# The Relationship of Drinking and Hangovers to Workplace Problems: An Empirical Study\*

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ABSTRACT. Objective: This article reports on the relationship between drinking patterns and workplace problems in a manufacturing facility operated by a Fortune 500 industry. Method: The data come from a survey of 832 hourly employees (88% male) and from ethnographic research in the plant. This study is distinctive because it examined a large random sample of workers, rather than an impaired subpopulation. Moreover, the study is among the few that has asked employees how much they drank prior to and during working hours and how frequently they had been hungover at work. Respondents were also asked about their overall alcohol consumption and their experience of various problems in the work-place. Results: Bivariate analyses indicated that overall drinking, heavy drinking outside of work, drinking at or just before work and coming to work hungover were related to the overall number of work problems ex-

TUDIES OF ALCOHOL and work have long suggested That certain drinking patterns may cause problems in the workplace. In 1983, in Britain, for example, absenteeism and illness related to alcohol were estimated to have cost £641 million, and accidents and substandard performance to have cost industry a further £1.5 billion (McDonnell and Maynard, 1985). In the same year, alcohol abuse and alcoholism are estimated to have cost United States workers and employers nearly \$71 billion in lost employment and reduced productivity (Harwood et al., 1985). Unfortunately, the actual costs of alcohol-related workplace problems are difficult to verify (cf., Berry and Boland, 1977, p. 32). As a result, evidence of this relationship between drinking and workplace problems is not entirely conclusive. In particular, research has failed to account for the contribution of work-related drinking (i.e., drinking just before or during work hours) and hangovers to workplace problems, relative to other personal and work-related variables. In order to help clarify these relationships, the present study analyzed self-reports of these phenomena in a representative sample of hourly employees in a large midwestern manufacturing facility. This report presents our findings on linkages of drinking patterns and hangovers to workplace problems.

A recent analysis of a large survey in an Australian industrial worksite could not demonstrate an association between perienced by respondents, and to specific problems such as conflicts with supervisors and falling asleep on the job. Multivariate analyses revealed that workplace drinking and coming to work hungover predicted workrelated problems even when usual drinking patterns, heavy drinking and significant job characteristics and background variables were controlled. Overall drinking and heavy drinking outside the workplace did not predict workplace problems in the multivariate analyses. The analyses show that workplace problems were also related to age, gender, ethnicity, work shift and departments. Survey results are explicated with findings from a plant ethnography. *Conclusions:* Although the relationships are modest, they support the hypothesis that work-related drinking and hangovers at work are related to problems within the workplace and may lead to lowered productivity and morale. (J. Stud. Alcohol **58**: 37-47, 1997)

overall high alcohol consumption and one costly problem, work injuries and absences related to work injuries (Webb et al., 1994). However, Webb and associates found that selfreported problem drinkers (as measured by the Mortimer-Filkins test) were 2.7 times more likely than nonproblem drinkers to have injury-related absences. Another way of assessing alcohol's role in occupational accidents is to test the blood of workers who have been injured or killed. Wechsler et al. (1969) found that 16% of emergency room patients who had been injured at work had positive blood alcohol concentrations (BACs), although only 5% of the sample had BAC measurements of .05 g/dl or greater. Similarly, Baker et al. (1982) found that 15% of Maryland victims of fatal workrelated accidents who were tested for BAC showed evidence of drinking during or prior to work. In a study of occupational accidents and alcohol consumption in Spain, Gutierrez-Fisac et al. (1992) found that as overall drinking levels rise, the odds of having an industrial accident also rise. These studies are limited, however, because the base rates of all employee drinking in these specific study populations are unknown. As Stallones and Kraus (1993) conclude after reviewing the extant literature on alcohol-related occupational injuries, "the true magnitude of the problem of alcohol and work related injuries has not been accurately assessed" (1993, p. 950).

Many studies of alcohol-related problems in the workplace have focused on sample populations of alcohol dependent employees and/or employees in treatment. In part, this is the result of the widespread belief that alcoholic employees are responsible for the majority of work-related alcohol problems (cf., Follman, 1976; Maxwell, 1972; Trice, 1965), rather than their fellow workers who drink varying amounts

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of alcohol, but are not identified as alcohol dependent. In contrast, alcohol researchers in Poland have suggested that the total number of problems caused by moderate drinkers may have a greater impact in the workplace than those created by heavy drinkers (Morawski et al., 1991). A study of workers in a U.S. sample found that heavy drinkers had fewer absences and incidences of being late than their lightdrinking counterparts (Blum et al., 1993). However, the authors' suggested explanation for this counterintuitive pattern, in agreement with Trice and Roman's (1972) earlier suggestions, is not that moderate drinkers have more attendance problems, but rather that heavy drinkers make a concerted effort to avoid frequent absences from work or being late as a "cover-up" for a developing drinking problem. Furthermore, Blum et al.'s (1993) analyses of collateral and self-reports of levels of alcohol consumption and work performance with a small nonrepresentative sample of 136 working men revealed that the heavier drinkers in their sample scored lower on job performance scales, including measures of selfdirection at work, conflict avoidance at work and interpersonal relations at work, and did less well on technical aspects of their jobs, than did the lighter drinkers. Clearly, these findings suggest links between heavier drinking and problems of lowered individual job performance and, thereby, lower workplace productivity.

There is a relative lack of research directly addressing the effects of work-related drinking (drinking before or during work hours) on problems at work. The reason for this omission may be due in part to the lack of good data on workrelated drinking. Studies of workplace alcohol-related problems rarely ask respondents direct questions about alcohol consumption during or just prior to their working hours. A limited number of surveys that have asked general (rather than exclusively clinical) employee populations directly about their own drinking prior to and during work suggest that these behaviors may be relatively common. For example, in a large-scale survey of seven railroads, the percentage of respondents reporting drinking on the job at least once in 1978 ranged between 6% and 24% (Mannello, 1979). In a 1984 national survey, the proportion of male respondents in five major job categories who reported drinking on the job ranged from 31% to 50% (Fillmore, 1990). In the 1985 "National Longitudinal Survey of Youth Ages 17-27," 4.4% said that they had become drunk on the job (Gleason et al., 1991). Similarly, among workers representing a variety of occupations in a major metropolitan survey, 24% reported in a survey that they had consumed alcohol at work (with others), 11% had gone to work drunk at least once and 22% had missed work because of a hangover (Hitz, 1973). Finally, in a survey of military personnel, 10.1% said that they had drunk just before or during work and 22.1% reported productivity losses because of alcohol use (Bray et al., 1991).

There is also little direct evidence of the effect of hangovers on workplace problems. Studies of hangover on performance have focused on tests of cognitive or motor skills, such as driving or piloting aircraft simulators (Lemon, 1993), rather than directly examining the effects of hangovers in the workplace. For example, a study of hangover effects on aircraft pilots found that pilots in a flight simulator who had reached a BAC of .10 the night before had significantly poorer responses on most performance measures, including heading measures on landings and average yaw on take-off (Yesavage and Leirer, 1986).

In a growing field of research on the relationship between drinking and problems at work (Blum et al., 1993; Martin et al., 1994; Webb et al., 1994), the present study is distinctive for two reasons. First, it is one of a few to examine a large random sample of a workforce, rather than a subpopulation of alcohol-dependent employees. Second, most other studies have focused on overall alcohol consumption rather than drinking prior to or during working hours. The present article presents one of the few studies that directly examines the relationship between employees' drinking patterns (including drinking before and during work), their hangovers, and the problems those same workers experience on the job.

#### Method

#### Research setting

The subject company is a multinational corporation with facilities throughout the United States and abroad. The company employs approximately 400,000 workers. The research site is a large unionized heavy machinery manufacturing plant located in the Midwest. Both union and management officials sanctioned the study. At the time of the survey, approximately 5,300 hourly and salaried people worked at the plant. The total population of hourly workers, most of whom worked in assembly areas, was 4,800 at that time.

#### Sample characteristics

Men constituted 88% of the survey sample. The respondents were predominately white (66%), although a significant proportion of them were black (30%). They ranged in age from 22 to 69 years, with a mean age of 43 years. They had an average of about 12 years of education. The majority had not studied beyond high school. Median family income was \$45,000, and most (77%) of the respondents were married. About 79% of the respondents worked in the paint, trim and other assembly departments, 13% worked in technical service departments and 8% worked in materiel management and environmental management.

# Procedure

The 5-year study employed ethnographic as well as survey methods. Semi-structured ethnographic interviews were conducted with over 50 managers, first-line supervisors and elected union officials representing a variety of depart-

ments, shifts and positions in the plant and union hierarchy. Over 175 hours of naturalistic observations also were carried out throughout the plant. The transcribed interviews and observational and other field notes were systematically coded and entered into a computer program for text analysis (see Janes and Ames, 1992, for a more detailed description of the ethnographic methods employed in this study). Analyses of these data were used in the development of the survey instrument and sampling procedures, as background to the overall study and for empirical explanations of survey findings.

The initial survey sample consisted of 1,120 hourly employees selected at random from the entire plant population. (Salaried employees were also surveyed; their responses will be reported elsewhere.) The sample was stratified by shift (day, swing and graveyard) and by work team. Potential respondents were initially contacted through a letter co-signed by union and management leaders. This letter urged those selected for the survey to participate. A follow-up letter from research staff further described the study. A fact sheet that answered commonly asked questions about the study was enclosed with this letter. Shortly thereafter, survey research staff contacted the potential respondents by telephone to schedule interviews. The data were obtained through confidential structured interviews approximately an hour in length that were conducted in the respondents' homes. Respondents were compensated \$10 for their time. Interviews were completed with 832 of the hourly employees, a response rate of 74%.

#### Measures

Drinking. Work-related drinking was defined as alcohol consumption during work hours, including lunch and breaks, or just before work. Specifically, the respondents were asked: (1) how often during the past year they had at least one drink of any alcoholic beverage during working hours (never—eight or more times); (2) the usual number of drinks they had when they drank at work (less than one—eight or more); and (3) how often they had four or more drinks within an hour of going to work during the previous year (never almost every day). Drinking outside of work was measured by asking the respondents how often they drank any alcoholic beverages during the past year and how many drinks they usually had when they drank. Heavy drinking was ascertained by asking them how often they had consumed 10 or more drinks on a single occasion during the previous year.

Work-related problems. Work-related problems were addressed with 11 items asking the respondents how many times in the past year they had (1) become sick while at work, (2) visited the medical department at work, (3) had an accident at work, (4) filed a grievance, (5) been criticized by a supervisor, (6) had an argument with a supervisor, (7) had a serious argument or fight with a co-worker, (8) had trouble getting their job done, (9) been on disciplinary lay-off, (10) fell asleep while on the job, and (11) lost benefits because of absences. In addition, they were asked the number of days of work they had missed during the past year, not counting vacations and holidays.

Background and workplace characteristics. Personal characteristics that were ascertained in the survey were gender, age, ethnicity, marital status, family income and education. Information also was recorded regarding the respondents' work shift and department within the plant. Gender (1 = female) and shift (1 = day) were coded as dummy variables. Department was coded into dummy variables representing the major divisions within this assembly plant: body, hard trim, soft trim, paint, final process, technical services (e.g., skilled tradesmen such as tool and die makers, machinists, electricians, etc.) and materiel/environmental management (e.g., operators of forklift and part-delivery vehicles, oilers, janitorial and other cleanup, etc.). The remaining departments were treated as the contrast group. It is important to note that the rates of accidents and absences vary markedly by department and shift (Janes and Ames, 1992). Evening and night shift workers have more absences and latenesses than their counterparts on day shift. Workers in welding-assembly and materials management departments experience higher rates of injuries, due primarily to the risks inherent in the tasks conducted by workers in those departments (in weldingassembly, workers are exposed to sharp metal surfaces, whereas materials workers are more prone to musculo-skeletal strain-related injuries). These background and workplace variables were included in the multivariate analyses because of their potential importance as correlates of drinking or work-related problems.

#### Results

About 24% of the sample reported drinking at work at least once in the previous year. Workers who reported drinking at work indicated that they consumed an average ( $\pm$  SD) of 1.8  $\pm$  1.41 drinks per drinking occasion. A small percentage (5%) of the sample reported having four or more drinks just before work at least once in the year prior to the survey. In terms of their current drinking habits in general, 72% of the sample reported drinking alcohol at least once within the past year. Those who did drink during the past year reported drinking on an average of 67  $\pm$  100.28 occasions and consuming 2.8  $\pm$  1.82 drinks, on the average, per occasion. Just over 17% of the sample reported having ten or more drinks at a sitting at least once in the previous year and about 17% reported usually consuming four or more drinks per drinking occasion.

Table 1 displays the prevalence of each of the major drinking behaviors by gender, ethnicity and work shift. Men were more likely than women to report that they usually consumed four or more drinks on a given drinking occasion and that they had consumed ten or more drinks on at least one occasion during the previous year. Men and women did not differ significantly in their prevalence of either reported

	N	Drank in past year	Usually 4+ drinks	Had 10+ drinks past year	Drank at work	Had 4+ drinks before work
Gender						
Men	728	70.3	18.5	19.2	22.8	5.5
Women	104	80.8	5.8	3.8	27.9	5.8
X <sup>2</sup>		4.90	10.53*	15.00*	1.30	0.01
Ethnicity						
White	524	75.4	20.8	20.9	26.9	5.6
Black	266	63.4	7.9	9.1	16.6	6.0
Other	42	76.2	26.2	23.8	23.8	2.4
X <sup>2</sup>		12.97†	23.29‡	18.63‡	10.41*	0.92
Shift						
Day	377	69.0	18.4	18.2	18.2	1.6
Swing	412	74.3	16.3	16.5	28.6	8.5
Graveyard	43	69.0	9.5	16.7	19.0	11.9
X <sup>2</sup>		2.84	2.37	0.40	12.30†	21.14 <sup>‡</sup>

TABLE 1. Prevalence of drinking behaviors by gender, ethnicity and work shift, in percent

Note: All tests are Bonferroni protected within sets of comparisons.

\*p < .05. †p < .01. ‡p < .001.

drinking at work or consuming four or more drinks just before work. Male drinkers, however, reported drinking on more occasions during the past year (mean [ $\pm$ SD] = 73.2  $\pm$  104.2) than did female drinkers (mean = 32.5  $\pm$ 61.5) (F = 12.09, 1/592 df, p < .001,  $\eta^2 = .02$ ). Similarly, male drinkers consumed more drinks, on the average, on each drinking occasion (mean = 2.9  $\pm$  1.8) than did female drinkers (mean = 1.9  $\pm$  1.08) (F = 22.60, 1/591 df, p < .001,  $\eta^2 = .04$ ).

Blacks were less likely than whites or other workers to report drinking in the year prior to the survey, to usually consume four or more drinks per drinking occasion, to have consumed ten or more drinks and to have consumed alcohol at work (Table 1). There were no significant ethnic differences in the reported prevalence of drinking 4+ drinks before work. Drinkers who were white, black or of other ethnicities did not differ significantly in their usual frequency of drinking. Black drinkers, however, reported consuming significantly fewer drinks (mean =  $2.3 \pm 1.31$ ) per drinking occasion than did white drinkers (mean =  $3.0 \pm 1.97$ ) or drinkers of other ethnic backgrounds (mean =  $3.1 \pm 2.02$ ) (F = 7.73, 2/589 df, p < .001,  $\eta^2 = .03$ ).

Finally, Table 1 also shows that workers who were on swing (evening) shift were more likely than those on day or graveyard (night) shifts to report drinking at work. Similarly, those on swing and graveyard shifts were significantly more likely than workers on day shift to drink just before work. These groups of workers did not differ significantly (p > .05), however, on any of the other drinking variables.

# Workplace problems and current drinking

The relationship between alcohol consumption and workplace problems was initially investigated through a series of simple bivariate analyses. Specifically, the percentage of respondents reporting that they had experienced each of the problems was compared for those who had consumed alcohol during the previous year and those who had not (Figure 1). Because of the large number of comparisons being conducted, these significance tests were Bonferroni protected. This procedure provides a conservative estimate of the statistical significance of the relationships. Overall, being a current drinker, as opposed to a current abstainer, was not significantly related to any of the 11 problems. However, current drinkers did report a greater overall number of different problems (mean =  $3.8 \pm 2.10$ ) when compared with nondrinkers (mean =  $3.3 \pm 2.08$ ) (F = 8.93, 1/827 df,



FIGURE 1. Relationships between workplace problems and drinking (solid columns, current drinkers; hatched columns, current nondrinkers)

p < .01). This relationship was relatively small ( $\eta^2 = .01$ ). Drinkers did not report a significantly greater number of absences than did nondrinkers (F < 1). On the average, drinkers missed 4.6 ± 15.05 days of work compared with 4.5 ± 15.81 missed days of work for nondrinkers.

#### Workplace problems and heavy drinking

The relationship between heavy drinking and workplace problems was examined initially by comparing those respondents who reported drinking 10 or more drinks on at least one occasion during the past year with those who did not (Figure 2). Heavy drinkers were significantly more likely than other workers to report that they had argued with a supervisor ( $\chi^2 = 15.10, 1 \text{ df}, p < .001, \eta^2 = .02$ ) and had problems doing their jobs ( $\chi^2 = 9.53$ , 1 df, p < .02,  $\eta^2 = .01$ ). On the average, heavy drinkers also reported a greater total number of problems (mean =  $4.2 \pm 2.12$ ) than did workers who were not heavy drinkers (mean =  $3.5 \pm$ 2.09) (F = 10.19, 1/827 df, p < .01,  $\eta^2 = .01$ ). Again, however, these relationships are relatively modest. Heavy drinkers did not differ significantly (F < 1) from other workers in the mean number of absences they reported. On the average, heavy drinkers were absent on  $5.4 \pm 13.39$  days and nonheavy drinkers were absent on  $4.4 \pm 22.19$  days.

#### Workplace problems and work-related drinking

A further series of bivariate analyses (Figure 3) indicated that work-related drinking was related to a number of workplace problems. Employees who drank at work or just be-



FIGURE 2. Relationships between workplace problems and heavy drinking (solid columns, heavy drinkers; hatched columns, not heavy drinkers; \*p < .05)



FIGURE 3. Relationships between workplace problems and work-related drinking (solid columns, workplace drinkers; hatched columns, workplace nondrinkers; p < .05)

fore work were significantly more likely to report that they had argued with a supervisor ( $\chi^2 = 14.28$ , 1 df, p < .01,  $\eta^2 = .02$ ), had been criticized by a supervisor ( $\chi^2 = 9.70$ , 1 df, p < .05,  $\eta^2 = .01$ ) and had a serious fight or argument with a coworker ( $\chi^2 = 15.37$ , 1 df, p < .001,  $\eta^2 = .02$ ). Overall, workplace drinkers reported a significantly greater total number of work-related problems (mean =  $4.5 \pm 2.20$ ) than did respondents who were not workplace drinkers (mean =  $3.7 \pm 2.04$ ) (F = 23.09, 1/826 df, p < .001,  $\eta^2 =$ .03). Workplace drinkers and nondrinkers did not differ in the number of absences they reported (F < 1). Both groups reported missing work on an average of 4.6 days.

# Workplace problems and hangovers

The prevalence of workplace problems was also compared for respondents who reported coming to work with a hangover at least once in the previous year and those who had not done so (Figure 4). Workers who had been hungover at work were significantly more likely to report that they had felt sick at work ( $\chi^2 = 8.90, 1$  df,  $p < .05, \eta^2 = .01$ ), been criticized by a supervisor ( $\chi^2 = 8.88, 1$  df,  $p < .05, \eta^2 = .01$ ), been in a serious argument or fight with co-workers ( $\chi^2 = 18.06, 1$ df,  $p < .001, \eta^2 = .02$ ), had trouble getting their job done ( $\chi^2 = 13.88, 1$  df,  $p < .01, \eta^2 = .02$ ) and fallen asleep on the job ( $\chi^2 = 8.63, 1$  df,  $p < .05, \eta^2 = .01$ ). Those who had come to work with a hangover also reported a significantly greater number of different problems (mean =4.9 ± 2.16) compared with those not coming to work with a hangover (mean =  $3.6 \pm 2.07$ ) (F = 24.89, 1/830 df,  $p < .001, \eta^2 =$ 



FIGURE 4. Relationships between workplace problems and hangover at work (solid columns, been hungover at work; hatched columns, never hungover at work; \*p < .05)

.03). They did not, however, report significantly (F < 1) more days absent (mean =  $6.2 \pm 15.30$  vs  $4.4 \pm 14.47$ ).

### Dimensions of work-related problems and drinking

Work-related problems. A principal components factor analysis was used to investigate the underlying dimensions of work-related problems and to obtain problem measures to be used in the multivariate analyses that follow. (Principal components analysis was used primarily because it is possible to compute direct factor scores when using this method. Similar results were obtained using other factoring procedures, e.g., principal axis.) An oblique rotation was specified because it was assumed that the dimensions of workplace problems might be correlated with one another. This analy-

TABLE 2. Oblique rotated factor pattern for workplace problems

	Factor					
Problem items	1	2	3	4	5	
Grievances	.75	.13	12	02	.04	
Criticized by supervisor	.69	.01	.06	- 03	28	
Argued with supervisor	.67	.05	04	05	32	
Disciplinary layoff	.60	08	.36	.14	.36	
Medical visits	.11	.83	.08	06	.13	
Accidents	.01	.78	13	.07	03	
Sick at work	03	.50	.41	.03	12	
Lost benefits	.09	10	.77	.05	.02	
Number of absences	12	.17	.67	10	16	
Sleeping on job	07	.05	04	.98	08	
Arguments or fights	.01	05	.17	.03	77	
Trouble doing job	.21	.05	04	.06	57	

*Note:* The factor scores for Factor 5 were reversed prior to the regression analyses so that higher scores on all factors indicated more frequent problems. Significant factor loadings (>.40) are in bold type.

sis suggested on the basis of interpretability that the workrelated problem items could be represented adequately by five factors: (1) conflicts with supervisors, (2) medical problems/injuries, (3) absences, (4) sleeping on the job, and (5) problems with job tasks/co-workers. Table 2 displays the factor pattern matrix from this analysis. The five-factor solution accounted for about 63% of the variance among the items. The initial eigenvalues were 2.66, 1.24, 1.07, 1.03 and .98, respectively. The next largest eigenvalue was .82. Bartlett factor scores were generated to represent each of these problem dimensions for the multivariate analysis.

Drinking. A principal components analysis with an oblique rotation also was used to examine the structure of the drinking items and to obtain measures of alcohol consumption for the multivariate analysis. A five-factor solution was selected as most appropriate on the basis of interpretability. This solution accounted for about 94% of the variance in the drinking items. The five factors were (1) usual quantity-frequency of drinking, (2) drinking before work, (3) quantity-frequency of drinking at work, (4) frequency of being hungover at work, and (5) heavy drinking. The factor pattern matrix for this analysis is shown in Table 3. The initial eigenvalues were 3.40, 1.02, .94, .75 and .44, respectively. Bartlett factor scores were obtained for each of these dimensions of alcohol consumption.

TABLE 3.	Oblique rotated factor pattern for drinking items
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			Factor		
Drinking items	1	2	3	4	5
Usual frequency	.95	.03	.00	.05	.06
Usual quantity	.92	02	01	05	08
Frequency 4+ drinks before work	.02	.97	01	.01	04
Usual frequency at work	01	.14	93	.00	.06
Usual quantity at work	.03	12	93	.02	07
Frequency hangover at work	.00	.00	.00	.99	01
Frequency 10+ drinks	.01	.03	01	.02	97

*Note:* The factor scores for Factors 3 and 4 were reversed prior to the regression analyses so that higher scores on all factors indicated higher levels of drinking. Significant factor loadings (>.40) are in **bold** type.

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Table 4.	Regression analysis predicting work-relate	d drinking problems

	Standardized	Unstandardized		
Predictor	coefficient	coefficient	SE	t
Total number of problems				
Drinking before work	06	12	.077	-1.62
Drinking at work	.08	.16	.083	1.98*
Hangover at work	.12	.24	.078	3.117
Usual drinking	01	01	.082	15
Heavy drinking	.05	.11	.000	3.481
Age	08	49	.14	-7.05
Day shift	- 03	14	.070	-2.03*
Hard trim	06	38	.139	-2.69†
		$R^2 = .12$		
Problems with supervisor				
Drinking before work	02	02	.038	51
Drinking at work	.11	.11	.041	2.65†
Hangover at work	.04	.04	.039	.96
Usual drinking	03	03	.041	72
Heavy drinking	.05	.05	.043	1.26
Age	14	16	.041	-3.96‡
Single	05	24	.106	2.25*
Body	08	23	.0/2	3.27
Hard trim	10	29	102	-2.97
rmai process	.07	$R^2 = 06$	.105	2.71
		n- − .00		
Medical problems/injuries	0 <b>5</b>	05	027	- 1 <u>2</u> 4
Drinking before work	.05	05	.037	-1.30
Hangover at work	.01	.01	038	1.60
Usual drinking	- 01	- 01	.040	19
Heavy drinking	.01	.01	.042	.26
Female	15	46	.101	-4.56‡
Age	19	21	.040	-5.36‡
White	07	14	.053	$-2.65^{\dagger}$
Body	.06	.16	.076	2.10*
Final process	07	27	.112	-2.42 <sup>‡</sup>
Material	06	23	.105	2.19*
		$K^{2} = .10$	,	
Absences	01	01	020	- 14
Drinking before work	01	01	.038	14
Hangover at work	.07	.07	039	1.62
Usual drinking	08	08	.041	-1.89
Heavy drinking	.03	.04	.044	.78
Female	10	31	.104	-2.93†
Income	09	06	.020	-2.79†
White	08	.16	.069	2.32*
		$R^2 = .04$		
Sleeping on job				
Drinking before work	05	05	.038	-1.34
Drinking at work	.08	.08	.040	1.99*
Hangover at work	.08	.08	.039	2.01*
Usual drinking	01	01	.041	22
Heavy drinking	.00	.00	.043	03
Body	1/	48	110	-4.41+
raini Soft trim	09	30	108	2.47 
Hard trim	- 14	- 38	.111	-3.42
Chassis	16	42	.101	-4.15‡
		$R^2 = .04$		
Problems with tasks/co-workers				
Drinking before work	02	02	.037	65
Drinking at work	01	01	.040	14
Hangover at work	.21	.21	.038	5.41*
Usual drinking	01	01	.040	54
heavy drinking	.00	.00	.042	-4 38±
nge White	15 12	10 24	.040	3 97
Material	.12	32	.122	2.59
Mater in	.00	$R^2 = 0.09$		,

\*p < .05 †p < .01. ‡p < .001.

# Predicting workplace problems

Although the bivariate analysis showed that some workrelated problems are associated with drinking, heavy drinking, work-related drinking and being hungover on the job, those analyses do not take into account the potential confounding effects of background and job characteristics. Moreover, they do not allow for direct comparisons of the relative predictive importance of drinking at work, hangover and usual drinking for workplace problems. Therefore, a multivariate analysis was undertaken to investigate these issues. The total number of problems reported by each worker and the five workplace problem factor scores were simultaneously predicted from the drinking factor scores and from potentially important background and job characteristics using a seemingly unrelated regressions model. This model was solved using the maximum likelihood procedure in EQS version 5.01 (Bentler, 1995).

The analysis followed a hierarchical approach. First, an equation system was solved that included effects for workrelated drinking, hangover, drinking before work, usual drinking and heavy drinking on each of the problem scores. Because autocorrelations among the error terms can lead to biases in estimates of the regression coefficients in models with interrelated equations, correlations among all disturbances for the dependent variables were specified in the initial model. Background and job characteristics were allowed to freely correlate with one another and with the drinking variables, but no relationships between them and workplace problems were specified in the initial model. This model was then solved and a specification search was then undertaken using Lagrange multiplier tests to determine what effects of background and job characteristics could be added to improve fit. Wald tests were used to ascertain which correlations among the disturbances could be dropped without worsening the fit of the model. All of the effects for the drinking variables were retained in the equations as predictors of problems regardless of their statistical significance. The specification search was continued until no further significant effects were found. The final model provided a very good fit to the data ( $\chi^2 = 70.26, 68 \text{ df}, p > .4$ ).

The results from the regression analysis are presented in Table 4 and the significant correlations among the disturbances or prediction errors are shown in Table 5. The most important findings from the regression analysis are that workplace drinking and being hungover at work predicted work-related problems even when usual drinking patterns, heavy drinking and significant job characteristics and background variables are controlled. Drinking at work was significantly related to three of the workplace problem indicators: total number of problems, problems with supervisors and sleeping on the job. Consistent with expectations, drinking at work increased all of these problems. Being hungover at work was also related to three of the problem indicators: total number of problems, sleeping on the job and problems with job tasks and co-workers. These problems in-

Fable 5.	Correlations	among	disturbance terms
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Total problems	-					
Problems with supervisor	.66	-				
Medical problems/injuries	.60	.17	-			
Absences	.31	.18	.15	_		
Sleeping on job	.14	-	-	_	-	
Problems with job tasks/						
co-workers	.46	.14	.20	.08	-	_

creased with the frequency of being hungover at work. Although the effects for being hungover at work generally appear to be somewhat greater than those for drinking at work, a series of equality constraints placed on the equations indicated that they were, for the most part, equivalent. The one exception was for problems with job tasks and co-workers. Being hungover at work had a significantly greater effect on this variable than did drinking at work ( $\chi^2 = 9.90$ , 1 df, p < .001). Although statistically significant, the effects of drinking at work and being hungover were relatively modest. Nonetheless, the findings suggest that consumption of alcohol during working hours and being hungover at work are two factors that may contribute to work-related problems.

Usual drinking, heavy drinking and drinking just before coming to work did not significantly predict any of the problem indicators once drinking at work, being hungover at work and job and background characteristics were controlled. Other significant effects, however, are worth noting. In general, women and older workers were less at risk for workplace problems. This was particularly the case for total problems and medical problems and injuries. In addition, women were also less at risk for absences and older workers were less at risk for problems with supervisors and problems with job tasks and co-workers. White workers were less at risk for medical problems/injuries and for absences. They were more at risk, however, for problems with job tasks/coworkers. Being single decreased problems with supervisors when drinking and other significant factors were controlled and being on day shifts decreased total number of problems. Finally, it is worth noting that the types of problems experienced by workers are differentially distributed among the departments within the plant. Thus, for example, workers in the assembly departments (paint, body, chassis and trim) were less at risk for sleeping on the job and workers in maintenance had fewer problems with job tasks and co-workers. Workers in the body department reported more medical problems and injuries, but fewer problems with supervisors. Other differences in problem rates among the departments are noted in Table 4.

#### Discussion

The most important conclusion to be reached from the analyses presented here is that alcohol consumption and coming to work hungover are modestly, but significantly, associated with self-reported workplace problems for this sample of hourly workers. Bivariate analyses indicated that overall drinking, heavy drinking outside of work, drinking at or just before work and coming to work hungover were related to the overall number of work problems experienced by respondents, as well as to specific problems such as conflicts with supervisors and falling asleep on the job. Multivariate analyses revealed that workplace drinking and coming to work hungover predict work-related problems even when usual drinking patterns, heavy drinking and significant job characteristics and background variables were controlled. It is worth noting that overall drinking and heavy drinking outside the workplace did not significantly predict workplace problems in the multivariate analysis when more immediate factors were taken into account. That is, it appears that overall drinking and heavy drinking are related to workplace problems only because they are correlated with drinking at work, with being hungover at work or with other background characteristics.

Although the relationships are modest, the findings from this study suggest that work-related drinking and hangovers may have important implications for productivity, safety and quality of working life. They also reinforce previous studies that suggest that alcohol consumption can have serious consequences for both employees and employer. Sleeping during work hours, getting into verbal or physical disputes, problems with supervisors and grievance negotiations all require special services from labor relations, medical personnel or the Employee Assistance Program. Clearly, these kinds of problems, as well as the processes through which they are handled, are costly. In addition to actual dollar costs of personnel time and lost productivity, there are human costs associated with higher risks and lowered morale for employees who are involved in or who witness the consequences of hangovers or workplace-related drinking.

The findings concerning hangovers and their relation to problems at work should be underscored because of the scarcity of literature on this widespread phenomenon. As Emery (1986) observes, the fairly constant rate at which the liver metabolizes alcohol (roughly one standard drink per hour) means that employees may still have a perceptible level of blood alcohol content at the start of their shift even if they had concluded a heavy-drinking session many hours earlier. This situation applies to first shift workers who drank large amounts the night before work, as well as to second and third shift workers who drank earlier in the day. Thus, it is not surprising that hangovers may play some role in exacerbating workplace problems.

It is interesting to note that drinking and workplace problems were directly predicted by a number of background and workplace-environment variables. For example, even though overall drinking levels showed no significant differences across the three shifts, second and third shift workers reported higher rates of drinking just before and during work and higher rates of problems than did first shift workers. In general, being older and on first shift reduced risks for workplace problems. From our in-plant ethnography, we find explanations for these differences in certain characteristics of the organizational culture of this plant and industry.

In this industry, periodic layoffs are an ongoing fact of life, and seniority provides the major protection against loss of job: workers with less seniority are always the first to receive their layoff notices. Since the union contract dictates that choice of shift is based on seniority, it is not surprising that the older (average age 47), most senior workers (seniority range 22 to 35 years) are found on the most desirable day shift. In a previous study of workers in this same industry who had lost their jobs when a factory closed, interviews with workers and their wives revealed that the ever-present fear of layoffs was a major source of stress, and one that was frequently mentioned in conjunction with the formation of drinking subcultures in the workplace (Ames and Janes, 1987).

Different levels of supervision offer another explanation for higher drinking on later shifts. The majority of high- and mid-level managers and union officials work during the first shift and are highly visible on the shop floor. However, the visibility of supervisors is greatly reduced for the second shift and is almost nonexistent for the third shift. These organizational factors of lowered or disinterested supervision and lowered visibility of work are social control factors that, as has been suggested elsewhere, influence deviant drinking patterns (Roman and Trice, 1970) and can be viewed as risk factors for on-the-job drinking for evening and graveyard shift workers.

Finally, the impact of circadian rhythms may be an important risk factor for encouraging work-related drinking. As has been shown in other studies, shift work negatively affects sleeping patterns and digestive functions, raises anxiety levels about spouses and children (Holt, 1982) and is associated with lapses of attention and reduced reaction time (Gold et al., 1992). All of these effects may led to work-related drinking and thereby to problems with sleepiness and arguments with co-workers and supervisors. Other studies have reported that later shift workers were more likely to report higher drinking rates, use of alcohol to sleep during the day hours, on-the-job accidents (Richardson et al., 1989-90) and drinking problems (Smart, 1979). Additionally, people who come to work at 4:30 in the afternoon or at midnight may be more likely to drink before work than those who arrive at 6:30 in the morning simply because these later hours are more consistent with social norms and expectations regarding appropriate drinking times.

The differential distribution of types of problems among the departments in the plant is another finding that can be explained ethnographically. Workers who were in the assembly departments (paint, body and trim), for example, were less at risk for sleeping on the job than were workers in other departments, and workers in maintenance had fewer problems with job tasks and co-workers. The differences for sleeping on the job are not surprising because it is literally impossible for an assembly worker to nap on the job without causing line shutdown or being caught by a supervisor. However, in-plant interviews and observations revealed that skilled and unskilled maintenance workers and delivery personnel, and especially the third shift maintenance (cleanup, etc.) workers, could find a place "to curl up and fall asleep."

The finding that maintenance workers had fewer problems with job tasks and co-workers than did assembly workers can again be explained by characteristics of jobs and work environment. Whereas maintenance workers have low supervision, low visibility and high mobility (travel to various areas of the plant), assembly workers work under the opposite situation of high supervision and visibility, almost no mobility and in crowded work spaces. Maintenance workers simply have fewer opportunities for problems with tasks and coworkers to develop.

Other predictors of conflicts with supervisors (besides drinking at work and belonging to maintenance or certain assembly departments) were being younger and white rather than black. These findings are supported by ethnographic evidence for greater rambunctiousness among the younger workers in comparison to older counterparts. Ethnicity is a significant variable in this setting because of the markedly different relationships that white and black employees have with management. In both ethnographic and survey reports, blacks reported that they expected disapproval from work friends and supervisors if they drank at work. It is reasonable to predict that, since blacks in the plant believe they are discriminated against for advancement, they also believe drinking at work would only exacerbate this problem (cf., Delaney and Ames, 1995).

The higher rate of medical problems and injuries among workers in the body department can be explained in part by the fact that their work already puts them at more risk for injury. The work is physically demanding and repetitive.

There is also the question of generalizability of findings: Do these results represent an over- or underestimation of the relationships we might find in other settings, or are they limited to this study because of the distribution of demographic and environmental variables in this plant and company? In this regard, a number of factors should be kept in mind. First, the subject company represents a substantial number of U.S. workers. It is a multinational corporation with close to 400,000 employees, working in facilities throughout the United States where the physical, political and social environments are similar to the work setting of this study. Second, the influence of adversarial labor relations (Ames and Delaney, 1992), shift work (Smart, 1979) and alcohol expectancies (Grube et al., 1994) on drinking patterns and problems in the subject company may be generalizable to other work cultures with similar environmental characteristics. Third, the findings of this study support the cultural approach to conceptualizing occupational alcohol issues. That is, the workplace as a distinct cultural environment can support or inhibit the development of high risk or problem drinking (Ames and Janes, 1992). While our specific findings may not be generalizable to a host of other work settings, the theoretical framework for identifying and explaining them is.

These findings and possible explanations help support the argument that characteristics of the work environment, along with personal demographic factors, influence work-related drinking (Trice and Sonnenstuhl, 1988; Ames and Janes, 1992). They also support the argument that identification and explanation of environmental factors that put employees at risk can be employed in the development of strategies for primary prevention of alcohol-related problems (Ames, 1993). The case study approach is uniquely suited to understanding the cultural/environmental context of alcohol problems and is important for the development of effective prevention programs to minimize risks of such problems *before* they develop. Some of the findings reported on here offer guidelines for prevention intervention that can be implemented through changes in the organizational culture of the work environment.

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