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The morning after: alcohol misuse and employment problems

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Abstract

Using a rich, recent, and nationally representative longitudinal survey specifically designed to examine alcohol use and associated problems, we investigate the effects of alcohol misuse on a series of understudied and perhaps less common employment problems. Such problems include being fired or laid off from a job, sustained unemployment, and conflicts with a supervisor and/or co-worker. After controlling for time-invariant omitted variables via fixed effects estimation, we find evidence that three measures of alcohol misuse are significantly related to employment problems. The results offer new information on the potential adverse labor market effects of alcohol misuse and shed light on potential mechanisms through which alcohol misuse may impact intensive labor supply and/or wages.

1. Introduction

“No wine, no wisdom. Too much wine – the same.”

Blaise Pascal

Common sense, anecdotal evidence, and economic research all suggest that alcohol consumption has the potential to impose costs on employers, employees, and society in general by lowering the labor market performance of those who excessively use or abuse this substance. In addition to being potentially addictive, alcohol can affect cognitive processes, the ability to evaluate costs and benefits, and physical coordination. Current and/or past alcohol misuse can limit workers’ abilities to perform their jobs through lowered human capital accumulation and physical impairments. Many employers have developed employee assistance programs (EAPs) in light of these facts and provide incentives for wellness programs to lower alcohol-related costs (Hartwell et al., 1996; Blum and Roman, 1995). Governments invest considerable resources in prevention campaigns and treatment programs (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2004a). While

low to moderate alcohol use may be beneficial through improved cardiac health, stress reduction, social connections, and overall well being, heavy and abusive drinking is more likely to result in adverse effects (Eckardt et.al., 2006; Kannel and Ellison, 1996; Peele and Brodsky, 2000; Schmidt and Popham, 1975).

Economists have extensively investigated the role of alcohol use in labor market performance. Published research has examined a range of labor market outcomes, including the probability of employment/unemployment, earnings/income/wages, hours worked, and non-wage job characteristics (Chatterji and DeSimone, 2006; Hamilton and Hamilton, 1997; Johansson et al. 2007; Tekin, 2002). The present study contributes to our understanding of the role of alcohol misuse in labor market performance by examining several understudied employment problems: being fired or laid off from a job, sustained unemployment, and conflict with supervisors and/or co-workers. These negative outcomes may not be fully captured in traditional labor market measures (e.g., wages and hours worked) and could be a pathway through which alcohol misuse lowers productivity and earnings. Moreover, these labor market measures may be a signal for underlying behavioral problems that impede career growth and advancement.

Several additional features of this research are noteworthy. First, we used econometric techniques to generate consistent estimates of the relationship between alcohol misuse and employment problems. Specifically, we addressed one form of potential endogeneity (i.e., time invariant omitted variables) in all employment equations with fixed effects estimation. We also examined three indicators for alcohol misuse: weekly binge drinking (consuming more than five drinks per episode for men and more than four drinks per episode for women on a weekly basis), alcohol abuse and/or dependence, and both alcohol abuse and dependence. Finally, because our dataset is a current, large, and representative panel of the entire U.S., our statistical power is high, and our results are generalizable.

II. Background

The following literature review has two primary objectives: first, to provide the reader with a brief summary of relevant economic studies that have examined the role of alcohol in labor market performance and, second, to highlight how other researchers have addressed the potential endogeneity of alcohol use in employment equations.

The extant research on alcohol consumption and labor market productivity does not consistently link all patterns of alcohol consumption with poor performance. Rather, use is associated with both better (e.g., Berger and Leigh, 1988; Bray, 2005; French and Zarkin, 1995; Hamilton and Hamilton, 1997; Heien, 1996; Lye and Hirschberg, 2004; Zarkin et al., 1998) and worse (e.g., Bray, 2005; French and Zarkin, 1998; Kenkel and Wang, 1999; MacDonald and Shields, 2004; Mullahy and Sindelar, 1989, 1991, 1993, 1994, 1995, 1996, 1997) outcomes. Economists have proposed a variety of potential pathways by which alcohol might enhance work performance, including improved health, social networking, reverse causality, an income effect, and unobservable characteristics associated with alcohol use that are rewarded in the labor market (Eckardt et al., 2006; Hamilton and Hamilton, 1997; Kannel and Ellison, 1996; Peele and Brodsky, 2000). While some of these pathways are plausible for moderate use (i.e., unobservables and reverse causality), none can satisfactorily explain a positive impact of heavy or addictive drinking on work performance. Indeed, the main health benefit of alcohol use is a lowered probability of cardiovascular disease, which may not be an important predictor of labor market performance during prime working age (Dave and Kaestner, 2002).

Economic literature on labor market outcomes

Since the 1970s (Berry and Boland, 1977), economists have examined the relationships between an array of employment outcomes (e.g., labor supply, hours worked, earnings/income/wages, and non-wage job characteristics) and a range of alcohol consumption patterns (e.g., from any to moderate to problematic use). In one of the earlier studies, Berger and Leigh (1988) investigated the effect of alcohol use on wages in a sample of U.S. workers. Data were obtained from the 1972–73 Quality of Employment Survey. The authors adjusted for selection bias and estimated separate equations for alcohol consumers and abstainers. Berger and Leigh found that alcohol consumers earned more than abstainers, even after adjusting for observable characteristics and selection bias. This work has limited relevance today due to its antiquated data, its use of a single binary alcohol measure (used alcohol once or twice a week), and the absence of any information on heavy or abusive drinking (French and Zarkin, 1995).

Mullahy and Sindelar (1996) utilized the 1988 Alcohol Supplement of the National Health Interview Survey to examine the effects of problem drinking on the probability of employment and unemployment. Three definitions of problem drinking were used: abuse/dependence, exceeding the 90th percentile of ethanol consumption, and exceeding the 95th percentile of ethanol consumption. Unobserved heterogeneity was addressed with an instrumental variable model. The authors found that for both men and women, problem drinking decreased (increased) the likelihood of employment (unemployment).

The importance of drinking patterns during young adulthood on future labor market success was examined by Kenkel and Wang (1999). Data were obtained from the 1989 wave of the National Longitudinal Survey of Youth. The authors extended the employment literature by investigating the impact of alcohol use on non-wage job characteristics. The empirical results suggest that relative to non-alcoholics, alcoholics are less likely to be employed in white-collar jobs or to receive fringe benefits (e.g., health insurance and paid vacation) and more likely to be injured on the job, to work for smaller firms, and to be employed in blue-collar jobs. Conditional upon being in a white-collar (blue-collar) job, alcoholics were found to have similar (lower) earnings to those of their non-alcoholic colleagues.

Dave and Kaestner (2002) estimated reduced form models of the effect of alcohol taxes on the probability of employment, hours worked, and wages using the outgoing rotation files of the Current Population Survey from 1979 to 1995. The authors suggest that reduced form models are useful for at least two reasons. First, such models provide information on an important tool (alcohol taxes) for policy makers. Second, reduced form models can provide information about the structural relationship between alcohol use and labor market outcomes. The authors found unexpected variation in the sign of the coefficients for alcohol taxes, and the estimates were large and imprecise. Dave and Kaestner interpreted their results to suggest a weak and indefinite association between alcohol taxes and employment outcomes.

A sizeable literature has also addressed the relationship between alcohol use during youth and educational attainment. Studies have investigated high school completion (Dee and Evans, 2003), years of schooling (Koch and Ribar, 2001; Mullahy and Sindelar, 1989, 1994), missing class (Wechsler et al., 1994; Wechsler et al., 1997; Wechsler et al., 2000), grade point average (Wolaver, 2002), time dedicated to study (Williams et al., 2003; Wolaver, 2002), college matriculation (Dee and Evans, 2003), and college graduation (Cook and Moore, 1993). These studies generally identify worse outcomes for alcohol consumers relative to abstainers, although there is some inconsistency on the magnitude and strength of the relationship. Educational attainment is both intuitively and empirically linked to work

outcomes, with those who obtain more education generally experiencing greater labor market success than those who obtain less.

Statistical challenges

One of the most prominent statistical challenges facing researchers attempting to establish a causal effect of alcohol use on labor market outcomes is the potential endogeneity of alcohol use in employment equations. Alcohol use may be endogenous for at least three reasons. First, employment outcomes may influence alcohol use, perhaps through an income effect, or problems at work may lead to excessive alcohol use as a form of stress release. Second, difficult to measure or unobservable variables may be correlated with both alcohol use and employment outcomes. Third, alcohol use and/or employment outcomes may be measured with error, as the published literature suggests that individuals tend to underestimate or refuse to report their true alcohol consumption (Koppes et al., 2002) and earnings (Meyer and Sullivan, 2003; Turrell, 2000) in survey settings.

To account for unobserved individual heterogeneity in studies examining the predictors of labor market performance, economists often employ instrumental variable (IV) techniques. These approaches have the potential to generate consistent estimates of the effect of alcohol use on labor market outcomes if valid instruments are obtained. Valid instrumental variables are difficult to find, however, and economists often have divergent opinions about what constitutes a credible instrument (Angrist, 2001; Angrist and Krueger, 2001; French and Popovici, 2008; Murray, 2006).

An alternative approach to IV estimation in the face of potential omitted variable bias is fixed-effects estimation using longitudinal data. Yet cross-sectional data are much more common than longitudinal data, which limits opportunities for fixed-effects estimation. Given our less common labor market measures and our ability to address time-invariant omitted variables in the employment equations with a panel dataset, the present investigation could make an important contribution to the literature. The results could have significant economic and policy implications related to the causal effects of alcohol consumption, the potential pathways by which alcohol misuse impacts earnings and/or labor supply, and the areas employers may most profitably target as they develop and improve workplace programs.

Conceptual Framework

In the U.S., workers who are unable to meet their job requirements due to excessive alcohol consumption (either within or outside the workplace) have limited recourse. In some instances, however, if the individual is diagnosed with alcohol abuse and/or dependence, the Americans with Disabilities Act (ADA) would require the employer to provide a reasonable accommodation, most likely a leave of absence to seek treatment (usually initiated through the EAP) (Hartwell et al., 1996). If treatment is not successful in such an instance, however, the employer is not required to offer further accommodation. Disciplinary action for excessive absenteeism, a violation of a company rule, or other misconduct are typically treated the same for all employees, regardless of the source of the employment problems (Roman and Blum, 2002). Courts have varied somewhat in how they believe the ADA should be applied to alcoholism and worker protection. This has led to considerable variation in policies, programs, and sanctions across worksites. For example, workers in “safety sensitive” occupations, such as train conductors and airplane pilots, are subject to pre-employment drug and alcohol screening, random testing, and testing after an accident (with appropriate privacy protections).

From a statistical perspective, the effect of alcohol use on labor market outcomes may be nonlinear. Light alcohol consumption is unlikely to be a risk factor, and moderate consumption may correlate with other forms of moderate living that lower the likelihood of employment problems (French and Zavala, 2007). Alcohol misuse, as measured by weekly binge drinking or a clinical diagnosis of abuse or dependence, implies high exposure to the intoxicating and unhealthy effects of alcohol and may correlate with other forms of excessive living that lead to poor labor market performance. Yet the same characteristics that lead an individual to drink excessively may also lead that individual to work excessively. One of the main empirical questions of this research, therefore, is which if any of these effects is dominant for alcohol misusers?

Gender differences in alcohol consumption and labor market outcomes abound, prompting economists to estimate separate models for men and women (e.g., Berger and Leigh, 1988; Dave and Kaestner, 2002; Mullahy and Sindelar, 1991, 1996, 1997). In general, men are more likely to be employed, receive higher wages for the work they perform, are more likely to consume alcohol (Hupkens et al., 1993), consume more alcohol when they drink (Wilsnack et al., 2000), and cause more problems as a result of their drinking (Robbins and Martin, 1993). Previous studies have reported estimates that are often unusual in sign and magnitude for women, possibly due to weak instruments (e.g. Kenkel and Ribar, 1994; Mullahy and Sindelar, 1996, 1997). For these reasons, we have followed convention and estimated gender-specific models.

One of the central statistical challenges in deriving consistent estimates of these relationships is properly accounting for the potential endogeneity of alcohol misuse in the employment equations. If alcohol misuse is strictly exogenous in the employment models, then single-equation estimation can generate consistent estimates of the true effect of alcohol misuse on the probability of employment problems. But if alcohol misuse is endogenous in the employment equations, the resulting single-equation estimates will be biased and/or inconsistent. One way to partially address potential endogeneity bias is to estimate the alcohol misuse and employment equations with a panel dataset. Fortunately, the data source we selected for this inquiry contains two waves that allow us to track the same measures of alcohol misuse and employment problems for each respondent at two different points in time.

III. Data and Measures

Data Set

The present study used data from Waves 1 and 2 of the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) to examine the impact of alcohol misuse on the probability of employment problems among working men and women. Wave 1 was administered in 2001–2002, and Wave 2 was administered in 2004–2005. Respondents were asked a series of questions on alcohol use and employment problems to permit the calculation of several analysis variables.

Field work for the first wave of the NESARC was conducted by the U.S. Bureau of the Census on behalf of the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Wave 1 of the NESARC recruited a representative sample of the U.S. population, including both citizens and non-citizens. A total of 43,093 respondents were interviewed face-to-face through computer-assisted personal interviewing between August of 2001 and May of 2002. The target population of the NESARC was the civilian non-institutionalized population aged 18 and older and residing in the U.S. and the District of Columbia, including Alaska and Hawaii. The overall survey response rate was 81 percent, which is comparable to other national comorbidity surveys (Division of Health Interview Statistics, National Center for

Health Statistics, 2004). It is perhaps worth noting that the U.S. experienced a mild economic recession in the early 2000s while Wave 1 of the NESARC was in the field. Any effect this recession may have had on the drinking or employment problem measures, however, is unknown.

In Wave 2, the NESARC located and re-interviewed 34,093 of the respondents that participated in Wave 1.¹ Because we estimated fixed-effects models using longitudinal data, we included only those respondents who were surveyed in both waves. After excluding those respondents who were not in the labor force and those who did not provide valid responses for all of the key variables in each wave, the final analysis sample included 20,368 respondents between the ages of 25 and 60 in Wave 1 (9,163 men and 11,205 women). Respondents under the age of 25 may be in school and/or not fully connected to the labor market whereas respondents over the age of 60 may be retired or have reduced their involvement in the labor market as they transition into retirement.

Measures

Employment Problems—To examine the relationships between alcohol misuse and employment problems, three measures were selected corresponding to past-year behaviors: dichotomous indicators for 1) being fired or laid off from a job, 2) being unemployed and looking for work for more than one month, and 3) experiencing trouble (conflict) with a supervisor and/or co-worker. As noted earlier, these measures have been understudied in the economics literature relative to conventional measures of earnings and labor supply. Another redeeming feature of these measures is the small degree of overlap across respondents. Specifically, 19.6% (20.79%) of men (women) experienced at least one of these employment problems in Wave 1 whereas 6.1% (6.1%) experienced at least two problems and only 0.9% (1.1%) reported all three problems. A similar pattern is present in Wave 2, where 18.8% (20.1%) of men (women) experienced at least one of these employment problems, 5.9% (6.2%) experienced at least two problems, and 1.2% (1.4%) reported all three problems.

Alcohol Use—The explanatory variables of primary interest were measures of alcohol misuse. To obtain robust estimates of the relationship between alcohol misuse and the employment problems, we selected measures of (1) weekly or more frequent binge drinking; (2) alcohol abuse, alcohol dependence, or both conditions; and (3) both alcohol abuse and dependence. The latter measure is indicative of the most severe type of alcohol misuse.

IV. Methods

We first estimated pooled cross-sectional linear regression models to predict employment problems as a function of alcohol misuse and other covariates. Despite the potential endogeneity problems discussed earlier, these estimates will establish a benchmark for the fixed-effects models. We measured employment problems (P_{it}) and alcohol misuse (A_{it}) several different ways. Each empirical model, however, had the same basic specification:

$$P_{it} = \beta_0 + \beta_A A_{it} + X_{it} \beta_X + u_i + \varepsilon_{it} \quad (1)$$

¹Additional information on the sampling frame, instrumentation, and key findings of the NESARC can be found in Grant *et al.* (2003), Dawson *et al.* (2007), Ruan *et al.* (2008), and Grant *et al.* (2009).

²NESARC respondents were asked how often they consumed five or more drinks (four or more drinks for women) in the last 12 months. Eleven response categories were provided ranging from “never” in the last 12 months to daily consumption at this level. Abstainers were not asked and were coded as zero. Respondents reporting this pattern of alcohol use on a weekly or more frequent basis were coded as one and zero otherwise.

where i indexes individuals; t indexes time; X_{it} is a vector of all other explanatory variables; u_i represents the unobservable variables; and ε_i is the disturbance term. β_0 , β_A , and β_X , are the coefficients to be estimated. Variables included in X_{it} include many of the standard human capital measures and other controls, such as occupation, age, race, ethnicity, nativity, household structure, urbanicity, educational attainment, work experience, and mental health status. In the estimation of Equation (1) we also included a dummy variable for the second wave to control for the trend change from Wave 1 to Wave 2. Finally, although our dependent variables are binary, we estimated linear probability models for comparability in estimates with the fixed-effects models.

The first hypothesis suggests that β_A is positive and significantly different from zero. Estimation of single-equation models such as Equation (1) will be consistent if all regressors are uncorrelated with the error term in the employment equations. Intuitively, however, there are reasons to believe that important explanatory variables are missing from the employment equations. If this endogeneity problem is present, then the alcohol misuse coefficient estimates will be inconsistent. Stated differently, single-equation cross-sectional estimation of Equation (1) will produce a consistent estimate of β_A only if the unobservable variables contained in u_i are uncorrelated with the alcohol misuse measure, A_{it} (Greene 2007).

Although one potential way to control for omitted variable bias is by using instrumental variables, finding valid and reliable instruments is often difficult (Murray, 2006; French and Popovici, 2008). Because of the inherent challenges associated with a credible IV analysis, and given the fact that the NESARC recently became a panel dataset, we decided to implement a fixed-effects approach as our core model. The fixed-effects approach is an efficient way of controlling for unobserved omitted variables because time-invariant factors (e.g., race/ethnicity, personality traits) drop out of the estimating equation. In other words, by the nature of the fixed-effects transformations, the model drops the unobserved individual heterogeneity, u_i , that was previously included in the disturbance term of Equation (1) and produces a consistent estimate of the effect of alcohol misuse on the outcome measures.³

To formally express the model, we first average all the variables over time (i.e., between Waves 1 and 2):

$$\bar{P}_i = \beta_0 + \beta_A \bar{A}_i + \bar{X}_i \beta_X + u_i + \bar{\varepsilon}_i \quad (2)$$

Next, we subtract Equation (2) from Equation (1):

$$P_{it} - \bar{P}_i = \beta_A (A_{it} - \bar{A}_i) + (X_{it} - \bar{X}_i) \beta_X + (\varepsilon_{it} - \bar{\varepsilon}_i) \quad (3)$$

The time-invariant omitted variables, u_i , drop out of Equation (3) because they are assumed to be constant over time. Of course, any time-varying omitted variables, if present, would continue to function as a source of potential bias in the fixed-effects models. In addition, the fixed-effect technique is unable to address reverse causality or measurement error, if present. Nevertheless, unlike many of the earlier IV studies, our findings are not burdened by potentially invalid instruments and can provide improved estimates of the relationships between alcohol misuse and problems at work.

³For a detailed review of fixed-effects models, see Wooldridge (2001).

V. Results

Descriptive Statistics

Table 1 presents descriptive statistics of the sample for all the variables included in the analysis. For men, the percentage of respondents who experienced trouble with a supervisor or co-worker decreased slightly from 9.79 in Wave 1 to 9.56 in Wave 2, but this decrease is not statistically significant. The percentage of men who were fired or laid off from a job was 8.24 in Wave 1 and 6.89 in Wave 2, and this difference is significant at the 1 percent level. Men who reported sustained unemployment increased from 8.51 percent in Wave 1 to 9.36 percent in Wave 2, but this change is not statistically significant. We found similar changes in the labor market measures between Waves 1 and 2 for women. Women were more likely to have trouble with their supervisor and/or co-workers and to experience sustained unemployment than men, but they were less likely to be fired or laid off from a job.

Turning to the alcohol misuse measures, 13.36 percent of men reported binge drinking at least once a week in Wave 1, and this percentage declined to 12.77 in Wave 2. Trending in the opposite direction, 12.69 percent of men were classified with alcohol abuse or dependence disorder in Wave 1, and this percentage rose to 15.04 percent in Wave 2. The percentage of men who had both conditions (abuse and dependence) was 3.01 in Wave 1 and 4.13 in Wave 2. We found that women who met our criteria for alcohol misuse rose slightly between Waves 1 and 2, but the overall percentages for women were substantially smaller than those for men. In Table 1, we have also reported the p-values for the changes in all analysis variables between Wave 1 and Wave 2.

Appendix Tables A1 (men) and A2 (women) further disaggregate the descriptive statistics by alcohol misuse groups. For all three measures of employment problems, the proportions are higher among alcohol misusers relative to the full sample, especially for individuals with a diagnosis of both alcohol abuse and dependence. Alcohol misusers were also more likely to be current smokers and less likely to be married.

Table 2 shows the patterns of change between Waves 1 and 2 for the employment and alcohol misuse variables. Because the fixed effects estimation relies on the “changers” for identification, it is important to have a sufficient proportion of changers for each of the key dependent and explanatory variables. For the employment problem variables, more than 10 percent of the sample experienced a change in status between Waves 1 and 2 for each of the three measures. For the alcohol misuse variables, more than 10 percent of men reported a change for two of the three measures. Approximately 5 percent of women experienced changes in the alcohol misuse variables, signaling clear gender disparities. Regardless of gender, the least amount of change occurred for the most severe alcohol misuse variable (abuse and dependence), which had the lowest overall prevalence.

Selected coefficient estimates (corresponding to the alcohol misuse variables) for each of our three labor market variables are reported in Tables 3–5. The full set of estimation results for one of the labor market outcomes is reported in Appendix Table A3 (pooled cross-sectional specification) and Appendix Table A4 (fixed-effects specification). The estimation results for the other two labor market outcomes are similar and are available upon request.

All three alcohol misuse measures are positively associated with the likelihood of experiencing trouble with a boss and/or co-worker among working men and women in the pooled cross-sectional estimation, and most of these coefficients are significant at conventional levels (see Table 3). After controlling for potential omitted variable bias with fixed-effects estimation, the coefficients for the alcohol misuse measures decline considerably, as is typical with fixed-effects models. For example, in the cross-sectional

estimation, the probability of having trouble with a boss and/or co-worker is 4.1 percentage points higher for men and 6.7 percentage points higher for women who have an alcohol abuse and/or dependence disorder. These estimates are 3.8 percentage points for men and 2.6 percentage points for women in the fixed-effects estimation. In addition, the effects of weekly binge drinking on the probability of having trouble with a boss and/or co-worker are very small and not statistically significant in the fixed-effects estimation. Finally, the marginal effects of alcohol misuse on the probability of having trouble with a boss and/or co-worker are generally larger for women than for men.

Comparing estimates from the linear probability and fixed-effects models suggests that certain important time invariant omitted variables are significantly correlated with both alcohol misuse and labor market problems, thereby introducing bias into the linear probability estimates. When controlling for these fixed effects, we are in essence purging the estimates of the omitted variable bias, leading to smaller effect sizes and sometimes non-significant estimates.

Table 4 shows the estimated effects of alcohol misuse on the probability of being fired or laid off from a job. Similar to trouble with a boss or co-worker, we find that all three alcohol misuse variables are positively associated with the probability of being fired or laid off for both men and women in the cross-sectional estimation. After controlling for omitted variable bias with fixed-effects estimation, the marginal effects become much smaller and non-significant for men. This suggests that endogeneity is playing a large role in the cross-sectional estimates for men. For women, the coefficient estimates and significance levels for all three alcohol misuse measures are similar with cross-sectional and fixed-effects estimation. For example, weekly binge drinking increases a women's probability of being fired or laid off by 2.7 percentage points in the cross-sectional estimation and by 2.3 percentage points in the fixed-effects estimation. Apparently, the omitted time invariant individual factors are less important for women. Another possibility is that there is less variation present to identify these effects relative to men because a smaller percentage of women experience changes in labor market problems and alcohol misuse between waves (see Table 2).

Table 5 presents the effects of the alcohol misuse measures on the probability of experiencing sustained unemployment. Both the cross-sectional and the fixed-effects estimation show positive and significant coefficients, but the marginal effects for women are much larger than those for men. In addition, the fixed-effects coefficients are similar to the cross-sectional coefficients for two of the three outcomes, indicating that omitted variable bias is probably a less serious concern when estimating sustained unemployment relative to being fired or laid off. Lastly, as with the other outcomes, the marginal effects for alcohol abuse and dependence are much larger than those for the other measures of alcohol misuse. This finding is conceptually predictable, as alcohol abuse and dependence is the most advanced stage of alcohol misuse (NIAAA, 2004b; Hasin et al., 2007).

VI. Discussion and Conclusion

This research makes an interesting contribution to the labor market literature in the U.S. because it uses a rich, recent, and nationally representative longitudinal dataset specifically designed to examine alcohol misuse and related consequences. The study employs an economic framework and econometric techniques to quantify the effects of alcohol misuse on three understudied and often overlooked forms of employment problems. With access to a panel dataset, we were able to address potential omitted variable bias in the employment equations via fixed-effects estimation. The examination of less conventional employment outcomes sheds light on potential pathways by which alcohol misuse may impact the labor

market. Conflicts with supervisors and/or co-workers, frequent firings and layoffs, and sustained unemployment may serve as mechanisms through which alcohol misuse can lead to lower productivity and earnings. Frequent firings and layoffs and sustained unemployment have a direct effect on labor supply and human capital accumulation (e.g., on-the-job training) while conflicts with supervisors and/or co-workers may lead to poor performance reviews, thereby impeding salary adjustments.

The empirical analysis generally confirmed our research hypotheses. We identified several statistically significant relationships between alcohol misuse and the probability of employment problems in the predicted (i.e., positive) direction. Fixed-effects estimation indicated that that time invariant individual factors were important in at least two (having conflicts with a boss and/or co-worker and being fired or laid off) of the three specifications. In addition, the estimates were usually larger in magnitude and more often statistically significant for women than for men.

Our findings provide further evidence of the difficulty in pinning down the true effects of alcohol misuse on labor market performance. Given the differences in magnitude and statistical significance between the pooled cross-sectional and fixed-effects estimates, our results highlight the importance of addressing potential correlation between alcohol misuse and the error term in employment equations. In accordance with many previous studies (Agarwal, 1996; St. John et al., 2009), we found gender differences in the estimates that are difficult to explain intuitively. Perhaps working women are penalized more harshly when they misuse alcohol or working men are better able to prevent their alcohol misuse from affecting their workplace performance. Regardless of the explanation, however, these findings emphasize the importance of conducting gender-specific analyses when investigating the role of alcohol use in labor market outcomes.

As with any empirical study using secondary data, limitations must be acknowledged in order for the findings to be properly interpreted. First, all measures of employment problems and alcohol misuse were self-reported by NESARC subjects. Several studies found that self-reported alcohol consumption measures are generally reliable for use in statistical analyses (Del Boca and Darkes, 2003; Friesema et al., 2004; Lintonen et al., 2004; Townshend and Duka, 2002). The presence of misreporting within our sample is impossible to determine, but if present the most likely impact is smaller coefficient estimates. Second, like most empirical work with individual-level data, it is difficult to remove all potential sources of endogeneity in the estimation. Although fixed-effects estimation with panel data is preferable to standard linear regression with cross-sectional data, we cannot rule out any bias associated with reverse causality or time-varying omitted variables. Third, since the NESARC is a nationally representative data set, the results are generalizable to the U.S. population, but not necessarily to workers in specialized markets or foreign countries.

In conclusion, the current analysis suggests that alcohol misuse is significantly related to various less conventional measures of employment difficulties. Awareness of these relationships may be beneficial to employers in designing employee assistance programs (EAPs) and to policy makers in developing effective programs to lower the costs of alcohol use to society. For example, conflicts with coworkers and/or supervisors may be masking underlying issues with alcohol misuse, which would need to be addressed before workplace performance could be improved. Similarly, EAPs and community-based treatment programs should incorporate anger management classes and workplace training when developing treatment plans for their substance-abusing clients. Regardless of setting, both employers and policy makers should consider the gender-specific relationships between alcohol misuse and employment difficulties along a full spectrum of outcomes.

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Table 1

Summary Statistics

Variables	Men		Women	
	Wave 1	Wave 2	Wave 1	Wave 2
<i>Employment variables, past year</i>				
Conflict with a boss and/or coworker ¹ (%)	9.79	9.56	11.88	10.85
Laid off or fired ² (%)	8.24	6.89	6.88	6.03
Unemployed longer than one month ³ (%)	8.51	9.36	9.21	10.01
<i>Alcohol misuse variables, past year</i>				
Weekly binge drinking ⁴ (%)	13.36	12.77	4.83	5.11
Alcohol abuse and/or dependence (%)	12.69	15.04	5.38	6.02
Alcohol abuse and dependence (%)	3.01	4.13	1.14	1.63
<i>Demographics and other variables</i>				
Number of people in household	2.70 (1.51)	2.90 (1.55)	2.73 (1.43)	2.90 (1.47)
Number of children in household (less than 18 years old)	0.88 (1.17)	0.77 (1.12)	1.01 (1.20)	0.86 (1.13)
Years of schooling	13.78 (3.30)	13.84 (3.32)	13.81 (3.14)	13.91 (3.16)
Current smoker (%)	34.26	29.60	23.36	20.95
Living in an MSA (%)	82.03	84.07	82.56	83.98
Marital status				
Currently married (%)	64.94	63.13	56.37	54.13
Widowed, divorced, or separated (%)	16.57	20.92	24.87	29.31
Never married (%)	18.49	15.95	18.76	16.56
Age	41.88 (9.43)	44.95 (9.42)	41.29 (9.66)	44.37 (9.67)
Years since first worked full time	23.12 (10.41)	26.38 (10.25)	20.93 (10.69)	24.25 (10.54)
Occupation				
Executive, admin., and managerial (%)	16.37	17.15	15.54	15.28

Variables	Men			Women		
	Wave 1	Wave 2	p-value	Wave 1	Wave 2	p-value
Professional specialty (%)	16.62	16.16		23.87	24.13	
Technical and related support (%)	12.11	10.44		7.84	6.97	
Sales (%)	7.18	8.13		9.19	9.37	
Admin. support, including clerical (%)	3.06	2.76		14.56	15.52	
Protective services (%)	2.84	3.42		0.96	1.17	
Private household and other services (%)	10.12	9.59		18.17	17.90	
Farming, forestry, and fishing (%)	2.41	2.11		0.77	0.74	
Precision production, craft, and repair (%)	6.92	7.55		1.21	1.17	
Operators, fabricators, and laborers (%)	11.36	11.95		4.73	4.56	
Transportation and material moving (%)	5.24	6.11		1.16	1.25	
Handlers, equip. cleaners and laborers (%)	4.54	3.97		1.78	1.76	
Military (%)	1.23	0.66		0.22	0.18	
Norm-based (SF-12) mental health scale ⁵	53.35 (9.57)	52.98 (9.66)	0.01	51.01 (10.46)	50.55 (10.54)	<0.01
Race						
White, non Hispanic (%)	60.22			54.91		
African American, non Hispanic (%)	15.62			22.55		
Native American Indian (%)	1.72			1.76		
Asian (%)	3.20			2.87		
Hispanic (%)	19.24			17.91		
Born outside the US (%)	17.21			15.25		
Sample size	9,163			11,205		

Note: The *p*-values refer to student's *t*-tests for continuous variables and to Chi-square tests for categorical variables.

- ¹Had trouble with boss or coworker in the past year.
- ²Fired or laid off from a job in the past year.
- ³Unemployed and looking for a job longer than a month in the past year.
- ⁴Binge drinking corresponds to 5+ drinks per episode for men and 4+ drinks per episode for women.
- ⁵Higher scores correspond to better health status.

Table 2

Summary of Changes from Wave 1 to Wave 2 for Key Measures

Variables	Men	Women
<i>Employment variables</i>		
Conflict with a boss and/or coworker (%)		
Conflict in Wave 1 → No conflict in Wave 2	7.18	8.71
No conflict in Wave 1 → Conflict in Wave 2	6.95	7.68
No changes	85.87	83.61
Laid off or fired (%)		
Laid off or fired in Wave 1 → Not laid off or fired in Wave 2	6.69	5.84
Not laid off or fired in Wave 1 → Laid off or fired in Wave 2	5.34	4.99
No changes	87.97	89.17
Unemployed (%)		
Unemployed in Wave 1 → Not unemployed in Wave 2	6.13	6.91
Not unemployed in Wave 1 → Unemployed in Wave 2	6.98	7.71
No changes	86.89	85.38
<i>Alcohol misuse variables</i>		
Weekly binge drinking (%)		
Weekly binge in Wave 1 → Not weekly binge in Wave 2	6.68	2.77
Not weekly binge in Wave 1 → Weekly binge in Wave 2	6.09	3.05
No changes	87.23	94.18
Alcohol abuse <u>and/or</u> dependence (%)		
Abuse <u>and/or</u> dependence in Wave 1 → No abuse <u>or</u> dependence in Wave 2	6.20	3.35
No abuse <u>or</u> dependence in Wave 1 → Abuse <u>and/or</u> dependence in Wave 2	8.55	3.99
No changes	85.25	92.66
Alcohol abuse <u>and</u> dependence (%)		
Abuse <u>and</u> dependence in Wave 1 → No abuse <u>and</u> dependence in Wave 2	1.94	0.80
No abuse <u>and</u> dependence in Wave 1 → Abuse <u>and</u> dependence in Wave 2	3.06	1.29
No changes	95.00	97.91

Table 3

Coefficient Estimates for Alcohol Misuse in the “Conflict with a Boss and/or Coworker” Specification

Alcohol misuse variables	Men	Women
<i>Weekly binge drinking in the past year</i>		
Pooled cross-sectional specification ¹	0.002 (0.007)	0.020** (0.010)
Fixed-effects specification ²	−0.002 (0.011)	0.005 (0.016)
<i>Alcohol abuse and/or dependence in the past year</i>		
Pooled cross-sectional specification ¹	0.041*** (0.006)	0.067*** (0.009)
Fixed-effects specification ²	0.038*** (0.010)	0.026* (0.014)
<i>Alcohol abuse and dependence in the past year</i>		
Pooled cross-sectional specification ¹	0.079*** (0.012)	0.135*** (0.018)
Fixed-effects specification ²	0.045*** (0.018)	0.040 (0.026)

* significant at the 10% level;

** significant at the 5% level;

*** significant at the 1% level.

Notes: All cross-sectional specifications also include the following explanatory variables: household size, number of children under age 18 in the household, education, smoking status, MSA, marital status, age, years since first worked full time, occupation dummies, mental health status, race, born outside the US, and a dummy for Wave 2. All fixed-effects specifications also include the following explanatory variables: household size, number of children under age 18 in the household, education, smoking status, MSA, marital status, and mental health status.

¹ Linear probability estimation.² Fixed-effects estimation using *xtreg* command in Stata.

Table 4

Coefficient Estimates for Alcohol Misuse in the “Laid Off or Fired” Specification

Alcohol misuse variables	Men	Women
<i>Weekly binge drinking in the past year</i>		
Pooled cross-sectional specification ¹	0.013** (0.006)	0.027*** (0.008)
Fixed-effects specification ²	0.006 (0.010)	0.023* (0.013)
<i>Alcohol abuse and/or dependence in the past year</i>		
Pooled cross-sectional specification ¹	0.022*** (0.006)	0.029*** (0.007)
Fixed-effects specification ²	0.013 (0.009)	0.036*** (0.011)
<i>Alcohol abuse and dependence in the past year</i>		
Pooled cross-sectional specification ¹	0.036*** (0.011)	0.073*** (0.014)
Fixed-effects specification ²	-0.012 (0.016)	0.079*** (0.021)

* significant at the 10% level;

** significant at the 5% level;

*** significant at the 1% level.

Notes: All cross-sectional specifications also include the following explanatory variables: household size, number of children under age 18 in the household, education, smoking status, MSA, marital status, age, years since first worked full time, occupation dummies, mental health status, race, born outside the US, and a dummy for Wave 2. All fixed-effects specifications also include the following explanatory variables: household size, number of children under age 18 in the household, education, smoking status, MSA, marital status, and mental health status.

¹ Linear probability estimation.² Fixed-effects estimation using *xtreg* command in Stata.

Table 5

Coefficient Estimates for Alcohol Misuse in the “Unemployed Longer Than One Month” Specification

Alcohol misuse variables	Men	Women
<i>Weekly binge drinking in the past year</i>		
Pooled cross-sectional specification ¹	0.032*** (0.006)	0.062*** (0.009)
Fixed-effects specification ²	0.028*** (0.011)	0.073*** (0.015)
<i>Alcohol abuse and/or dependence in the past year</i>		
Pooled cross-sectional specification ¹	0.025*** (0.006)	0.047*** (0.008)
Fixed-effects specification ²	0.020*** (0.010)	0.038*** (0.013)
<i>Alcohol abuse and dependence in the past year</i>		
Pooled cross-sectional specification ¹	0.082*** (0.011)	0.105*** (0.017)
Fixed-effects specification ²	0.046*** (0.017)	0.063*** (0.025)

* significant at the 10% level;

** significant at the 5% level;

*** significant at the 1% level.

Notes: All cross-sectional specifications also include the following explanatory variables: household size, number of children under age 18 in the household, education, smoking status, MSA, marital status, age, years since first worked full time, occupation dummies, mental health status, race, born outside the US, and a dummy for Wave 2. All fixed-effects specifications also include the following explanatory variables: household size, number of children under age 18 in the household, education, smoking status, MSA, marital status, and mental health status.

¹Linear probability estimation.²Fixed-effects estimation using *xtreg* command in Stata.

Appendix Table A1

Summary Statistics, by Alcohol Misuse Categories: Men

Variables	Full sample	Weekly binge drinking	Alcohol abuse and/or dependence	Alcohol abuse and dependence
<i>Employment variables, past year</i>				
Conflict with a boss and/or coworker ¹ (%)	9.67	11.28	15.23	20.95
Laid off or fired ² (%)	7.56	10.74	10.82	13.91
Unemployed longer than one month ³ (%)	8.94	13.91	12.91	20.49
<i>Demographics and other variables</i>				
Number of people in household	2.80	2.67	2.59	2.47
	(1.53)	(1.59)	(1.52)	(1.51)
Number of children in household	0.82	0.76	0.71	0.58
(less than 18 years old)	(1.15)	(1.14)	(1.09)	(1.03)
Years of schooling	13.81	12.79	13.60	13.03
	(3.31)	(2.76)	(2.86)	(2.57)
Current smoker (%)	31.92	55.72	50.22	61.62
Living in an MSA (%)	83.05	82.25	83.08	80.43
<i>Marital status</i>				
Currently married (%)	64.03	51.59	49.94	43.43
Widowed, divorced, or separated (%)	18.74	26.65	27.98	34.10
Never married (%)	17.23	21.76	22.08	22.47
Age	43.42	41.28	41.32	40.97
	(9.55)	(9.42)	(9.27)	(9.36)
Years since first worked full time	24.75	23.33	23.17	23.38
	(10.46)	(10.25)	(9.98)	(9.92)
<i>Occupation</i>				
Executive, admin., and managerial (%)	16.76	13.12	17.28	13.30
Professional specialty (%)	16.39	9.82	13.66	11.47
Technical and related support (%)	11.28	10.11	10.04	8.72
Sales (%)	7.66	7.39	7.71	7.34
Admin. support, including clerical (%)	2.91	1.75	2.28	1.83
Protective services (%)	3.13	2.30	2.72	2.60
Private household and other services (%)	9.85	10.57	9.80	12.69
Farming, forestry, and fishing (%)	2.26	2.34	1.93	2.45
Precision production, craft, and repair (%)	7.24	11.03	9.56	11.47
Operators, fabricators, and laborers (%)	11.66	17.08	13.73	15.44
Transportation and material moving (%)	5.68	7.56	6.34	6.57
Handlers, equip. cleaners and laborers (%)	4.26	6.02	4.60	5.96
Military (%)	0.92	0.91	0.35	0.16
Norm-based (SF-12) mental health scale ⁴	53.16	52.04	50.89	47.65
	(9.62)	(10.24)	(9.91)	(10.75)

Variables	Full sample	Weekly binge drinking	Alcohol abuse and/or dependence	Alcohol abuse and dependence
Race				
White, non Hispanic (%)	60.22	60.23	65.84	62.54
African American, non Hispanic (%)	15.62	14.37	13.77	13.15
Native American Indian (%)	1.72	2.17	2.20	3.82
Asian (%)	3.20	1.50	1.42	1.07
Hispanic (%)	19.24	21.73	16.77	19.42
Born outside the US (%)	17.21	13.03	9.21	9.17
Sample size	18,326	2,394	2,541	654

Note: Pooled cross-sectional sample from Waves 1 and 2.

¹ Had trouble with a boss and/or coworker in the past year.

² Fired or laid off from a job in the past year.

³ Unemployed and looking for a job longer than a month in the past year.

⁴ Higher scores correspond to better health status.

Appendix Table A2

Summary Statistics, by Alcohol Misuse Categories: Women

Variables	Full sample	Weekly binge drinking	Alcohol abuse and/or dependence	Alcohol abuse and dependence
<i>Employment variables, past year</i>				
Conflict with a boss and/or coworker ¹ (%)	11.37	16.07	21.21	29.90
Laid off or fired ² (%)	6.46	11.22	10.95	16.72
Unemployed longer than one month ³ (%)	9.61	18.85	16.67	24.76
<i>Demographics and other variables</i>				
Number of people in household	2.81 (1.45)	2.71 (1.44)	2.57 (1.36)	2.61 (1.42)
Number of children in household (less than 18 years old)	0.93 (1.17)	0.90 (1.17)	0.84 (1.10)	0.85 (1.15)
Years of schooling	13.86 (3.15)	13.34 (2.53)	13.96 (2.77)	13.65 (2.78)
Current smoker (%)	22.16	54.49	44.52	56.59
Living in an MSA (%)	83.27	84.56	83.18	86.17
<i>Marital status</i>				
Currently married (%)	55.25	40.39	38.73	38.59
Widowed, divorced, or separated (%)	27.09	34.83	35.37	38.26
Never married (%)	17.66	24.78	25.90	23.15
Age	42.83 (9.79)	40.24 (9.02)	39.50 (8.98)	39.52 (8.43)
Years since first worked full time	22.59 (10.75)	20.95 (9.93)	20.24 (9.61)	20.43 (9.38)
<i>Occupation</i>				
Executive, admin., and managerial (%)	15.41	14.36	16.90	13.83
Professional specialty (%)	24.00	15.17	21.52	16.72
Technical and related support (%)	7.41	8.80	7.36	5.47
Sales (%)	9.28	13.20	10.09	11.58
Admin. support, including clerical (%)	15.04	15.89	16.59	18.33
Protective services (%)	1.07	0.72	0.86	1.29
Private household and other services (%)	18.04	21.36	17.53	21.54
Farming, forestry, and fishing (%)	0.75	0.54	0.39	0.32
Precision production, craft, and repair (%)	1.19	1.17	1.02	1.29
Operators, fabricators, and laborers (%)	4.65	5.03	4.38	5.14
Transportation and material moving (%)	1.20	1.26	1.49	1.61
Handlers, equip. cleaners and laborers (%)	1.77	2.42	1.72	2.57
Military (%)	0.19	0.08	0.15	0.31
Norm-based (SF-12) mental health scale ⁴	50.78 (10.50)	48.23 (11.19)	47.44 (10.68)	43.46 (11.54)

Variables	Full sample	Weekly binge drinking	Alcohol abuse and/or dependence	Alcohol abuse and dependence
Race				
White, non Hispanic (%)	54.91	59.16	64.79	64.31
African American, non Hispanic (%)	22.55	21.81	18.47	20.26
Native American Indian (%)	1.76	2.15	1.96	2.57
Asian (%)	2.87	1.17	1.33	2.25
Hispanic (%)	17.91	15.71	13.45	10.61
Born outside the US (%)	15.25	6.10	4.62	6.11
Sample size	22,410	1,114	1,278	311

Note: Pooled cross-sectional sample from Waves 1 and 2.

¹ Had trouble with a boss and/or coworker in the past year.

² Fired or laid off from a job in the past year.

³ Unemployed and looking for a job longer than a month in the past year.

⁴ Higher scores correspond to better health status.

Appendix Table A3

Full Regression Results for “Conflict with a Boss and/or Coworker”: Pooled Cross-Sectional Specification

Explanatory variables	Men		Women	
	Coefficient	S.E.	Coefficient	S.E.
Alcohol abuse and/or dependence	0.041 ***	(0.006)	0.067 ***	(0.009)
Dummy variable for Wave 2	0.001	(0.004)	−0.009 **	(0.004)
Number of people in household	−0.001	(0.003)	0.000	(0.003)
Number of children in household	0.001	(0.003)	−0.015 ***	(0.003)
Years of schooling	0.003 ***	(0.001)	0.004 ***	(0.001)
Current smoker	0.008 *	(0.005)	0.012 **	(0.005)
Living in an MSA	0.007	(0.006)	0.011 **	(0.006)
Marital status				
Currently married (reference)				
Widowed, divorced, or separated	0.004	(0.006)	0.027 ***	(0.005)
Never married	−0.005	(0.007)	0.017 ***	(0.006)
Age	−0.005 ***	(0.001)	−0.004 ***	(0.001)
Years since first worked full time	0.003 ***	(0.001)	0.002 ***	(0.0003)
Occupation				
Exec., admin, and managerial (reference)				
Professional specialty	−0.024 ***	(0.008)	−0.018 ***	(0.007)
Technical and related support	−0.005	(0.008)	−0.009	(0.009)
Sales	0.004	(0.009)	−0.023 ***	(0.009)
Administrative support, including clerical	0.027 **	(0.014)	−0.001	(0.008)
Protective services	0.005	(0.013)	0.016	(0.021)
Private household and other services	−0.015 *	(0.009)	−0.022 ***	(0.008)
Farming, forestry, and fishing	−0.046 ***	(0.016)	−0.050 ***	(0.025)
Precision production, craft, and repair	0.008	(0.010)	0.026	(0.020)
Operators, fabricators, and laborers	−0.003	(0.009)	−0.027 ***	(0.011)
Transportation and material moving	−0.001	(0.011)	0.001	(0.020)
Handlers, equipment cleaners, and laborers	−0.028 **	(0.012)	−0.024	(0.017)
Military	−0.036	(0.022)	−0.034	(0.047)
Norm-based (SF-12) mental health scale	−0.005 ***	(0.001)	−0.004 ***	(0.001)
Race				
White, non Hispanic (reference)				
African American, non Hispanic	0.012 **	(0.006)	−0.001	(0.006)
Native American Indian	0.041 ***	(0.017)	0.025	(0.016)
Asian	0.001	(0.013)	0.017	(0.014)
Hispanic	−0.001	(0.007)	−0.004	(0.007)

Explanatory variables	Men		Women	
	Coefficient	S.E.	Coefficient	S.E.
Born outside of the US	-0.020 ***	(0.007)	-0.028 ***	(0.007)
Constant	0.434 ***	(0.024)	0.425 ***	(0.023)

* significant at the 10% level;

** significant at the 5% level;

*** significant at the 1% level.

Appendix Table A4

Full Regression Results for “Conflict with a Boss and/or Coworker”: Fixed-Effects Specification

Explanatory variables	Men		Women	
	Coefficient	S.E.	Coefficient	S.E.
Alcohol abuse and/or dependence	0.038 ***	(0.010)	0.026 *	(0.014)
Number of people in household	0.003	(0.004)	0.004	(0.004)
Number of children in household	0.005	(0.006)	−0.001	(0.005)
Years of schooling	−0.002	(0.007)	0.003	(0.006)
Current smoker	0.019 *	(0.011)	0.004	(0.014)
Living in an MSA	−0.008	(0.007)	0.004	(0.007)
Marital status				
Currently married (reference)				
Widowed, divorced, or separated	−0.020	(0.014)	−0.016	(0.013)
Never married	−0.087 ***	(0.023)	0.045 *	(0.024)
Norm-based (SF-12) mental health scale	−0.002 ***	(0.0003)	−0.002 ***	(0.0003)
Constant	0.251 **	(0.103)	0.168 **	(0.082)

* significant at the 10% level;

** significant at the 5% level;

*** significant at the 1% level.