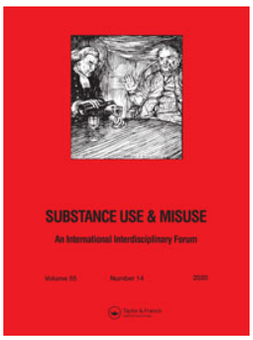

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ORIGINAL ARTICLE

Work-Related Alcohol Use and Harm to Others

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ABSTRACT

Background: Drinking alcohol with coworkers is a common practice in many occupational cultures. This practice may produce negative consequences for some employees. *Objectives*: We estimate the prevalence of a set of negative consequences of work-related alcohol use and identify risk factors associated with experience of harm from coworkers' drinking. *Methods:* In an online survey, Norwegian employees ($n = 3596$) aged 20–69 reported whether they had experienced the following due to coworkers' drinking the past 12 months: (a) felt excluded, (b) experienced unwanted sexual attention, (c) been physically harmed, and (d) been verbally abused. Each outcome was regressed on socio-demographics (age, gender, education, and income), job characteristics (flexibility and autonomy), respondents' alcohol use, and perceived intoxication frequency in work contexts for a typical coworker (perceived coworker intoxication frequency). *Results:* The 12-month prevalence of experiencing any of the negative consequences was 18%. Having felt excluded (10.7%) and experienced unwanted sexual attention (7.0%) were more common than being verbally abused (4.8%) or physically harmed (1.9%). Perceived coworker intoxication frequency was strongly associated with all outcomes. Respondents' own drinking frequency predicted being verbally abused, being physically harmed, and experiencing unwanted sexual attention. Women experienced less physical harm and more unwanted sexual attention than men. Prevalence also varied by age, education, income, and job characteristics. *Conclusions:* Each year, approximately one-sixth of Norwegian employees experience harm from their coworkers' drinking. The frequency of intoxication in work contexts is strongly associated with harm to others.

KEYWORDS
Alcohol; harm to others; secondhand effects of drinking; work; coworkers

Introduction

In many western countries, drinking alcohol with coworkers is a common practice (Frone, 2012; Lie & Nesvåg, 2001; Moan & Halkjelsvik, 2019). Many employees consider alcohol as important for work-related networking and report that alcohol should be a natural part of celebrations at work (Moan & Halkjelsvik, 2016). Although there may be positive aspects associated with the use of alcohol in work contexts, employees' drinking may also have negative consequences. The present study estimates the prevalence of four negative consequences of employees' drinking in work contexts that directly affects their coworkers (i.e. harm to others, secondhand effects of drinking) and investigate demographic and work-related factors predicting the occurrence of these negative experiences. Drinking in work contexts included any drinking by the respondents' colleagues that occurred in work-related settings, such as drinking during regular work hours, after-work drinking with colleagues, and drinking during a work-related trip, at a party, or a conference.

Alcohol's harm to others, also commonly referred to as secondhand effects of drinking, includes a wide range of negative consequences for people in the drinker's immediate surroundings and for society (Babor et al., 2011; Nutt et al., 2010; van Amsterdam et al., 2010). Studies addressing possible consequences of alcohol use in a work context have typically focused on sickness absence and productivity loss (Moan, 2014; Moan & Halkjelsvik, 2020; Schou & Moan, 2016; Thørrisen et al., 2019) and the costs attributed to the absence and productivity loss (Dale & Livingston, 2010; Laslett et al., 2010; Single et al., 1998; Sullivan et al., 2019). Research on the possible negative consequences of employees' alcohol use for coworkers is scarce.

A few studies have addressed the negative effects of having coworkers who drink excessively (Casswell et al., 2011a, 2011b; Dale & Livingston, 2010; Laslett et al., 2011). These studies investigated outcomes such as reduced productivity, the need to cover for a coworker, the need to work additional hours due to a coworkers' alcohol use, and the impact on conflicts with managers and/or coworkers (Casswell et al., 2011a; Dale & Livingston, 2010; French et al., 2011). However, the above-mentioned studies did not address the consequences of drinking in work contexts, that is, drinking that occurs with coworkers, and they only focused on coworkers who drink heavily. Two Norwegian

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studies have specifically addressed the consequences of drinking in work contexts (Lie & Nesvåg, 2001; Nesvåg, 2004). However, these studies focused on the consequences of alcohol use for the drinker (e.g. whether drinking in work contexts made him/her relax) and for the work environment (e.g. whether alcohol contributes to strengthening social relations in the workplace). Thus, the possible negative consequences of work-related drinking for individuals other than the drinker, that is coworkers, have yet to be examined.

The general literature on alcohol's harm to others points to several consequences of drinking that is likely relevant in work contexts. General population surveys from several countries have shown that possible consequences of others' drinking include being physically harmed, receiving unwanted sexual attention, and being verbally abused (Laslett et al., 2011; Lund et al., 2016; Moan et al., 2015; Storvoll et al., 2016). In the present study, we investigated whether, and to what extent, employees experience these consequences due to their coworkers' drinking. In addition, we wanted to assess the effect of work-related drinking on experience of social exclusion. Social exclusion is associated with several negative consequences, such as poorer employee psychological well-being and job satisfaction, and more stress and negative health symptoms. Social exclusion is also associated with an increased risk of turnover (see O'Reilly & Banki, 2016, for a review).

A recent study showed that 93% of Norwegian employees reported drinking alcohol the past 12 months (Moan & Halkjelsvik, 2019), and between one-third and half of Norwegian employees believe drinking with coworkers strengthens social relations at work (Lie & Nesvåg, 2001; Moan & Halkjelsvik, 2016). It is therefore reasonable to assume that some employees who do not partake, or do not drink, at work-related social events (e.g. due to personal preferences, health, religion, or alcohol problems), feel socially excluded due to coworkers' drinking.

In sum, we were interested in the prevalence of the following possible consequences of coworkers' drinking: being physically harmed by, receiving unwanted sexual attention from, and being verbally abused by a coworker who had been drinking, and feeling socially excluded because of alcohol use.

Who are negatively affected by coworkers' drinking?

Population surveys from Australia and six Northern European countries, including Norway, show that women and young individuals carry a greater burden from harm related to others' drinking (see Laslett et al., 2011; Moan et al., 2015; Ramstedt et al., 2015; Storvoll et al., 2016). This makes age and sex relevant variables to investigate in the context of work-related drinking. Social inequalities have been documented in the prevalence of alcohol-related problems in general (Bloomfield et al., 2006; Grittner et al., 2013; Katikireddi et al., 2017; Roche et al., 2015), but results from studies on social inequality in harm due to others' drinking are inconsistent. While one study found that highly educated individuals experienced more harm from others' drinking (Rossow & Hauge, 2004), another study showed that those with a low educational level experienced more harm (Storvoll et al., 2016). Recent studies suggest that group differences according to educational level depend on the type of harm (Moan & Brunborg, 2020; Moan & Halkjelsvik, 2020).

Previous studies have demonstrated that the prevalence of negative consequences due to alcohol use varies greatly by profession (Berry et al., 2007; Edvardsen et al., 2015; Moan & Halkjelsvik, 2019). This may suggest that job characteristics could be associated with experiencing negative consequences from others' drinking. Job autonomy may be one type of job characteristics that is particularly relevant. Having a job with a high degree of autonomy implies greater flexibility in deciding the content of the work, and when and where to work; thus, it might also provide more opportunities for substance use (cf. Zhang & Snizek, 2003), including the use of alcohol. One the other hand, a high degree of job autonomy may imply less social pressure from colleagues and therefore it may be easier for this group of employees to decide not to drink.

Population surveys from Australia as well as from Northern European countries have found that in comparison with people who drink less, people who frequently drink and drink to intoxication report more harm from others' drinking (e.g. Laslett et al., 2011; Moan et al., 2015; Storvoll et al., 2016). It is thus reasonable to assume that employees' own work-related alcohol use is related to the frequency of experiencing negative consequences from coworkers' drinking. Furthermore, the probability of experiencing harm from coworkers' drinking is likely to depend on the level and pattern of work-related drinking among coworkers. Employees with coworkers who frequently drink to intoxication will likely experience more harm from secondhand drinking than employees with coworkers who drink less.

To sum up, results from the more general literature on consequences of alcohol use point to socio-demographics, job autonomy, respondents' own work-related alcohol use, and coworker intoxication frequency as relevant factors in identifying who are more likely than others to be negatively affected by coworkers' drinking. In addition to estimating the prevalence of the four consequences of interest (physical harm, unwanted sexual attention, verbal abuse, and social exclusion), we investigate their associations with the above-mentioned characteristics of the respondents and their workplace.

Material and methods

Procedure and respondents

Samples of part- and full-time workers from the Kantar TNS online panel were invited to online surveys in 2015, 2016, and 2017. The panel is intended to provide a representative sample of the Norwegian online population (the part of the population with access to the Internet). Only the panelists who were registered with part- or full-time employment were invited to participate. The participants were contacted by email, with a link to an online questionnaire

that they could complete in the Web-browser on a computer, tablet, or phone of their choice. The data were pseudonymized by the research agency. Results from the surveys have previously been published in Norwegian reports (Moan & Halkjelsvik, 2016, 2019).

The samples were stratified on the variables gender, age group, and education level based on demographic data of the employed Norwegian population from Statistics Norway (2019). Seventy-nine respondents were excluded due to inconsistent responses on two or more of 10 predetermined criteria (e.g. if the frequency of drinking to intoxication was higher than the frequency of drinking), and 31 respondents were outside the target age range. The remaining sample comprised 3596 unique respondents aged 20–69 (see Table 1 for characteristics of the sample). Some of the respondents have participated in the survey more than once, but we only included their last response in the present analyses.

The response rates for the three years were 51% (2015), 37% (2016), and 47% (2017). These are the proportions of the invited individuals from the online panel who chose to participate in the survey. Due to the panel's multi-step recruitment process, these figures cannot be interpreted as response rates in the traditional sense. The online panel originates from numerous national representative population surveys, carried out by telephone, post or personal interview, for which we do not have access to response rates. Respondents from these surveys are in turn recruited to the panel. Periodically, inactive respondents are removed from the panel. In principle, there is no self-selection into the panel, but to maintain a representative sample of the Norwegian online population, demographic groups that are difficult to reach (e.g. younger participants) have been recruited to the panel through social media.

Measures

Measures on harm from others' drinking stem from general population surveys conducted in several countries (e.g. Laslett et al., 2011; Moan et al., 2015), but were adapted to a work context by the authors and have previously been used in Norwegian reports (Moan & Halkjelsvik, 2016, 2019).

Negative consequences from coworkers' drinking were measured with four questions, "How often during the 12 past months … ": (1) " … have you felt excluded in social work-related contexts because alcohol was used?"; (2) " … have you been physically harmed by someone who drank alcohol in a work-related context?"; (3) " … have you been verbally abused by someone who drank alcohol in a work-related context?"; and (4) " … have you received unwanted sexual attention by someone who drank alcohol in a work-related context?". The response options were "Never", "Yes, 1–2 times", and "Yes, more than 2 times". We constructed dichotomous "Never"/"Once or more" variables for the above four negative consequences. If the response to the item about sexual attention was affirmative, the respondent was asked whether this was experienced as problematic (options: "Completely unproblematic", "Somewhat unproblematic", "Somewhat problematic", and "Highly problematic").

Table 1. Characteristics of sample.

	Unweighted	Weighted
N	3596	3596
Women	48.9%	47.0%
Age	$M = 45.6$	$M = 42.3$
Higher education	48.3%	40.7%
Full-time (100%) employment	79.2%	82.3%
Never drank alcohol	1.8%	2.4%
Never drank alcohol past 12 months	6.7%	7.1%
Drinking monthly or more	77.5%	76.3%
Work-related drinking monthly or more often	7.1%	7.8%
Perceived coworker intoxication frequency (monthly+)	13.1%	13.8%
High work time flexibility	18.2%	17.5%
High work place flexibility	6.8%	6.6%
High income NOK699,999+	15.1%	12.8%

Socio-demographic variables were gender, age (five categories), educational level (completed higher education in university or college), personal income (categorized as less than NOK400,000, from NOK400,000 to NOK699,999, and more than NOK699,999).

Job characteristics. Degree of *work time flexibility* was measured with the question: "How flexible are your working hours?" The response options were "fixed working hours", "flexible working hours, but have to be present at work during regular/core working hours", "flexible working hours, and can mostly decide when to work", and "I can work whenever I want to" (the latter two categories were combined in the analyses due to few observations). Degree of *work location flexibility* was measured with the question, "How flexible is your work regarding work location?" The response options were "I always have to be present at work", "Mostly I have to be present at work, but occasionally I can work at home", and "I can work wherever I want". The variable *job autonomy* was an index of three items: "In my job, I can choose which tasks to conduct", "In my job, the way I conduct the tasks can be chosen independently of others", and "In my job, I can to a large extent think and act independently of others". The questions were based on the scale developed by Hackman and Oldham (1975). The three items were rated on a five-point response scale from "Completely disagree" to "Completely agree". We calculated the average of the three items and mean-centered and standardized this index before the analyses. Cronbach's alpha of the three items was 0.78.

Alcohol use in work contexts during the past 12 months was assessed using one question: "During the past 12 months, how often did you drink alcohol in work-related situations, for example, after-work drinking with colleagues, drinking during a work-related trip, at a party or conference?" The response options were: "Never", "1 day", "2–3 days", "More than 3 days", "1 day per month", "2–3 days per month", "Once a week", "2–3 times a week", "4–5 times a week", and "almost daily" (the latter five categories were combined in the analyses due to few observations).

Perceived coworker intoxication frequency was measured with the question: "How often do you think a typical coworker in your workplace drinks to intoxication in work-

Table 2. Estimated percentages and weighted number (in parenthesis) of respondents who experienced negative consequences in the past 12 months from coworkers' alcohol use.

	Never	1–2 times	>2 times	*N*	Missing
Felt excluded	89.3% (3193)	8.5% (303)	2.2% (78)	3574	0.6% (22)
Physical harm	98.2% (3513)	1.6% (56)	0.3% (9)	3578	0.5% (18)
Verbally abused	95.2% (3401)	4.1% (147)	0.7% (25)	3574	0.6% (22)
Sexual attention	93.0% (3326)	5.8% (207)	1.2% (42)	3576	0.6% (21)
Any of the above	82.6% (2958)	13.2% (473)	4.2% (152)	3583	0.4% (13)

Note. Data weighted by gender, education, and age group. Missing given as percentages of full sample, other columns given as percentages of non-missing sample. The response "Do not know" (chosen by 7–11 participants) is included in the missing category.

related situations?", with response options "Never", "1–2 times per year", "Less than monthly", "Monthly", and "Weekly or more often" (the latter two categories were combined in the analysis due to few observations).

Analyses

We calculated results on the prevalence in the SPSS Complex Samples module with non-response survey weights based on the variables education (higher education vs. lower or no education), age (four categories), and gender, calibrated against demographic data from Statistics Norway (2019). For regression analyses, we used a model-based approach (i.e. unweighted data with covariates) and the logistic regression function in Stata 14.1.

We ran two sets of regressions, one with socio-demographics and job characteristics as predictors, and one that additionally included alcohol use (own use and perceived intoxication frequency in work contexts for a typical coworker). Both sets of analyses can be of value in understanding who experience harm from colleagues' drinking (who is at risk of experiencing harm from colleague's drinking in general, and who is at risk even when holding the level of alcohol use constant).

About 4% of the data on income, 3% of data on own work-related alcohol use, and 1.3% of data on perceived coworker intoxication frequency were missing (other variables <0.7%; see Table 2 for further details). The regressions were based on 10 imputed dataset obtained by the multiple imputation chained equation function in Stata (logistic model for binary, ordered logistic for the categorical variables, and linear model for the job autonomy index). All outcome and predictor variables presented in Table 3 were used in the imputation.

Results

The prevalence of experiencing any of the four negative consequences of work-related drinking was approximately 18% (CI 95%: 16–19). Table 2 provides the 12-month prevalence for each of the consequences. Approximately, 11% (CI 95%: 10–12) had felt excluded because of alcohol use in work contexts, 5% (CI 95%: 4–6) had experienced being verbally abused, 2% (CI 95%: 1.2–2.7) had been physically harmed, and 7% (CI 95%: 6–8), reported they had experienced unwanted sexual attention. Of the respondents who had experienced unwanted sexual attention, 40% reported this was quite or highly problematic, suggesting that annually about 3% of employees experience unpleasant sexual attention in work contexts.

Table 3 presents the results of four regression analyses predicting the prevalence of negative consequences in the past 12 months with socio-demographics and job characteristics as predictors, and Table 4 presents models that additionally include the variables work-related alcohol use (own use) and perceived coworker intoxication frequency (perceived frequency of intoxication in work contexts for a typical coworker).

Women reported experiencing less physical harm but more unwanted sexual attention than men. The effect sizes corresponded to about a third of men's odds for physical harm and more than twice the odds for sexual attention. Education had no systematic effect across outcomes, but employees with higher education were more inclined to feel excluded due to drinking.

We observed a reduction in the odds of experiencing harm with increasing age for all four consequences. Part of the effects of age appeared to be driven by differences in alcohol use, as the effects were weaker when controlling for alcohol use,[1] but there was still a gradient of decreased risk with increasing age for all outcomes. The largest effect was found for physical harm, as the youngest employees had about five times the odds of the three oldest categories. The second largest effect of age was for the outcome sexual attention, where the oldest age group had less than half the odds of the three youngest age categories.

No consistent pattern emerged across outcomes for the variable income, but employees with the highest level of income felt less excluded than those with lower income.

An increase on the job autonomy scale (work task autonomy) of one standard deviation was associated with slightly lower odds of experiencing negative consequences, and, in particular, lower odds of feeling excluded. No consistent pattern emerged for work *time* flexibility. Higher work *location* flexibility was associated with greater odds of experiencing negative outcomes, but the lower bounds of the confidence intervals were above 1 only for the outcome *unwanted sexual attention*.

In terms of employees' own alcohol use, several noticeable patterns emerged: First, the outcome *feeling excluded* revealed a different pattern than the other variables. Employees who never drank, and the most frequent drinkers, had the highest likelihood of experiencing being

[1]This was not due to rescaling of the model from the inclusion of more covariates, as the decrease was also evident in standardized coefficient (see Long & Freese, 2014).

Table 3. Adjusted odds ratios (95% CI) from four regression analyses predicting experience of negative consequences of work-related alcohol use in the past 12 months ($N = 3596$).

	Felt excluded	Physically harmed	Verbally abused	Unwanted sexual attention
Constant	0.14 [0.10, 0.21]	0.09 [0.04, 0.18]	0.06 [0.04, 0.10]	0.05 [0.03, 0.07]
Socio-demographics				
Gender: Woman	1.00 [0.78, 1.28]	0.25 [0.11, 0.55]	0.81 [0.57, 1.15]	2.66 [1.94, 3.63]
Education: Higher	1.33 [1.04, 1.69]	0.62 [0.29, 1.32]	0.92 [0.65, 1.32]	0.86 [0.64, 1.17]
Age				
20–29	Ref.	Ref.	Ref.	Ref.
30–39	0.96 [0.67, 1.37]	0.27 [0.12, 0.62]	0.84 [0.50, 1.41]	0.89 [0.59, 1.35]
40–49	0.69 [0.47, 1.01]	0.15 [0.05, 0.42]	0.67 [0.39, 1.15]	0.74 [0.48, 1.14]
50–59	0.77 [0.53, 1.10]	0.09 [0.03, 0.28]	0.65 [0.38, 1.10]	0.48 [0.31, 0.76]
60–69	0.58 [0.37, 0.89]	0.07 [0.02, 0.32]	0.32 [0.16, 0.66]	0.28 [0.15, 0.51]
Income				
NOK400,000>	Ref.	Ref.	Ref.	Ref.
NOK400,000–699,999	0.72 [0.55, 0.94]	1.01 [0.47, 2.17]	1.12 [0.74, 1.69]	1.02 [0.73, 1.43]
NOK699,999<	0.51 [0.32, 0.80]	0.37 [0.08, 1.80]	1.21 [0.67, 2.17]	1.32 [0.79, 2.20]
Job characteristics				
Job autonomy	0.79 [0.69, 0.89]	0.91 [0.63, 1.31]	0.84 [0.70, 1.00]	0.89 [0.77, 1.04]
Work time flexibility				
Low	Ref.	Ref.	Ref.	Ref.
Some	1.19 [0.89, 1.60]	0.79 [0.31, 2.02]	1.04 [0.67, 1.61]	1.05 [0.73, 1.51]
High	1.34 [0.91, 1.97]	0.81 [0.27, 2.46]	1.15 [0.66, 2.00]	0.81 [0.50, 1.30]
Work location flexibility				
Low	Ref.	Ref.	Ref.	Ref.
Some	0.83 [0.60, 1.14]	1.35 [0.53, 3.46]	1.06 [0.67, 1.68]	2.01 [1.39, 2.91]
High	1.17 [0.69, 1.98]	2.96 [0.79, 11.04]	1.90 [0.95, 3.82]	2.60 [1.39, 4.87]

Table 4. Adjusted odds ratios (95% CI) from four regression analyses predicting experience of negative consequences of work-related alcohol use in the past 12 months, with respondents' own alcohol use and perceived coworker intoxication frequency as additional predictors ($N = 3596$).

	Felt excluded	Physically harmed	Verbally abused	Unwanted sexual attention
Constant	0.07 [0.04, 0.11]	0.03 [0.01, 0.09]	0.02 [0.01, 0.05]	0.01 [0.01, 0.02]
Socio-demographics				
Gender: Woman	1.04 [0.81, 1.33]	0.21 [0.09, 0.52]	0.85 [0.59, 1.23]	2.92 [2.11, 4.04]
Education: Higher	1.55 [1.20, 2.01]	0.68 [0.32, 1.45]	1.02 [0.71, 1.48]	0.90 [0.66, 1.22]
Age				
20–29	Ref.	Ref.	Ref.	Ref.
30–39	1.01 [0.69, 1.46]	0.37 [0.15, 0.91]	1.04 [0.60, 1.80]	1.04 [0.67, 1.61]
40–49	0.78 [0.53, 1.17]	0.23 [0.08, 0.68]	0.92 [0.52, 1.63]	0.96 [0.61, 1.51]
50–59	0.92 [0.63, 1.36]	0.17 [0.05, 0.54]	0.98 [0.56, 1.73]	0.71 [0.44, 1.13]
60–69	0.78 [0.49, 1.23]	0.13 [0.03, 0.64]	0.55 [0.26, 1.14]	0.44 [0.23, 0.83]
Income				
NOK400,000>	Ref.	Ref.	Ref.	Ref.
NOK400,000–699,999	0.78 [0.59, 1.04]	0.94 [0.41, 2.18]	1.20 [0.78, 1.86]	0.96 [0.68, 1.36]
NOK699,999<	0.55 [0.34, 0.88]	0.23 [0.04, 1.23]	1.12 [0.61, 2.07]	1.09 [0.65, 1.86]
Job characteristics				
Job autonomy	0.82 [0.72, 0.94]	0.90 [0.60, 1.36]	0.85 [0.70, 1.03]	0.92 [0.78, 1.08]
Work time flexibility				
Low	Ref.	Ref.	Ref.	Ref.
Some	1.30 [0.96, 1.77]	0.75 [0.28, 2.02]	1.07 [0.68, 1.67]	1.00 [0.69, 1.45]
High	1.49 [0.99, 2.23]	0.68 [0.20, 2.29]	1.08 [0.60, 1.92]	0.73 [0.45, 1.19]
Work location flexibility				
Low	Ref.	Ref.	Ref.	Ref.
Some	0.84 [0.60, 1.17]	0.84 [0.30, 2.35]	0.93 [0.57, 1.51]	1.81 [1.24, 2.65]
High	1.03 [0.59, 1.82]	2.70 [0.64, 11.44]	1.69 [0.81, 3.51]	2.43 [1.26, 4.66]
Alcohol use				
Work-related alcohol use past 12 months				
Never	Ref.	Ref.	Ref.	Ref.
1 day	0.55 [0.40, 0.76]	0.82 [0.28, 2.38]	0.73 [0.44, 1.21]	1.75 [1.12, 2.74]
2–3 days	0.35 [0.25, 0.49]	0.12 [0.01, 0.96]	0.61 [0.36, 1.01]	1.73 [1.11, 2.69]
More than 3 days	0.33 [0.22, 0.49]	0.99 [0.31, 3.19]	0.65 [0.36, 1.19]	1.86 [1.14, 3.04]
1 day per month	0.38 [0.20, 0.70]	4.33 [1.48, 12.62]	1.85 [0.98, 3.47]	2.71 [1.44, 5.10]
2–3 days per month or more	0.86 [0.45, 1.65]	9.94 [3.34, 29.59]	4.13 [2.14, 7.96]	6.41 [3.29, 12.52]
Perceived coworker intoxication frequency				
Never	Ref.	Ref.	Ref.	Ref.
1–2 times per year	2.63 [1.91, 3.63]	2.50 [0.79, 7.95]	1.90 [1.17, 3.08]	1.91 [1.29, 2.83]
Less frequent than monthly	6.19 [4.30, 8.90]	6.00 [1.80, 19.96]	4.42 [2.62, 7.46]	3.51 [2.26, 5.46]
Monthly or more often	10.60 [6.70, 16.79]	6.80 [1.81, 25.57]	7.87 [4.28, 14.46]	6.91 [4.01, 11.91]

excluded due to work-related alcohol use. For the three other outcomes, the odds were substantially higher for the employees with the highest frequency of work-related drinking.

Finally, there was a strong and consistent increase in the odds of experiencing negative consequences from coworker's alcohol use with increasing intoxication frequency of a typical coworker (i.e. perceived coworker intoxication frequency). Across all outcomes, the odds were three to four times as large among employees who reported that their typical coworker drank to intoxication in work-related situations *monthly or more often* compared to *1–2 times per year*.

Discussion

This study extends the scarce research on the possible consequences of alcohol use in work contexts and suggests that more than one-sixth of employees experience negative consequences due to their coworkers' drinking. The extent to which employees are negatively affected by coworkers' drinking varies according to the characteristics of the employees and their work.

Previous studies have estimated that work-related alcohol use constitutes 20–25% of all drinking occasions among Norwegian employees (Lie & Nesvåg, 2001; Moan & Halkjelsvik, 2016). For most employees, however, work-related drinking does not occur frequently. Moan and Halkjelsvik (2016) found that three quarters of the Norwegian work force drank once or more in work contexts outside regular working hours and 13% drank alcohol during regular working hours the past 12 months. However, only 6% and 2% reported drinking more frequently than monthly outside and during regular working hours, respectively. Despite the low frequency of work-related alcohol use among Norwegian employees, this study's findings suggest a relatively large proportion of employees are negatively affected by their coworker's alcohol use. Approximately, 18% of the employees reported having experienced one or more of the four consequences during the past 12 months. This does not necessarily mean that a large proportion of employees cause problems for their coworkers; a few employees with alcohol-related problems can affect several coworkers (see Buvik et al., 2018).

We found that 11% of the employees had felt socially excluded once or more often the past 12 months due to work-related alcohol use. These where mainly people who never drank in work contexts (cf. Table 4), but also the category with the most frequent work-related drinking had relatively high odds of feeling excluded. It has been shown that more than one in 10 Norwegian employees chose not to attend work-related social events due to their coworkers' drinking (Moan & Halkjelsvik, 2019). These results correspond with an Australian study finding that alcohol use was an important indicator of social belonging and that non-drinkers were described as outsiders who did not fit in (Allan et al., 2012). While studies show that social exclusion in work contexts is associated with several negative consequences, for example, poor health symptoms and turnover (O'Reilly & Banki, 2016), further research is needed to determine the consequences of social exclusion due to work-related alcohol use.

Five percent of the employees reported having been verbally abused in the past 12 months by a coworker who had been drinking. A general population study found that 9% reported being verbally abused by someone who had been drinking (Moan et al., 2015). It is reasonable to believe that the proportion is higher when asking about harm from others' drinking in general, because this would also include settings unrelated to work (i.e. private and public contexts). However, this reasoning also means it is somewhat surprising that the proportion who reported being physically harmed by a coworker who had been drinking (2%) in this study was comparable to the proportion who reported being physically harmed by (any) persons who had been drinking in the general population (Lund et al., 2016; Moan et al., 2015). Furthermore, the finding that 7% of the Norwegian employees received unwanted sexual attention from a coworker who had been drinking was slightly higher than in a general population survey in Norway for which that proportion was 6% (Storvoll et al., 2016). A different pattern of alcohol consumption among employees than in the general population may be one explanation. Another possible explanation could be that the survey context with many questions about work-related alcohol use facilitated recall of specific episodes. Furthermore, people may have higher expectations of coworkers than of pub patrons, and therefore may have a lower threshold for reporting negative consequences in work-related drinking contexts than in general drinking contexts.

Perceived coworker intoxication frequency was consistently and strongly associated with all four consequences. The likelihood of reporting negative consequences increased markedly with an increase in the perceived intoxication frequency of a typical coworker. For example, employees who reported having coworkers who drank to intoxication at least monthly had more than three times the odds of experiencing unwanted sexual attention due to coworker's alcohol use than employees whose colleagues typically drank 1–2 times per year.

Employees who reported drinking frequently in work contexts were more likely to report being verbally abused by, receiving unwanted sexual attention from, and being physically harmed by a coworker who had been drinking. This is consistent with population studies finding those who report more frequent drinking and drinking to intoxication experience more harm from others' drinking (e.g. Laslett et al., 2011; Moan et al., 2015; Storvoll et al., 2016). Alcohol is often consumed with others (Bye et al., 2013), suggesting that people who drink frequently have greater exposure to situations that may cause harm. In addition, a person impaired by alcohol might be more vulnerable than someone who is sober; for example, it has been found that sexual assault often occurs when the victim is intoxicated (Grubb & Turner, 2012). Finally, a substantial body of literature provides empirical evidence for an association between alcohol use and aggressive behaviors (e.g. Bye & Rossow, 2008),

implying that employees who drink may provoke others to cause harm.

Employees who abstained from drinking in work contexts more often reported feeling excluded than employees who were current drinkers. However, the employees who reported drinking most frequently felt excluded almost to the same extent as those who never drank. Thus, serving alcohol at work-related social events may exclude both non-drinkers and employees who have problems controlling their alcohol use.

We observed some differences in prevalence according to socio-demographic and job characteristics. Being physically harmed was more common among young employees and men, while receiving unwanted sexual attention was most common among women and young employees. These findings correspond with those of a population study on alcohol's harm to others (Storvoll et al., 2016). Although there were indications of social inequalities in experiencing negative consequences of coworkers' alcohol use, these results were not consistent across outcomes. For instance, feeling excluded was more common among those in the lowest income group and those with higher education. Consistent with the findings in two recent studies, the differences appeared to depend on the type of harm (Moan & Brunborg, 2020; Moan & Halkjelsvik, 2020).

The present study has shed light on some possible consequences of employees' work-related alcohol use for other employees on an individual level. Future studies should examine how such consequences (e.g. social exclusion and unwanted sexual attention) may affect the workplace. Population studies show that being harmed by others' drinking is associated with lower well-being and poorer health (Bloomfield et al., 2019; Casswell et al., 2011b). Thus, on a workplace level, work-related drinking may subsequently result in reduced productivity, and in absence and turnover.

Methodological considerations

The recruitment process for the market research panel was based on multiple stages that may result in a selection bias. For example, compared with official statistics on education in Norway (Statistics Norway, 2019), the net sample had relatively few respondents with a low educational level. This may partly be attributable to differences between what respondents define as "completed education" and what is recorded in national registries, but it is not uncommon to observe lower participation in surveys among people with shorter or no education (e.g. Jensen, 2018). The proportion of young employees was also lower in the current study than in the data from Statistics Norway (2019). Young employees drink more frequently than older employees, and a larger proportion of young employees experience negative consequences of alcohol use than older employees (e.g. Edvardsen et al., 2015; Schou et al., 2014). Although the survey weights compensate for fewer young and less educated employees, the lower participation rate among these demographic groups implies that they may be less representative of the subpopulations they represent.

Moreover, heavy drinkers are typically underrepresented in surveys, and alcohol use is underreported by survey respondents (Johnson, 2014). This may have resulted in a downward bias in our estimates of prevalence.

Although we ask about the negative consequences experienced the past 12 months, it is likely that some of the respondents ignore or misjudge the time frame and consequently report harm from others' alcohol use that occurred before the past 12 months. On the other hand, people may also fail to remember incidents. Thus, the present results represent approximate estimates of the 12-month prevalence.

Conclusion

In addition to the documented financial costs associated with employees' alcohol use (e.g. Laslett et al., 2010; Single et al., 1998; Sullivan et al., 2019), the present study suggests that work-related alcohol use also may have considerable social costs for the workplace. Employees who drink frequently in work contexts or have coworkers who drink frequently to intoxication in work contexts are most negatively affected by coworkers' drinking. However, employees who abstain from alcohol in work contexts are more likely to feel excluded from social situations. Decisions regarding measures to reduce harm from alcohol in the workplace, such as a workplace alcohol policy or government regulations, could take into account a broader perspective of harm, which in addition to the typical focus on productivity loss and harm to the drinker, also can include the negative consequences for coworkers.

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References

Allan, J., Clifford, A., Ball, P., Alston, M., & Meister, P. (2012). 'You're less complete if you haven't got a can in your hand': Alcohol consumption and related harmful effects in rural Australia: The role and influence of cultural capital. *Alcohol and Alcoholism*, *47*(5), 624–629. https://doi.org/10.1093/alcalc/ags074

Babor, T. F. (2011). Commentary on Laslett et al. (2011): Alcohol-related collateral damage and the broader issue of alcohol's social costs. *Addiction*, *106*(9), 1612–1613. https://doi.org/10.1111/j.1360-0443.2011.03578.x

Berry, J. G., Pidd, K., Roche, A. M., & Harrison, J. E. (2007). Prevalence and patterns of alcohol use in the Australian workforce: Findings from the 2001 National Drug Strategy Household Survey. *Addiction (Abingdon, England)*, *102*(9), 1399–1410. https://doi.org/10.1111/j.1360-0443.2007.01893.x

Bloomfield, K., Grittner, U., Kramer, S., & Gmel, G. (2006). Social inequalitites in alcohol consumption and alcohol-related problems in the study countries of the EU concerted action 'Gender, culture and alcohol problems: A multi-national study'. *Alcohol and*

Alcoholism, *41*(suppl_1), i26–i36. https://doi.org/10.1093/alcalc/agl073

Bloomfield, K., Jensen, H. A. R., & Ekholm, O. (2019). Alcohol's harms to others: The self-rated health of those with a heavy drinker in their lives. *European Journal of Public Health*, *29*(6), 1130–1135. https://doi.org/10.1093/eurpub/ckz092

Buvik, K., Moan, I. S., & Halkjelsvik, T. (2018). Alcohol-related absence and presenteeism: Beyond productivity loss. *The International Journal on Drug Policy*, *58*, 71–77. https://doi.org/10.1016/j.drugpo.2018.05.005

Bye, E. K., Amundsen, E. J., & Lund, M. (2013). Bruk av tobakk, rusmidler og vanedannende legemidler i Norge – hovedfunn fra SIRUS' befolkningsundersøkelse i 2012 (Use of tobbacco, alcohol, drugs and pharmaceuticals in Norway – Findings from SIRUS' general population study in 2012) (SIRUS-reports 6/2013). Norwegian Institute for Alcohol and Drug Research (SIRUS).

Bye, E. K., & Rossow, I. (2008). Is the impact of alcohol consumption on violence relative to the level of consumption? *Journal of Scandinavian Studies in Criminology and Crime Prevention*, *9*(1), 31–46. https://doi.org/10.1080/14043850801896729

Casswell, S., Harding, J. F., You, R. Q., & Huckle, T. (2011a). Alcohol's harm to others: Self-reports from a representative sample of New Zealanders. *The New Zealand Medical Journal*, *124*(1336), 1087–1094.

Casswell, S., You, R. Q., & Huckle, T. (2011b). Alcohol's harm to others: Reduced wellbeing and health status for those with heavy drinkers in their lives. *Addiction (Abingdon, England)*, *106*(6), 1087–1094. https://doi.org/10.1111/j.1360-0443.2011.03361.x

Dale, C. E., & Livingston, M. J. (2010). The burden of alcohol drinking on co-workers in the Australian workplace. *The Medical Journal of Australia*, *193*(3), 138–140. https://doi.org/10.5694/j.1326-5377.2010.tb03831.x

Edvardsen, H. M. E., Moan, I. S., Christophersen, A. S., & Gjerde, H. (2015). Use of alcohol and drugs by employees in selected business areas in Norway: A study using oral fluid testing and questionnaires. *Journal of Occupational Medicine and Toxicology*, *10*(1), 46. https://doi.org/10.1186/s12995-015-0087-0

French, M. T., Maclean, J. C., Sindelar, J. L., & Fang, H. (2011). The morning after: Alcohol misuse and employment problems. *Applied Economics*, *43*(21), 2705–2720. https://doi.org/10.1080/00036840903357421

Frone, M. R. (2012). Workplace substance use climate: Prevalence and distribution in the US workforce. *Journal of Substance Use*, *17*(1), 72–83. https://doi.org/10.3109/14659891.2010.531630

Grittner, U., Kuntsche, S., Gmel, G., & Bloomfield, K. (2013). Alcohol consumption and social inequality at the individual and country levels – Results from an international study. *European Journal of Public Health*, *23*(2), 332–339. https://doi.org/10.1093/eurpub/cks044

Grubb, A., & Turner, E. (2012). Attribution of blame in rape cases: A review of the impact of rape myth acceptance, gender role conformity and substance use on victim blaming. *Aggression and Violent Behavior*, *17*(5), 443–452. https://doi.org/10.1016/j.avb.2012.06.002

Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology*, *60*(2), 159–170. https://doi.org/10.1037/h0076546

Jensen, C. H. (2018). Rusundersøkelsen 2017: Dokumentasjonsrapport [Survey on alcohol, tobacco and drug use in Norway 2017. Documentation report] (Documents 2018/25). Statistics Norway.

Johnson, T. P. (2014). Sources of error in substance use prevalence surveys. *International Scholarly Research Notices*, *2014*, 1–21. https://doi.org/10.1155/2014/923290

Katikireddi, S. V., Whitley, E., Lewsey, J., Gray, L., & Leyland, A. H. (2017). Socioeconomic status as an effect modifier of alcohol consumption and harm: Analysis of linked cohort data. *The Lancet Public Health*, *2*(6), e267–e276. https://doi.org/10.1016/S2468-2667(17)30078-6

Laslett, A.-M., Catalano, P., Chikritzhs, T., Dale, C., Doran, C., Ferris, J., Jainullabudeen, A., Livingston, M., Matthews, S., Mugavin, J., Room, R., Schlotterlein, M., & Wilkinson, C. (2010). *The range and magnitude of alcohol's harm to others*. AER Centre for Alcohol Policy Research, Turning Point Alcohol and Drug Centre, Eastern Health.

Laslett, A. M., Room, R., Ferris, J., Wilkinson, C., Livingston, M., & Mugavin, J. (2011). Surveying the range and magnitude of alcohol's harm to others in Australia. *Addiction (Abingdon, England)*, *106*(9), 1603–1611. https://doi.org/10.1111/j.1360-0443.2011.03445.x

Lie, T., & Nesvåg, S. (2001). Rusmiddelbruk blant ansatte i norsk privat arbeidsliv [Alcohol and drug use among employees in the private sector in Norway] (RF-Rapport 2001/068). Rogalandsforskning.

Long, S., & Freese, J. (2014). *Regression* models for categorical dependent variables using *Stata* (3rd ed.). Stata Press.

Lund, I. O., Moan, I. S., & Storvoll, E. E. (2016). Harm from others' drinking: How problematic do people with and without experience of harm perceive it to be? *The International Journal on Drug Policy*, *38*, 43–49. https://doi.org/10.1016/j.drugpo.2016.10.016

Moan, I. S. (2014). Arbeidstakeres alkoholbruk og konsekvenser for arbeidslivet – sykefravaer, nedsatt yteevne, ulykker og arbeidsledighet [Employees' alcohol use and consequences for work life – sickness absence, presenteeism, accidents and unemployment]. In H. Sagvaag & B. Sikveland (Eds.), *Alkohol + arbeidsliv = sant? En vitenskapelig antologi*. Gyldendal Akademiske Forlag.

Moan, I. S., & Brunborg, G. S. (2020). The frequency of drinking in various locations and experience of harm from others' drinking. Manuscript submitted for publication.

Moan, I. S., & Halkjelsvik, T. (2016). Alkohol og arbeidsliv. En undersøkelse blant norske arbeidstakere [Alcohol and work life. A survey among Norwegian employees] (Rapport 2016). Folkehelseinstituttet. Available at: https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2016/alkohol-og-arbeidsliv-pdf.pdf (accessed August 12th 2020)

Moan, I. S., & Halkjelsvik, T. (2019). Alkohol og arbeidsliv II. Bruk, konsekvenser og retningslinjer ved ulike typer arbeidsplasser i Norge [Alcohol and work life II. Use, consequences and guidelines at different types of workplaces in Norway] (Rapport 2019). Folkehelseinstituttet. Available at: https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2019/alkohol-og-arbeidsliv-ii-rapport-2019.pdf (accessed August 12th 2020)

Moan, I. S., & Halkjelsvik, T. (2020). Sociodemographic differences in alcohol-related work impairment. *Addiction*. https://doi.org/10.1111/add.15202

Moan, I. S., Storvoll, E. E., Sundin, E., Lund, I. O., Bloomfield, K., Hope, A., Ramstedt, M., Huhtanen, P., & Kristjánsson, S. (2015). Experienced harm for other peoples' drinking: A cross-country comparison. *Substance Abuse: Research and Treatment*, *9*(2), 45–57. https://doi.org/10.4137/SART.S23504

Nesvåg, S. (2004). Alkoholkulturer i norsk arbeidsliv [Alcohol cultures in Norwegian worklife]. "You could be yourself, but where's the Comfort in that" (RF-Rapport 2004/255). Rogalandsforskning.

Nutt, D., King, L. A., & Phillips, L. (2010). Drug harms in the UK: A multicriteria decision analysis. *The Lancet*, *376*(9752), 1558–1565. https://doi.org/10.1016/S0140-6736(10)61462-6

O'Reilly, J., & Banki, S. (2016). Research in work and organizational psychology: Social exclusion in the workplace. In P. Riva & J. Eck (Eds.), *Social exclusion*. Springer. https://doi.org/10.1007/978-3-319-33033-4_7

Ramstedt, M., Sundin, E., Moan, I. S., Storvoll, E. E., Bloomfield, K., Hope, A., Kristjánsson, S., Lund, I. O., & Tigerstedt, C. (2015). Harm from heavy drinking of family and friends – A comparative study of the Nordic countries and Scotland.. *Substance Abuse: Research and Treatment*, *9*(2), 107–118. https://doi.org/10.4137/SART.S23746

Roche, A., Kostadinov, V., Fischer, J., Nicholas, R., O'Rourke, K., Pidd, K., & Trifonoff, A. (2015). Addressing inequities in alcohol consumption and related harms. *Health Promotion International*, *30*(suppl 2), ii20–ii35. https://doi.org/10.1093/heapro/dav030

Rossow, I. M., & Hauge, R. (2004). Who pays for the drinking? Characteristics of the extent and distribution of social harms from others' drinking. *Addiction (Abingdon, England)*, *99*(9), 1094–1102. https://doi.org/10.1111/j.1360-0443.2004.00788.x

Schou, L., & Moan, I. S. (2016). Alcohol use–sickness absence association and the moderating role of gender and socioeconomic status:

A literature review. *Drug and Alcohol Review*, *35*(2), 158–169. https://doi.org/10.1111/dar.12278

Schou, L., Storvoll, E. E., & Moan, I. S. (2014). Alcohol-related sickness absence among young employees: Gender differences and the prevention paradox. *European Journal of Public Health*, *24*(3), 480–485. https://doi.org/10.1093/eurpub/cku035

Single, E., Robson, L., Xie, X., & Rehm, J. (1998). The economic costs of alcohol, tobacco and illicit drugs in Canada, 1992. *Addiction (Abingdon, England)*, *93*(7), 991–1006. https://doi.org/10.1046/j.1360-0443.1998.9379914.x

Statistics Norway. (2019). *Arbeidskraftundersøkelsen [The labour force survey]*. Retrieved March, 2019, from https://www.ssb.no/statbank/table/08338/

Storvoll, E. E., Moan, I. S., & Lund, I. O. (2016). Negative consequences of other people's drinking: Prevalence, perpetrators and locations. *Drug and Alcohol Review*, *35*(6), 755–762. https://doi.org/10.1111/dar.12376

Sullivan, T., Edgar, F., & McAndrew, I. (2019). The hidden costs of employee drinking: A quantitative analysis. *Drug and Alcohol Review*, *38*(5), 543–553. https://doi.org/10.1111/dar.12935

Thørrisen, M. M., Bonsaksen, T., Hashemi, N., Kjeken, I., van Mechelen, W., & Aas, R. W. (2019). Association between alcohol consumption and impaired work performance (presenteeism): A systematic review. *BMJ Open*, *9*(7), e029184. https://doi.org/10.1136/bmjopen-2019-029184

van Amsterdam, J., Opperhuizen, A., Koeter, M., & van den Brink, W. (2010). Ranking the harm of alcohol, tobacco and illicit drugs for the individual and the population. *European Addiction Research*, *16*(4), 202–207. https://doi.org/10.1159/000317249

Zhang, Z., & Snizek, W. E. (2003). Occupation, job characteristics, and the use of alcohol and other drugs. *Social Behavior and Personality: An International Journal*, *31*(4), 395–412. https://doi.org/10.2224/sbp.2003.31.4.395