predict variance in intercepts; the assumption being that many of the factors that are related to the difference in levels of behavior evidenced at intercept have had their influence prior to that time—childhood, adolescence, earlier in adulthood [Keiley et al., 2005]. We commonly do not predict very much variance in slopes, and very seldom in the quadratic terms [Keiley et al., 2005]. In our final fitted model, we were able to predict almost 50% (49% for husbands, 46% for wives) of the variance in the intercepts of growth in alcohol use with marital conflict, individual depression and anxiety, and interactions. However, we predicted a very large amount of the variance (35%) in the husbands' slopes and about 12% in the wives' with these same predictors. Somewhat more amazing, we explained 24% of the variance in the quadratic terms for husbands and 17% for wives.

¹Finally, to test for the effect of marital satisfaction, we entered the husbands' and wives' scores on the MAT as predictors of the growth parameters. Entry of these variables was not significant and because this was not the focus of our article, we do not report these nonsignificant results.

Overall Summary

On average, after controlling for all other effects in the model, verbal aggression has no effect on drinking by husbands or wives over time; none of the effects of verbal aggression on the growth parameters are significant (see Table IV) regardless of whether they are self-reports or other reports. What are significant are the effects of physical aggression. Husbands' drinking increases and accelerates when they are physically aggressive, but if their wives are also physically aggressive, husbands' drinking decreases and decelerates. Wives' drinking also increases and accelerates when they are physically aggressive, but they are not affected by their husbands' aggression. Wives' drinking is not influenced directly by anxiety or depression, whereas husbands' drinking is. Husbands' drinking, on average, is elevated if they are anxious and lowered if they are depressed. In addition, husbands who are depressed have elevated drinking on average when they are verbally aggressive (interaction of depression and verbal aggression). However, wives who are anxious and physically aggressive have drinking trajectories that are higher on average than those who are not anxious but those trajectories actually decrease and decelerate over time, whereas trajectories for the wives who are not anxious, but are physically aggressive, are lower, on average, and actually increase and accelerate over time (interaction of anxiety and physical aggression for women).

Prototypical Plot Illustrations of Parameter Estimates

The effects of the predictors in the final fitted model (Table IV) on the growth parameters in the domains of husband and wife alcohol use, controlling for SES and ethnicity, can best be illustrated by "identifying a prototypical individual distinguished by particular predictor values" [Singer and Willett, 2003; p 60]. We do this by selecting meaningful values of the predictors to substitute into the fitted final model, obtaining the estimated value for the outcome (husband and wife alcohol use), and plotting those trajectories, which will give us trajectories that would be typical for individuals in the population with those characteristics. In other words, the sample was not divided into groups to illustrate the findings; we are presenting the fitted "true" or "population" trajectories of marital couples similar to those in our sample. The meaningful values we chose for our plots of prototypical individuals were 30% above and below the median for self- and spouse-reported physical and verbal conflict (CTS) and self-reported depression and anxiety (SCL-90), while holding SES and ethnicity at their means (3.96 and 0.33, respectively). These can be seen in Figure 3; the parameters estimates from which these were constructed are in Table IV. These plots allow us to examine the results within the context of prototypical couple relationships.

The prototypical husbands and wives in Figure 3a are not physically or verbally aggressive with each other; however, they differ from each other in the levels of their depression and anxiety. Their alcohol trajectories indicate, on average, low alcohol use that declines over time. The average latent factor score for husbands' alcohol use over time is 1.8 and for wives' is 1.0. Therefore, these trajectories are all close to or lower than the average husband and wife. Anxiety and depression only had main effects on husbands' alcohol trajectories. Anxiety increases the average level of husbands' drinking. In addition, anxiety has a decelerating effect on the trajectory of husbands' drinking over time. In general, the husbands who are highly anxious (top two trajectories) drink more than those who are not

anxious (bottom two trajectories). Depression decreases the average level of drinking. Husbands who are depressed drink less than do those who are not depressed. The trajectories for the wives of these husbands show no effects of anxiety or depression. All of these wives have low average use of alcohol over time.

Interestingly, no effect of verbal aggression by itself exists either for husbands or wives. But, husbands' depression interacts significantly with their verbal aggression. That is, the effect of verbal aggression on the average level of alcohol use depends on the level of depression, again controlling for all else in the model. Figure 3b represents the prototypical couples in which wives are not aggressive and husbands are verbally aggressive. In these couples, if the husbands are depressed (top two trajectories), regardless of whether they are anxious or not, they are well above the average for the factor of alcohol use across all husbands ($M = 1.8$) and continue to show the anxiety-related deceleration in alcohol use across time. Their wives' alcohol trajectories remain similar to those shown in Figure 3a.

Physical aggression has several effects on both husbands' and wives' alcohol trajectories. For one, those spouses who report that they themselves are physically aggressive increase and accelerate their drinking over time. In Figure 3c, we illustrate couples in which husbands are physically aggressive but their wives are not aggressive at all. Although physical aggression by husbands does not have a significant effect on the average level of husbands' alcohol use, that level does increase and accelerate over time. Once again, the anxiety-related effect on average alcohol use for husbands and the deceleration effect can be seen as well as the usual flat trajectory for nonaggressive wives' alcohol use over time.

Figure 3d illustrates the above main effects of physical aggression as well as three other effects of physical aggression for prototypical couples in which *both* husband and wife are physically aggressive. First, these wives report lower than average levels of alcohol use at intercept, controlling for all else in the model. Second, the effect of these wives' physical aggression on their average alcohol use is different depending on their level of anxiety at that point in time. Those who are more anxious drink more, on average, than those who are not anxious. Finally, the husbands in these couples actually decrease and decelerate their alcohol use.

The main effect of reduction in the average level of alcohol use by these wives is overshadowed by the interaction effect of their physical aggression and anxiety; the wives' trajectories in Figure 3d are quite different from the previous ones for the wives in Figure 3a–c. In physically aggressive couples, if the wives are also highly anxious (top two trajectories of Fig. 3d), they drink more on average and, more importantly, their alcohol trajectories decrease and decelerate more slowly over time; that is, they remain at a fairly stable elevated level. Being paired with husbands who are also physically aggressive increases these wives' overall level of alcohol use. Furthermore, even the wives who are not anxious increase and accelerate their drinking over the same time period.

In these physically aggressive couples, the husbands have alcohol trajectories (Fig. 3d) that, on average, are only slightly higher than the average alcohol factor score for husbands ($M = 1.8$). If the husband is highly anxious, their drinking decreases and decelerates over time

while if they are not anxious it remains fairly stable. These effects are a combination of the deceleration effect of their anxiety and the decrease and deceleration effect of their wives' physical aggression on their drinking. The difference in alcohol trajectories for physically aggressive husbands with and without wives who are also physically aggressive can be seen by reexamining Figure 3c. The husbands' alcohol trajectories in Figure 3c are increasing and accelerating, whereas in Figure 3d, they are decreasing and decelerating. For couples in which both are physically aggressive, husbands' drinking is affected by their wives' responses to that aggression over time. In addition, on average, the wives' drinking increases in response to their husbands' behavior.

Possibly the worst-case scenario are the couples in which *both* husbands and wives are physically and verbally aggressive as shown in Figure 3e. All of the husbands' alcohol use trajectories, regardless of levels of depression or anxiety, are higher than the average husband alcohol factor score ($M = 1.8$). The husbands' verbal aggression effects (described for Fig. 3b) are pronounced, whereas the effects of their physical aggression (described for Fig. 3c) are canceled out by the effects their wives' physical aggression has on their own drinking behavior (described for Fig. 3d: the decrease and deceleration effect of their wives' physical aggression on their husbands' drinking). In addition, these alcohol use trajectories are fairly stable over the course of time with only minor downturns.

Remarkably, the alcohol use trajectories for the wives in couples in which *both* husbands and wives are physically and verbally aggressive are similar to those for wives in all of the previous figures. Anxiety plays an important part in their use of alcohol to manage physical aggression, their own or their husbands'. Wives who are physically aggressive increase and accelerate their drinking over time. But if they are anxious as well, their drinking decreases and decelerates, somewhat canceling out the previous effects of their physical aggression on their drinking.

The control variables SES and ethnicity did have effects on the drinking trajectories. The alcohol trajectories for African-American husbands and wives decrease and decelerate more than those for European-American husbands and wives, although African-American husbands have greater alcohol use on average than do European-American husbands. Husbands and wives at high SES levels had lower alcohol use on average, but the wives' trajectories decreased less than did the trajectories of lower SES wives. High SES husbands also had trajectories that accelerated less than did those of low SES husbands.

Within and Across Domain Relations

The estimated correlations within and across the domains of husbands' and wives' alcohol use are presented in Table V. The correlations between husbands' ($r = -.23, P < .01$) and wives' ($r = -.31, P < .001$) intercept and slope terms indicate that husbands or wives with high factor scores on alcohol use at intercept decrease their drinking behavior more than does the average person, and those with low factor scores at intercept decrease their drinking behavior less than does the average person. What are of most interest are the cross-factor intercorrelations. The level of the wives' drinking at intercept is positively related to the husbands' level of drinking ($r = .13, P < .01$). In addition, their trajectories of drinking are related ($r = .30, P < .001$) in terms of the linear growth of alcohol behavior; that is, as wives

increase their drinking so do husbands, and vice versa. However, the acceleration of their drinking is not related ($r = .09$, $P = ns$). The high correlations between the slope and quadratic terms are typical and are seldom interpreted.

DISCUSSION

The longitudinal link between problem drinking and later marital aggression, either verbal or physical, has been well established [Barnwell et al., 2006; Parrott and Giancola, 2006; Pihl et al., 2003]. However, the literature is scant on marital aggression as it relates to subsequent drinking problems, which was the focus of our study. Our study addresses this literature gap by investigating the longitudinal link between marital aggression (physical, verbal) and individual internalizing symptoms (depression, anxiety) as they relate to trajectories of alcohol use among husbands and wives. Findings contribute to the literature in important ways, and illustrate how aggression and internalizing behavior affect husbands' and wives' alcohol use. Much of the research on marital aggression has not specified possible differential effects of verbal and physical aggression on drinking behavior, in marital couples or other populations. Thus, our findings break new ground by explicating relations between both verbal and physical marital aggression and problem drinking over time.

After controlling for other effects, verbal aggression by husbands or wives, by itself, has no effect on their alcohol use over time; verbal aggression does not increase drinking in marital couples. In conjunction with depression, however, husbands do have elevated drinking levels if they are verbally aggressive. Verbally aggressive husbands who are depressed drink more, on average, than do those who are not depressed. Previous studies have shown that depression has an effect on alcohol use, but primarily for women [e.g., Buckner et al., 2007; Graham et al., 2007]. In addition, some have shown that being depressed leads to more marital conflicts [e.g., Du Rocher Schudlich et al., 2004]. Our findings extend the literature by demonstrating that depression moderates the effect of verbal aggression on alcohol use for husbands. If a husband is not depressed, his or his wife's verbal aggression has no effect on his drinking, but if he is depressed, he will drink more. It is possible, as we hypothesized, that individuals struggling with verbal aggression in the context of depression may be too impaired to utilize alternative coping strategies and instead turn to drinking. Obviously, these interpretations are speculative and future studies would benefit from clarifying the role of coping in the association between alcohol consumption, marital aggression, and depression symptoms. Nevertheless, the moderation findings illustrate that contemporaneous assessments of multiple behaviors (aggression, depression) in a relationship context are more likely to clarify trajectories of adaptation and maladaptation than investigations of few domains.

Husbands' and wives' physical aggression had obvious effects on their own and their partners' drinking behavior. By including both the husbands' and wives' reports of their own and their partners' physical aggression, we were able to determine that wives' and husbands' drinking behavior is related to their subsequent aggressive behavior and what they perceive as their spouses' aggressive behavior. Husbands' drinking increases and accelerates over time when they are the *only* partner who is physically aggressive. If physically aggressive husbands are paired with physically aggressive wives, the husbands'

perceptions of their wives' aggression appear to have a dampening effect on their own drinking over time. However, physically aggressive wives increase and accelerate their drinking regardless of their husbands' aggression, but if their husbands are perceived as physically aggressive, the overall level of their drinking is also elevated. Apparently, if both partners are physically aggressive, their drinking is maintained at more similar levels than if only one of them is physically aggressive.

Anxious husbands' average alcohol intake is higher, whereas depressed husbands' is lower. Interestingly, over time, husbands' anxiety appears to have a slight deceleration effect on their drinking. Perhaps the use of alcohol over time actually reduces the levels of anxiety for the husbands, thus diminishing their need for their previous levels of alcohol [Cooper et al., 1995]. Wives' drinking is not influenced directly by anxiety or depression. However, anxiety moderates the effect of physical aggression on alcohol use for wives. On average, anxious physically aggressive wives drink more than do those nonanxious physically aggressive wives. In addition, over time these anxious wives actually curb their drinking, whereas the nonanxious wives drink less, on average, but actually escalate their drinking over time. If husbands are using alcohol to modulate their depression in the face of their own verbal aggression, wives are using alcohol to manage their anxiety in the face of their own physical aggression. Prior evidence suggests that anxiety and depression are related to alcohol use [e.g., Buckner et al., 2008; Graham et al., 2007], and that alcohol use is related to later marital aggression [e.g., Barnwell et al., 2006], but the evidence of these internalizing symptoms (anxiety for wives, depression for husbands) as moderators of the effects of marital aggression (physical for wives, verbal for husbands) on alcohol use over time is unique to this study.

Strengths and Limitations

This study is one of the first to examine change over time in alcohol use for marital partners as related to marital aggression and internalizing symptoms. As such, we are adding to the sparse literature on this topic. Our results, on their own, shed light on areas of marital functioning (aggression, internalizing, alcohol use) that have not been investigated in conjunction with each other in a longitudinal design. The collection of a measure of social desirability from spouses and partners would have strengthened the validity of our results. However, the findings as illustrated by the use of plots of prototypical pairs of marital partners [Singer and Willett, 2003] provide an explicit picture of how alcohol use over time occurs in relation to an individual's symptomatology and aggressive behavior as well as the symptomatology and aggressive behavior of their partners.

The use of retrospective data for the measurement of alcohol use has been utilized in many other studies [e.g., Gillespie et al., 2007; Schuckit et al., 2006] and been validated [Longnecker et al., 1992], but, in so far as some of our data are retrospective, it is a limitation. This limitation is somewhat ameliorated by the use of collateral reports of husbands' and wives' drinking. Given the high estimated reliabilities for the alcohol measures, we are confident that we are modeling more true variance than error variance in our growth models.

Despite the limitations of this study, findings offer important evidence for the complex relations among marital aggression, anxiety, and depression and developmental trajectories of problem drinking. The results suggest that marital aggression may play an important role in the development of alcohol problems, although its effects depend on gender. Further, symptoms of anxiety and depression may contribute to the development of husbands' alcohol problems, and moderate associations between physical aggression and wives' alcohol problems. An important next direction for research is to examine the affect-regulation or stressor-vulnerability models of alcohol consumption as possible intervening variables; in this way, expectancies that drinking will alleviate the stress and negative mood associated with marital aggression may mediate the link between marital aggression and problem drinking.

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AGGRESSION AND DRINKING BEHAVIOR 2

Fig. 1.

Latent factor growth model to determine growth in alcohol use for wives and husbands over 4 time periods (-2, 0, 1.5, 2.5) in which the intercept was centered at the data collection time point 1.

Fig. 2. Prototypical fitted trajectories for husband's and wife's alcohol use (as self and other reported on the ADS and MAST) from the unconditional quadratic latent variable growth model ($N = 195$). ADS, Alcohol Dependence Scale; MAST, Michigan Alcoholism Screening Test.

Fig. 3.

(a) Prototypical fitted alcohol use trajectories for nonaggressive couples at high and low levels of depression and anxiety. (b) Prototypical fitted alcohol use trajectories for verbally aggressive husbands and nonaggressive wives at high and low levels of depression and anxiety. (c) Prototypical fitted alcohol use trajectories for physically aggressive husbands and nonaggressive wives at high and low levels of depression and anxiety. (d) Prototypical fitted alcohol use trajectories for physically aggressive husbands and wives at high and low levels of depression and anxiety. (e) Prototypical fitted alcohol use trajectories for verbally and physically aggressive husbands and wives at high and low levels of physical depression and anxiety.

TABLE I

Means, Standard Deviations, and Range of Scores for Study Variables

Variable name	Men			Women		
	M	SD	Range	M	SD	Range
1. T1 self-report—MAST	5.46	10.18	0–57	2.83	6.86	0–47
2. T2 self-report—MAST	4.79	8.61	0–49	2.68	6.31	0–45
3. T3 self-report—MAST	3.27	8.98	0–63	2.14	5.75	0–45
4. T4 self-report—MAST	2.25	5.26	0–35	1.93	5.15	0–43
5. T1 spouse report—MAST	5.08	9.57	0–51	2.76	6.97	0–45
6. T2 spouse report—MAST	4.86	9.31	0–51	2.46	5.61	0–42
7. T3 spouse report—MAST	3.55	8.17	0–47	1.03	1.99	0–9
8. T4 spouse report—MAST	3.34	7.86	0–47	0.96	1.68	0–6
9. T1 self-report—ADS	3.22	7.06	0–41	1.99	5.36	0–42
10. T2 self-report—ADS	3.06	6.88	0–41	1.38	3.85	0–25
11. T3 self-report—ADS	1.42	4.92	0–32	1.25	4.30	0–29
12. T4 self-report—ADS	0.93	3.32	0–24	0.90	2.86	0–18
13. T1 spouse report—ADS	3.30	7.37	0–42	0.59	2.27	0–17
14. T2 spouse report—ADS	3.24	7.29	0–42	0.84	2.94	0–19
15. T3 spouse report—ADS	2.44	7.05	0–38	0.43	1.70	0–11
16. T4 spouse report—ADS	1.81	6.01	0–39	0.22	1.01	0–7
17. Self-report physical conflict—CTS	2.30	6.35	0–38	2.27	6.26	0–46
18. Self-report verbal conflict—CTS	9.47	8.15	0–36	10.36	7.73	0–36
19. Spouse report physical conflict—CTS	2.76	7.60	0–41	2.19	5.99	0–37
20. Spouse report verbal conflict—CTS	10.10	8.20	0–36	9.22	7.31	0–31
21. Anxiety—SCL-90	0.34	0.59	0–3.6	0.41	0.57	0–2.9
22. Depression symptoms—SCL-90	0.50	0.59	0–3.23	0.75	0.76	0–3.31

MAST, Michigan Alcoholism Screening Test; ADS, Alcohol Dependence Scale; CTS, Conflict Tactics Scale; SCL-90, Symptom Checklist-90—Revised.

TABLE II

Parameter Estimates of Mean Growth Levels and Variance of Growth Factors for Husbands' and Wives' Unconditional Quadratic Latent Variable Growth Model

	Intercept (s.e.)	Slope (s.e.)	Quadratic (s.e.)
<i>Husband</i>			
Mean	1.045*** (.078)	-0.023** (.008)	-0.006~ (.003)
Variance	0.793*** (.123)	0.010~ (.006)	0.002** (.001)
<i>Wife</i>			
Mean	0.675*** (.065)	-0.028** (.010)	-0.006 (.004)
Variance	0.416*** (.077)	0.044** (.015)	0.003** (.001)

~ $P < .10$;

** $P < .01$;

*** $P < .001$.

TABLE III

Model Fit for the Series of Models Fit ($N = 195$)

Model	χ^2	df	χ^2/df	RMSEA	AIC
<i>Unconditional</i>					
Linear	1,448	452	3.2	.10	5,450
Quadratic	1,392	439	3.2	.10	5,420
<i>Conditional</i>					
SES, race (Step 1)	1,459	491	3.0	.10	6,189
Husband and wife reports of their own aggression (physical and verbal) and their reports of their spouse's aggression (physical and verbal) (Step 2)	1,908	723	2.6	.09	8,756
Husband and wife reports of their own anxiety and depression (Step 3)	2,110	839	2.5	.08	8,781
Husband's depression*husband's report of his verbal aggression, wife's anxiety*wife's report of her physical aggression (Step 4)	2,247	899	2.5	.08	8,971

All χ^2 -tests between these models were significant at $P < .001$. SES, socioeconomic status.

TABLE IV

Unstandardized Parameter Estimates and Standard Errors (in Parentheses) of the Conditional Latent Variable Quadratic Growth Models for Husband's and Wife's Alcohol Behaviors over 4 Time Points (−2, 0, 1.5, 2.5) ($N = 195$)

	Husband			Wife		
	Intercept	Slope	Quadratic	Intercept	Slope	Quadratic
Mean level	0.958*** (.294)	0.020 (.040)	0.036** (.016)	1.185*** (.248)	−0.134** (.050)	−0.018 (.023)
SES	−0.100* (.054)	−0.006 (.008)	−0.007* (.003)	−0.162*** (.046)	0.029** (.010)	0.005 (.004)
Black/Other (race)	0.235* (.118)	−0.055** (.017)	−0.028*** (.007)	−0.093 (.102)	−0.047** (.021)	−0.026** (.009)
<i>Physical CTS</i>						
Husband/wife physical reports on own alcohol factors	0.109 (.099)	0.065*** (.014)	0.024*** (.006)	−0.248* (.114)	0.067*** (.022)	0.028** (.010)
Husband/wife reports of spouse physical on own alcohol factors	0.074 (.103)	−0.050*** (.011)	−0.018*** (.006)	0.217** (.090)	0.011 (.017)	0.001 (.008)
<i>Verbal CTS</i>						
Husband/wife verbal reports on own alcohol factors	0.120 (.104)	−0.007 (.012)	−0.003 (.005)	0.007 (.084)	−0.001 (.010)	−0.001 (.007)
Husband/wife reports of spouse verbal on own alcohol factors	−0.074 (.103)	0.011 (.012)	0.005 (.005)	0.026 (.075)	−0.009 (.013)	−0.006 (.006)
Self-reported anxiety (SCL)	0.501* (.260)	−0.034 (.035)	−0.032** (.014)	0.247 (.269)	−0.021 (.049)	0.001 (.022)
Self-reported depression (SCL)	−0.762* (.402)	−0.017 (.032)	−0.002 (.013)	−0.182 (.194)	0.030 (.034)	0.013 (.016)
<i>Interactions</i>						
Husband's depression * his verbal aggression	0.496*** (.149)					
Wife's anxiety * her physical aggression				0.483*** (.120)	−0.075** (.025)	−0.024* (.012)
Variance remaining	0.432*** (.068)	0.001 (.010)	0.001* (.001)	0.229*** (.049)	0.021* (.011)	0.002* (.001)
R^2	48.6	35.0	24.4	45.5	12.1	17.3

* $P < .05$;

** $P < .01$;

*** $P < .001$. SES, socioeconomic status; CTS, Conflict Tactics Scale; SCL, Symptom Checklist.

Estimated Correlations Among the Growth Parameters for the Conditional Quadratic Latent Variable Growth Model Controlling for SES, Race, Physical and Verbal Conflict Tactics, Anxiety and Depression, Interactions Between Conflict Tactics and Anxiety and Depression (*N* = 195)

TABLE V

	I_Husband	S_Husband	Q_Husband	I_Wife	S_Wife
S_Husband	-.23**				
Q_Husband	-.38***	.90***			
I_Wife	.13**	-.05	.08		
S_Wife	.00	.30***	.00	-.31***	
Q_Wife	.00	.28**	.09	-.07	-.31**

** *P* < .01;

*** *P* < .001. SES, socioeconomic status.