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## Individual and spousal unemployment as predictors of smoking and drinking behavior

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### Abstract

The effects of unemployment on health behaviors, and substance use in particular, is still unclear despite substantial existing research. This study aimed to assess the effects of individual and spousal unemployment on smoking and alcohol consumption. The study was based on eight waves of geocoded Framingham Heart Study Offspring Cohort data (US) from 1971–2008 that contained social network information. We fit three series of models to assess whether lagged 1) unemployment, and 2) spousal unemployment predicted odds of being a current smoker or drinks consumed per week, adjusting for a range of socioeconomic and demographic covariates. Compared with employment, unemployment was associated with nearly twice the subsequent odds of smoking, and with increased cigarette consumption among male, but not female, smokers. In contrast, unemployment predicted a one drink reduction in weekly alcohol consumption, though effects varied according to intensity of consumption, and appeared stronger among women. While spousal unemployment had no effect on substance use behaviors among men, wives responded to husbands' unemployment by reducing their alcohol consumption. We conclude that individual, and among women, spousal unemployment predicted changes in substance use behaviors, and that the direction of the change was substance-dependent. Complex interactions among employment status, sex, and intensity and type of consumption appear to be at play and should be investigated further.

### Keywords

US; social epidemiology; multilevel modeling; unemployment; smoking; alcohol consumption

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The Great Recession of 2007-2009 cost the US economy an estimated 8.4 million jobs (Katz, 2010). Since the recession, historically high unemployment has persisted, with 10-15 million people seeking work in any given month between 2010 -2013 (Bureau of Labor Statistics, 2014). Globally, unemployment increased by 30 million people between 2007-2010, bringing the total unemployed population to 210 million worldwide (International Monetary Fund, 2010).

The magnitude of the ongoing unemployment crisis underscores the importance of understanding how unemployment rates affect health and health behaviors (M Harvey Brenner, 2005; McKee-Ryan, Song, Wanberg, & Kinicki, 2005; Christopher J. Ruhm, 2005; Christopher J Ruhm, 2009). As leading risk factors for global disease burden, smoking and alcohol consumption are of particular interest (Lim et al., 2013). Despite a substantial body of research, however, there is controversy over whether unemployment inhibits or promotes consumption of these substances (Henkel, 2011). This analysis uses data collected over several recessionary periods, between 1971-2008, to examine the effects of unemployment on substance use behaviors.

Previous papers have outlined competing hypotheses asserting that unemployment could protect against tobacco and alcohol consumption, on one hand, or that it might promote use of these substances, on the other (Davalos & French, 2011; Ettner, 1997; Henkel, 2011; Pacula, 2011; C J Ruhm, 1995; Christopher J Ruhm & Black, 2002).

In making arguments that unemployment inhibits smoking and drinking, economists conceptualize cigarettes and alcohol as “normal goods:” products for which demand falls when income falls, as in the case of unemployment (C J Ruhm, 1995; Christopher J. Ruhm, 2000), and spousal unemployment, to the extent that household finances are shared. Individual unemployment is also expected to reduce substance use by eliminating exposure to job strain and workplace stressors that motivate employees to smoke and drink (Lamontagne, 2012; Christopher J Ruhm & Black, 2002). To the extent that coworkers attend happy hours or office parties together, unemployment could reduce opportunities for substance use (Davalos & French, 2011).

In support of the latter argument that unemployment might promote smoking and drinking, job loss and long term unemployment are well-known stressors (Dooley, Fielding, & Levi, 1996; McKee-Ryan et al., 2005) that could trigger coping via substance use (Harris & Edlund, 2005). With more leisure time, the unemployed might also increase the amount they smoke or drink simply because there are more opportunities to do so, and fewer consequences of impairment, without work commitments. Spousal unemployment could likewise promote stress-related substance use among the employed by increasing pressure to provide steady financial support, reducing perceived job security, and via emotional contagion (Fowler & Christakis, 2008; Hatfield, Cacioppo, & Rapson, 1994; Howes, Hokanson, & Loewenstein, 1985).

Empirical studies on how unemployment affects individuals' health show mixed findings. A literature review by Henkel in 2011 summarizes the strongest research on individual unemployment and substance use conducted in recent years. The review included studies

published between 1990-2010 that relied on longitudinal data or instrumental variable analysis of cross-sectional data, and controlled for known individual confounders such as education and substance use history (Henkel, 2011). Overall, the literature supported the hypothesis that job loss and unemployment were risk factors for substance use on the individual level. Despite some null findings (Chandola, Head, & Bartley, 2004), a majority of studies that examined unemployment and smoking found that job loss increased the risk of relapse after cessation (Falba, Teng, Sindelar, & Gallo, 2005), odds of starting smoking, (Hammarström & Janlert, 1994) and smoking intensity (Falba et al., 2005; Hammarström & Janlert, 1994), while it decreased odds of cessation (Rose, Chassin, Presson, & Sherman, 1996; Weden, Astone, & Bishai, 2006).

The association between unemployment and alcohol consumption was more complex. Of 14 studies reviewed, 9 suggested that unemployment is a risk factor for alcohol abuse and increased alcohol consumption, 3 were null, and 2 showed mixed findings (Henkel, 2011). The two studies with mixed findings highlight interesting complexity in how unemployment affects drinking behavior. First, it appeared that while unemployment increased the risk of taking up drinking, it was not associated with the number of drinks consumed per day (Gallo, Bradley, Siegel, & Kasl, 2001). Second, unemployment was positively associated with alcohol consumption overall, but negatively associated with alcohol dependence symptoms (Ettner, 1997). One proposed explanation is that heavy drinkers may decrease consumption when they become unemployed, while less intensive users increase consumption.

Other studies have also shown support for the hypothesis that the effects of unemployment on drinking vary according to whether the subject is a heavy or light drinker. For example, a study of Health and Retirement Survey participants found that increases in drinking among those laid off after plant closures were largely driven by heavy drinkers (Deb, Gallo, Ayyagari, Fletcher, & Sindelar, 2011). Related research has found that heavy drinkers are less responsive to alcohol price increase than are light or moderate drinkers (Manning, Blumberg, & Moulton, 1995), providing a potential mechanism differentiating heavy and light drinkers' response to unemployment.

This analysis uses longitudinal data on alcohol consumption, smoking behavior, and employment status at eight waves to explore associations between unemployment and substance use behaviors. In sensitivity analyses, we control for neighborhoods because area-level socioeconomic factors are potential confounders of the relationship between individual employment and substance use, and to account for statistical dependence among observations from the same local areas. Likewise, baseline substance use predicts future employment outcomes (Henkel, 2011), and through this pathway, may also affect choice of neighborhood.

We also examine associations between spousal unemployment and smoking and drinking behavior, a question that has not been addressed previously despite evidence that spousal unemployment may be a risk factor for emotional distress (Røsand, Slinning, Eberhard-Gran, Røysamb, & Tambs, 2012). Further, testing spousal employment status as risk factor

for substance use allows us to better understand mechanisms linking unemployment and substance use in general.

## Methods

### Data

The Framingham Heart Study (FHS) Offspring Cohort was initiated in 1971 with 5,124 subjects. It comprises children of the FHS Original Cohort and the spouses of these children (Feinleib, Kannel, Garrison, McNamara, & Castelli, 1975). Subjects have completed eight waves of surveys and medical exams, conducted approximately every four years, to date. This analysis utilized all eight waves of exams (1971-2008), which were centered in 1973, 1981, 1985, 1989, 1992, 1997, 1999, and 2005.

### Ascertainment of social ties

FHS Offspring participants served as both “egos,” or participants on whose outcomes the analysis was focused, and “alters,” or the spouses of the egos. Because the Offspring Cohort was designed to include all participants' spouses, 83% of subjects with a spouse had that spouse in the network and providing data to the study.

### Outcome

Smoking status was self-reported at each wave, and was coded as a binary variable equal to one if the subject reported smoking one or more cigarettes per day in the year leading up to the exam, and zero if the subject reported smoking no cigarettes per day in the year leading up to the exam. In sensitivity analyses, we examined the number of cigarettes smoked per day by smokers, which was also recorded at each wave.

We used self-reported number of drinks per week as our main measure of alcohol consumption. We also characterized each participant as exhibiting low- or high-risk alcohol-related behavior for sensitivity analyses. Consuming fewer than 8 and 15 drinks per week was considered low-risk behavior for women and men, respectively, while consuming those amounts or more was considered high-risk (Dawson, 2000).

### Exposure

Participants reported their employment status at each wave. Responses were categorized as employed, unemployed, student, housewife, or retired. For the analysis of spousal unemployment, spouses were categorized as employed, unemployed, or not in the labor force (i.e., retirees, students, and homemakers). We used lagged employment status, which corresponded to the previous wave's employment category, as our main measures of exposure. We also created a binary variable denoting job loss that was coded affirmatively if the subject was unemployed in the current wave but had been employed in the previous wave. Both job loss and current employment status served as exposure measures in sensitivity analyses.

## Covariates

All analyses controlled for potential confounders, including continuous years of education, sex, Hispanic ethnicity, age at baseline, and fixed effects for study wave. In the analysis of spousal unemployment, we always included ego employment status as a categorical variable with employed, the most prevalent response, serving as the reference category. The analysis was limited to white participants, who contributed roughly 99% of observations.

## Statistical analysis

To examine whether unemployment was associated with odds of smoking at the individual-level, we fit a GEE-type marginal longitudinal logistic regression model with clustering on the ego that accounted for the correlation of observations within individuals (Cacioppo, Fowler, & Christakis, 2009; Christakis & Fowler, 2008; Liang & Zeger, 1986). A variance components, or independent, working covariance structure was assumed (Christakis & Fowler, 2008). To examine whether individual unemployment was associated with weekly alcohol consumption, we fit a marginal longitudinal linear regression model using a GEE approach that also accounted for the correlation of observations within individuals. For both models, we explored sex differences by including interaction terms between employment status and sex, and by running sex-stratified analyses. The stratified analyses offered the additional benefit that it separated spousal pairs for whom we would expect correlated measures (Christakis & Fowler, 2008).

In sensitivity analyses, we used two alternative conceptualizations of employment status; one analysis replaced lagged employment status with contemporaneous employment status and another used a binary indicator of job loss since the previous wave. We also explored whether results were robust to different measures of substance use. First, we used smoking intensity, as measured by cigarette consumption among smokers, as an outcome. In sensitivity analyses of alcohol consumption, we substituted a dichotomous indicator of high-risk drinking behavior in place of a continuous measure of alcohol consumption. Finally, we stratified analyses of alcohol consumption by high- and low-risk drinking in response to previous findings that light and heavy drinkers may have different reactions to unemployment (Deb et al., 2011; Manning et al., 1995).

Because area-level socioeconomic factors could confound relationships between individual employment status and substance use, we added Census tracts as fixed effects to previously specified marginal models. Including Census tracts as fixed effects allowed us to control stringently for confounding by area-level economic factors at any given time, such as unemployment rate, and to examine if individual-level relationships still held. This sensitivity analysis also accounted for statistical dependence among measures within local areas.

Finally, to test whether lagged spousal unemployment was associated with smoking and drinking behavior, we added categorical spousal employment status to single-level individual unemployment models. We again conducted a range of sensitivity analyses that used contemporaneous spousal employment status or job loss as the predictor of interest, and explored differences by sex and intensity of use. We also added fixed effects for census

tracts to our sex-stratified models to take into account both dependence of subjects within tracts and spousal pairs.

This study was approved by the Harvard School of Public Health Institutional Review Board. All models were fit in SAS 9.3.

## Results

The percentage of offspring cohort participants who were unemployed in a given wave ranged from nearly 2% in 1991-1995 to .2% in 2003-2008 as participants aged out of the workforce. Covariate distribution and outcome measures varied according to employment in bivariate analyses. On average, ever unemployed participants were younger, less educated, and more likely to be men than never unemployed subjects (Table 1). Both smoking prevalence and alcohol consumption also varied according to employment status ( $p < .0001$ ). Smoking prevalence among the unemployed was higher than the cohort average in all waves (Table 2). Among drinkers, weekly alcohol consumption was higher among the unemployed during 1973-1995, but fell below the cohort-wide average in 1995-2001. In 2003-2008, no unemployed participants reported drinking any alcohol. Overall, a higher percentage of unemployed abstained from alcohol completely than did the sample overall.

The number of participants with a spouse observed in the cohort ranged from 3,471 at the start of the study to 1,403 by the last round of data collection (Table 3). Mirroring individual employment trends, the highest percentage of participants were married to an unemployed spouse in 1991-1995 (2%), while no one with a spouse in the study was married to an unemployed partner in 2003-2008.

Smoking prevalence varied according to spousal employment category. A higher proportion of participants with unemployed spouses smoked compared to the married cohort overall except in two periods (1991-1995 and 1998-2001). Weekly alcohol consumption did not vary according to spousal employment category.

Within individuals over time, unemployment versus employment in the previous wave was associated with higher odds of smoking (OR 1.96, 95% CI: 1.43 – 2.71), adjusted for educational attainment, age, Hispanic ethnicity, sex, and wave (Table 4). Job loss since the previous wave similarly appeared to increase odds of smoking (OR 2.18, 95% CI: 1.56 - 3.06).

In addition to the main effect of lagged unemployment, there was a positive interaction between unemployment and male sex that suggested the effect of unemployment on smoking may be stronger among men. In response, we ran sex-stratified models examining both odds of smoking and smoking intensity among smokers. These stratified models helped us explore sex differences but also ensured that spousal pairs were analyzed separately, reducing the threat that the assumption of independence across participants was violated. Among men, unemployment in the previous wave was associated with higher odds of smoking (OR 2.36, 95% CI: 1.48 - 3.75), and roughly 4 additional daily cigarettes smoked by current smokers (95% CI: 0.14 - 8.42). Among women, unemployment in the previous

wave was a marginally significant ( $p=.057$ ) predictor of smoking odds (OR 1.59, 95% CI: .99-2.58). Unemployment was not associated with smoking intensity among women.

To ensure that these relationships were not confounded by neighborhood, which might affect both odds of individual unemployment and smoking behavior, we added fixed effects for Census Tracts. Under this specification, unemployment remained associated with higher odds of smoking ( $p=.05$ ) compared to employment (OR 1.50, 95% CI: 1 - 2.26).

Unemployment in the prior wave was also associated with alcohol consumption, but in the opposite direction, predicting 1.07 fewer drinks per week (95% CI: -1.8 - -.34) (Table 5). Ego sex did not modify the relationship between lagged employment status and drinking. As suggested by previous research, declines in consumption varied across low- and high-risk drinking behavior categories. Overall, high-risk subjects (Dawson, 2000), cut back the most, consuming 2.78 fewer drinks per week on average (95% CI: -4.62 - -.95). Unemployment was not associated with lower alcohol consumption among low-risk drinkers, but it we observed a .53 weekly drink reduction on average among the larger group of participants who exhibited any low-risk behavior, including transitions to abstaining (95% CI: -0.93 - -0.14). Although sex did not modify unemployment-drinking behavior relationships, we ran sex-stratified analyses by risk category to ensure that results were robust when spousal pairs were analyzed separately. Results held for both low-risk men and women, and for high-risk women.

To control for confounding by neighborhood, we added fixed effects for Census Tracts. The effect of unemployment on weekly drinks persisted when Census tracts were included in our main model, with unemployment in the prior wave associated with 1.05 fewer drinks per week across both sexes (95% CI: -1.86 - -0.23). Sex-stratified models that included fixed effects for Census Tracts showed robust associations among women, who cut back up .96 drinks per week on average (95% CI: -1.66 - -0.25), with a more pronounced reduction of 2.09 drinks among high-risk women (95% CI: -4.01 - -0.17). Effects for men and low-risk women were no longer detected after adding fixed effects for Census Tracts.

Having an unemployed spouse in the previous or current wave was not associated with higher odds of smoking compared to subjects with employed spouses, controlling for individual employment status and other socioeconomic and demographic controls (Table 6). Having an unemployed spouse in the current wave was associated with 1.2 (95% CI: -2.06 - -0.34) fewer weekly drinks among women, but not associated with changes among men. For women exhibiting heavy drinking, both lagged and contemporaneous spousal unemployment was associated with reduced alcohol consumption on the order of roughly 2.5 to 3.2 drinks per week. Spousal unemployment was not associated with drinking behavior among men in any models, nor among female low-risk drinkers.

The relationship between husband's unemployment and reductions in alcohol consumption among heavy drinking wives appeared robust, remaining marginally significant ( $p=.09$ ) when fixed effects for Census Tracts were added.



## Discussion

This paper presented three salient findings. First, compared with employment, unemployment was associated with nearly twice the odds of subsequent smoking, and with increased cigarette consumption among male, but not female, smokers. Second, unemployment predicted a one drink reduction in weekly alcohol consumption, though effects varied according to intensity of consumption, and appeared stronger among women. Third, while spousal unemployment had no effect on substance use behaviors among men, wives responded to husbands' unemployment by reducing their alcohol consumption.

Our results on smoking are in line with previous studies showing that job loss increases the risk of relapse after cessation (Falba et al., 2005), odds of starting smoking (Hammarström & Janlert, 1994), and smoking intensity (Falba et al., 2005; Hammarström & Janlert, 1994), and that it decreases odds of cessation (Rose et al., 1996; Weden et al., 2006). In contrast with smoking outcomes, we showed that unemployment inhibited alcohol consumption in this cohort, and that the effects appeared particularly strong for women. As suggested by previous literature (Manning et al., 1995; Christopher J Ruhm & Black, 2002), the effect of unemployment on drinking behavior varied according to intensity of consumption. Heavy drinkers, especially female heavy drinkers, reduced consumption. Despite major differences in study design, these results align with Ruhm and Black's findings that unemployment inhibits drinking, particularly among heavy drinkers (Christopher J Ruhm & Black, 2002).

We found that spousal unemployment had no effect on men, regardless of which substance use outcome we examined and regardless of model specification. However, wives did respond to husbands' unemployment by reducing their alcohol consumption, controlling for their own employment statuses. Again, this effect appeared to be driven by reductions among heavy drinkers. These findings were robust to model specifications that accounted for neighborhood and to those that used current rather than lagged spousal unemployment as the predictor variable. The sex difference in response to spousal unemployment may provide insight into mechanisms linking unemployment and drinking. For example, wives with unemployed husbands might be subject to lower household incomes and emotional contagion from a stressed spouse (Fowler & Christakis, 2008; Hatfield et al., 1994; Howes et al., 1985), but would not experience increased leisure time nor fewer work-related social events that offer opportunities to drink. While more research is needed, our results suggest that income may be a more important pathway linking unemployment to declines in alcohol consumption than is the elimination of job strain upon job loss.

Our analysis makes two unique contributions to the literature on unemployment and substance use. First, it uses unique social tie information and a longitudinal design to examine responses to spousal unemployment, which had not previously been studied. Secondly, it examines within-individual changes in consumption predicted by individual employment status, controlling for area of residence in sensitivity analyses. This approach reduces the threat of confounding by baseline drinking or smoking behavior, reverse causality, and confounding by neighborhood deprivation. A key methodological strength of the analysis is that while many previous studies misclassify participants who are outside the labor force, for example using surveys that ask only if respondents are employed and coding



all negative responses as unemployment (Henkel, 2011), we were able to correctly categorize students, retirees, and wives who stayed at home.

It is important to note several limitations, however. First, because we did not have data on income for participants at each wave, we could not test whether declines in household income were responsible for decreased alcohol consumption among the unemployed, or among the wives of unemployed husbands. Similarly, we could not test whether sex differences in response to spousal unemployment were driven by sex differences in earnings, or by sociocultural factors. Lacking detailed information about occupational category and work hours, we were also unable to examine the role of leisure time in shaping behavior changes. Data limitations also prevented us from controlling for a range of potential individual-level confounders that might explain the observed associations. Although statistically controlling for basic demographic and socioeconomic characteristics and analyzing within-person changes helps to address concerns about endogeneity, individual factors such as psychological functioning or other health behaviors could spur changes in both substance use employment status.

Second, our results have limited generalizability. Our analyses were restricted to White respondents and to heterosexual married couples, in the case of our spousal models. A large proportion of individuals with low job security does not fall into these demographic categories, and may respond differently to individual and family-level unemployment.

In summary, while more research is needed on this topic across different cohorts and using more detailed information on potential mediators and confounders, our analyses provide useful insights. Responses to unemployment are complex, with effects pointing in opposite directions for smoking versus drinking behavior, and varying across sex and type of user. Understanding these effects and further exploring mechanisms may help promote healthy behaviors during tough economic times.

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### Research Highlights

- We analyzed individual and spousal predictors of within-individual changes in substance use
- Unemployment was associated with nearly twice the odds of subsequent smoking
- Unemployment predicted a one drink reduction in weekly alcohol consumption
- Wives responded to husbands' unemployment by reducing their alcohol consumption

**Table 1**  
**Ethnicity, Sex, Years of Schooling, and Year of Birth by Ever versus Never Unemployment**

	Never unemployed	Ever unemployed	Test for Difference (p-value)
Percent Hispanic	10.4%	11.9%	0.2
Percent Male	48.2%	54.0%	0.03
Years of education	13.9	13.5	0.004
Year of birth	1936	1941	<.001

**Table 2**  
**Weekly Alcohol Consumption among Drinkers and Prevalence of Smoking (All Subjects and Unemployed Participants) by Wave**

Wave (middle year)	Count unemployed (% of cohort)	Percent Smokers (all subjects)	Percent Smokers (among unemployed)	Weekly Drinks (all subjects)	Weekly Drinks (among unemployed)
1 (1973)	58 (1.15)	44.38	65.52	9 (10.9)	12.4 (16.6)
2 (1981)	55 (1.09)	36.44	55.56	10.3 (11.7)	18.5 (18.8)
3 (1985)	46 (0.91)	29.12	35.71	9.9 (10.8)	10.8 (11.2)
4 (1989)	81 (1.6)	24.69	38.46	8.6 (9.7)	10.5 (10.4)
5 (1992)	101 (1.99)	19.65	40	8 (8.6)	8.4 (9.2)
6 (1997)	79 (1.56)	15.24	31.17	8.3 (8.4)	8.2 (7.9)
7 (1999)	68 (1.34)	13.67	28.79	8.5 (8.8)	7.8 (8.1)
8 (2005)	10 (0.2)	8.09	0	8.8 (8.6)	.



**Table 3**  
**Percent of Egos with Unemployed Spouses, Weekly Alcohol Consumption, and Smoking Prevalence by Spousal Employment Status**

Wave (middle year)	Participants with a spouse observed	Has an unemployed spouse			All with a spouse in network		
		Percent	Percent current smokers	Weekly drinks (SD)	Percent current smokers	Weekly Drinks (SD)	
1 (1973)	3,471	0.75	61.54	10.4 (12.9)	43.25	8.9 (10.6)	
2 (1981)	2,717	0.59	43.75	6.7 (5.3)	34.33	10.1 (11.4)	
3 (1985)	2,469	0.57	28.57	8.7 (10.7)	26.44	9.6 (10.1)	
4 (1989)	2,409	1.25	33.33	8.8 (8.2)	21.71	8.4 (9.4)	
5 (1992)	2,162	1.99	13.95	6.2 (6.4)	16.16	8 (8.7)	
6 (1997)	1,926	1.46	14.29	6.1 (6.7)	12.06	8.2 (8.4)	
7 (1999)	1,828	0.77	7.14	6.8 (9.1)	10.29	8.5 (9.3)	
8 (2005)	1,403	0	n/a	8.8 (9.3)	5.35	8.8 (9.2)	

**Table 4**  
**Associations between Unemployment and Smoking**

	Estimate	95% CI
Odds of smoking associated with unemployment compared to employment in prior wave		
All subjects <sup>a</sup> (n=2,934)	1.97 <sup>***</sup>	(1.43 - 2.71)
All subjects <sup>b</sup> (n=2,495)	1.72 <sup>***</sup>	(1.27 - 2.31)
Men <sup>c</sup> (n=1,122)	2.36 <sup>***</sup>	(1.48 - 3.75)
Women <sup>c</sup> (n=1,373)	1.59	(0.99 - 2.57)
Odds of smoking associated with job loss in prior wave compared to no job loss in prior wave		
Job loss <sup>b</sup> (n=2,495)	2.18 <sup>***</sup>	(1.56 - 3.06)
Additional daily cigarette consumption among current smokers associated with unemployment compared to employment in prior wave		
All subjects <sup>b</sup> (n=862)	2.68	(-0.21 - 5.56)
Men <sup>c</sup> (n=378)	4.28 <sup>*</sup>	(0.14 - 8.42)
Women <sup>c</sup> (n=484)	0.30	(-3.17 - 3.77)

Note:

\*\*\*  
p<.001

\*\*  
p<.01

\*  
p<.05

Students, homemakers, and retired subjects excluded from employed reference group in all models.

<sup>a</sup> Age-adjusted only.

<sup>b</sup> Adjusted for years of education, Hispanic ethnicity, age, wave, and clustering of observations within subjects and includes an interaction term between sex and employment category.

<sup>c</sup> Adjusted for years of education, Hispanic ethnicity, age, wave, and clustering of observations within subjects. Sample size (n) indicates number of subjects analyzed.

**Table 5**  
**Associations between Unemployment and Weekly Alcohol Consumption**

	Estimate	CI
Weekly drinks associated with unemployment compared to employment in prior wave		
All subjects <sup>a</sup> (n=2,934)	-.41	(-1.72 - .90)
All subjects <sup>b</sup> (n=2,495)	-1.07**	(-1.8 - -0.34)
Weekly drinks associated with unemployment compared to employment among high-risk subjects in prior wave		
All subjects <sup>b</sup> (n=934)	-2.78**	(-4.62 - -0.95)
Men <sup>c</sup> (n=469)	1.63	(-4.31 - 7.56)
Women <sup>c</sup> (n=465)	-3.17***	(-4.74 - -1.6)
Weekly drinks associated with unemployment compared to employment among low-risk subjects in prior wave		
All subjects <sup>b</sup> (n=2,437)	-0.53**	(-0.93 - -0.14)
Men <sup>c</sup> (n=1,095)	-0.95*	(-1.88 - -0.01)
Women <sup>c</sup> (n=1,342)	-0.54**	(-0.94 - -0.14)
Weekly drinks associated with unemployment compared to employment among low-risk drinkers in prior wave		
All subjects <sup>b</sup> (n=2,138)	-0.16	(-0.8 - 0.48)
Men <sup>c</sup> (n=979)	-0.4	(-1.62 - 0.82)
Women <sup>c</sup> (n=1,159)	-0.15	(-0.79 - 0.5)

Note:

\*\*\*  
p<.001

\*\*  
p<.01

\*  
p<.05

Students, homemakers, and retired subjects excluded from employed reference group in all models.

<sup>a</sup> Age-adjusted only.

<sup>b</sup> Adjusted for years of education, Hispanic ethnicity, age, wave, and clustering of observations within subjects and includes an interaction term between sex and employment category.

<sup>c</sup> Adjusted for years of education, Hispanic ethnicity, age, wave, and clustering of observations within subjects. Sample size (n) indicates number of subjects analyzed. Because subjects transitioned among drinking intensity categories across waves, sample sizes across high- and low-risk models do not sum to total sample size.

**Table 6**  
**Associations between Spousal Unemployment and Substance Use**

	Men Only		Women Only	
	Estimate	CI	Estimate	CI
Weekly drinks (counts) associated with having an unemployed compared to employed spouse				
Spousal unemployment, lagged (Men n=778; Women n=907)	-0.28	(-3.78 - 3.21)	-0.24	(-1.26 - 0.79)
Spousal unemployment, current (Men n=778; Women n=981)	0.38	(-2.88 - 3.63)	-1.2**	(-2.06 - -0.34)
Weekly drinks (counts) associated with having an unemployed compared to employed spouse among high risk subjects				
Spousal unemployment, lagged (Men n=276; Women n=276)	-2.6	(-12.07 - 6.88)	-2.53*	(-4.88 - -0.18)
Spousal unemployment, current (Men n=276; Women n=318)	-3.59	(-8.59 - 1.41)	-3.21**	(-5.65 - -0.77)
Weekly drinks (counts) associated with having an unemployed compared to employed spouse among low risk subjects				
Spousal unemployment, lagged (Men n=731; Women n=858)	-0.13	(-1.72 - 1.46)	0.19	(-0.46 - 0.84)
Spousal unemployment, current (Men n=731; Women n=938)	0.4	(-1.39 - 2.2)	-0.34	(-0.81 - 0.13)
Weekly drinks (counts) associated with having an unemployed compared to employed spouse among low risk drinkers				
Spousal unemployment, lagged (Men n=634; Women n=727)	-0.33	(-1.94 - 1.27)	-0.1	(-0.77 - 0.58)
Spousal unemployment, current (Men n=634; Women n=847)	0.05	(-1.76 - 1.87)	-0.48	(-1.1 - 0.14)
Odds of smoking for subjects with an unemployed spouse compared to subjects with an employed spouse (odds ratio)				
Spousal unemployment, lagged <sup>a</sup> (Men n=778; Women n=907)	0.67	(0.22 - 1.98)	1.73	(0.82 - 3.65)

Note:

\*\*\*  
 p<.001

\*\*  
 p<.01

\*  
 p<.05

All models adjusted for ego unemployment category, years of education, Hispanic ethnicity, age, wave, and clustering of observations within subjects; students, homemakers, and retired spouses excluded from employed spousal reference group.

<sup>a</sup> Additionally adjusted for spousal smoking status. Sample size (n) indicates number of subjects analyzed. Because subjects transitioned among drinking intensity categories across waves, sample sizes across high- and low-risk models do not sum to total sample size.