



Original Contribution

Socioeconomic and Psychosocial Exposures across the Life Course and Binge Drinking in Adulthood: Population-based Study

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Despite recognition of the health risks of binge drinking, its life-course precursors have not been widely examined. Data from the Kuopio Ischemic Heart Disease Risk Factor Study (1984–1989) were used to investigate the association between socioeconomic and psychosocial exposures across the life course and binge drinking in a population-based sample of 2,316 middle-aged men. Binge drinking was defined as drinking at least four bottles of beer, one bottle of wine, one bottle of strong wine, or six servings of spirits on a single occasion. A composite indicator of childhood socioeconomic position was based on parental education, occupation, and number of rooms and divided into tertiles. Low childhood socioeconomic position increased the odds of binge drinking (odds ratio = 1.70, 95% confidence interval: 1.26, 2.31) when other early life exposures were adjusted. Additional adjustment of adult socioeconomic and psychosocial factors attenuated the odds of bingeing associated with low childhood socioeconomic position (odds ratio = 1.29, 95% confidence interval: 0.93, 1.79). Adult socioeconomic conditions, marital status, hostility, and organizational membership were independently associated with bingeing. This study shows that both early and later life characteristics including socioeconomic conditions and adult psychosocial factors contribute to adult binge drinking in this population, but the effects of adult characteristics are stronger.

adult; alcohol drinking; alcoholic intoxication; child; socioeconomic factors

Abbreviations: CI, confidence interval; OR, odds ratio.

There is growing research interest in the actual pattern of drinking as distinct from the average level of alcohol consumption (1, 2). Binge drinking—a high intake of alcohol on a single occasion—is recognized as an important aspect of alcohol consumption (2, 3) that may increase the risk of cardiovascular diseases including myocardial ischemia, angina, and ischemic stroke (2). Binge drinking has also been implicated as an important mechanism in generating the Rus-

sian mortality crisis, where a large increase in deaths from cardiovascular diseases was observed after the collapse of the Soviet Union (4, 5). It is believed that arrhythmia is one of the mechanisms by which binge alcohol consumption increases cardiovascular disease deaths (4). In Finnish populations, epidemiologic studies have shown that binge drinking increases the risk of death from all causes, cardiovascular diseases, and external causes (6, 7), after adjustment

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for total alcohol consumption and other behavioral, psychosocial, and biologic risk factors (8). Binge drinking is associated with not only cardiovascular disease mortality but also nonfatal acute myocardial infarction (9) and cardiovascular disease risk factors, such as hypertension (10). At younger ages, binge drinking has also been associated with unintentional injuries, unprotected sex, drunk driving, and illicit drug use (11).

A recent US national survey showed that binge drinking episodes per capita increased by 35 percent between 1995 and 2001 (3). Moreover, even though drinkers aged 16–25 years showed the highest prevalence, binge drinking was not confined to young people, such that the prevalence of binge drinking among individuals aged 26–55 years increased by 25 percent. It is estimated that British men binge on 40 percent of drinking occasions, and its prevalence is on the rise (12). Binge alcohol consumption has been recognized as a culturally distinct feature in the drinking patterns of Finland, Russia, and other Baltic countries in the so-called “Vodka Belt” (13). Even though the per capita consumption is lower than those of other European Union countries such as France and Italy, Finnish men and women drink more than 60 percent and 40 percent of total alcohol consumed, respectively, to a stage of intoxication (14).

Despite the recognition of binge drinking as an important public health issue, there is little information on the factors associated with binge drinking. The prevalence of binge drinking is highest in adolescents and young adults and higher in men than in women (3, 15). In a nationally representative study of college students in the United States, Wechsler et al. (16) showed that, aside from being male and White, binge drinking was associated with both precollege factors, such as binge drinking history in high school and parental drinking behavior, and college life factors, such as residence in a fraternity and the perceived importance of parties. This suggests potentially important early life influences on the pattern of drinking. A recent review of European studies on binge drinking revealed that family history of problematic drinking, use of other substances, drinking as a coping strategy, and poor family relations were positively related to binge drinking among adolescents and young adults (15). It was also found that the association between socioeconomic position and binge drinking varied by age such that higher financial resources increased the binge rates among adolescents (17), whereas unemployment and low education were associated with higher bingeing in adult populations (18).

The body of evidence discussed above, however, is based mainly on adolescents and college students and provides relatively little knowledge about the life-course precursors of binge drinking in middle-aged populations. Contributions of both early and later life exposures are demonstrated in a variety of adult health outcomes (19), social inequalities in those outcomes (20), and their biologic, psychosocial, and behavioral mechanisms such as cholesterol, hypertension, obesity, smoking, and hopelessness (21–24). The aim of this study, therefore, is to investigate the effects of socioeconomic and psychosocial exposures across the life course on binge drinking in later life, in a population-based study of Finnish men.

MATERIALS AND METHODS

Study population

The study sample comprised participants in the Kuopio Ischemic Heart Disease Risk Factor Study, a population-based study of risk factors for ischemic heart disease, carotid atherosclerosis, and other related outcomes in men from eastern Finland (25). The study consists of an age-stratified random sample of men aged 42, 48, 52, or 60 years from the city of Kuopio and its six surrounding rural communities. Of 3,343 eligible men, 2,682 participated at the baseline examination between March 1984 and December 1989. The study protocol was approved by ethics review boards at the University of Kuopio and the University of Michigan. Our study utilized cross-sectional data collected at the baseline examination. Among the participants, 366 men who had abstained from drinking in the past year were excluded in this analysis. Our goal was to examine factors associated with the risk of binge drinking among those who drank some alcohol, so that to be at risk of binge drinking, an individual had to consume alcohol. Nondrinkers in the study population would be a heterogeneous group of lifetime teetotalers and former drinkers, but past drinking information is not available in our data. Previous research shows that nondrinkers have different health risk profiles, such that former drinkers have characteristics similar to those of moderate or heavy drinkers with regard to hypertension, obesity, and increased morbidity and mortality (26). However, sensitivity analysis showed that our findings remained unchanged when abstainers were included in the comparison group.

Data imputation

Analyses limited to individuals with nonmissing data assume that those individuals with complete data are a random sample of the study population, since the “missingness” occurs completely at random (27). This strong assumption is rarely valid. To overcome this, we used multiple imputation (28), which assumes that the data are missing at random rather than missing completely at random. This means that the probability of missing values depends on the observed data but not on the missing data, or alternatively that the data are missing at random conditionally on observed covariates. The multiple imputation approach involves imputing several sets of missing values that characterize the conditional relation of the imputed values to other nonmissing variables. The repeated procedures to produce multiple data sets account for the uncertainty about each imputed value that is drawn from a joint distribution of all variables. Each imputed data set is analyzed separately, and then point estimates and the covariance matrices are combined (29). Imputing missing values was conditioned on all observed variables through a sequence of multiple regressions. This approach to missing data limits nonresponse bias and gives us more efficient estimates as well as statistical power (30), though it does not completely eliminate biases. Five data sets were imputed, and standard errors for estimates were adjusted to account for the usage of five data sets. In a previous study of this population, we showed that the same conclusions were

reached using a complete case analysis and an analysis based on imputed data, but that the use of imputed data improved the precision of the estimated effects (24).

Measures of binge drinking

On the basis of usual quantity measures of beer, wine, strong wine, and spirits consumed on a single occasion, binge drinking was defined as drinking at least four bottles of beer, one bottle of wine, one bottle of strong wine, or 25 cl of spirits (six servings) on a single occasion. Our definition of binge drinking corresponds to that of the European Comparative Alcohol Study among 15 European countries including Finland (31). It should be noted that different definitions of binge drinking have been used in the literature, such that heavy drinking, drinking to intoxication, and occasional heavy intake are terms used interchangeably. More recently, a quantitative definition of binge drinking is used in the literature, but the cutoff quantity to define binge drinking also varies by countries and studies. For example, consuming five (often modified to four for women) or more drinks per occasion is defined as binge drinking in the United States (3, 32), whereas consuming eight or more drinks on a single occasion is defined as binge drinking in the United Kingdom (12). Different quantity definitions are also found in studies from a Finnish population (33). Given the lack of consensus in defining binge drinking, we adopted the definition from the European Comparative Alcohol Study, which is a comparative study on alcohol consumption and alcohol policy in European countries.

Measures of life-course exposures

Table 1 presents the life-course exposure variables and their distributions in both the imputed data and the unimputed data with the frequency missing for each exposure. It shows that the distribution of the imputed data is substantially identical to that of the original unimputed data. Early life characteristics include childhood socioeconomic position, birthplace of the mother, family structure, various life events, and educational attainment. An index was created to represent childhood socioeconomic position based on five questions: father's and mother's "longest lasting principal occupation" (unskilled manual/skilled manual/nonmanual), father's and mother's education (part of public school/primary or primary plus vocational/middle school or higher), and the number of rooms (1–2/3–4/≥5) at the age of 10 years. These five variables were summed (range: 5–15), and individuals were assigned to high, middle, or low childhood socioeconomic position by the index tertiles (34). Participants' birthplace was not measured, but the birthplace of the mother was included to represent the family's social or cultural environments and parental characteristics that may have influenced the development of drinking habits or health-related behaviors in general (35). The response options for maternal birthplace were Savo, Karelia, northwest Finland, southwest Finland, Kainuu, and elsewhere. The father's birthplace was also recorded; however, because it contained almost identical information, only the mother's birthplace was used in the analysis. A question on family

structure during childhood was divided into living with two biologic parents and other. The number of siblings was included as an additional indicator of the childhood family structure and was used as a continuous measure. Early life experiences were indicated by reports on nine events occurring by the age of 15 years, including father's or mother's death, father's being wounded in war, mother's or father's serious illness, and parental divorce. We combined them to construct four distinct, negative life events: deaths of parents or siblings, parental illness, parental divorce, and separation from parents due to war. Finally, educational attainment was measured by the years of schooling and divided into high, middle, and low according to the age cohort-specific tertile distribution. The use of cohort-specific educational distributions may help to overcome the distorting effects of the strong secular shifts in education over time (36).

Adulthood socioeconomic position was measured by three items: lifetime occupation (white collar/blue collar/farmer), current income categorized into quintiles, and the number of material possessions among 12 items (color television, video tape recorder, freezer, dish washer, car, motorcycle, telephone, summer cottage, house trailer, motor boat, sailing boat, and ski mobile). Marital status was used as a measure of adulthood family structure and categorized as being married or living as a couple, divorced or widowed, and never married. The number of organizations in which individuals participated was measured by a single open-ended question and divided into none, one, two or three, and four or more. Depressive symptoms were measured by 18 items from the Human Population Laboratory Depression Index including feeling depressed or unhappy, having a poor appetite, feeling left out, and being hard to feel close to others (37). Assigning one point for each true or false answer indicative of a "depressed" response generated scores that ranged from zero to 13. "Hopelessness" was defined as negative expectancies about oneself and the future and was measured by two items: likelihood of reaching goals and positive changes in the future (38). Cynical hostility was measured by the eight-item Cynical Distrust Scale (39). Items included questions about the trustworthiness, sympathy, honesty, and motives of others in social relationships. Responses were on a four-point Likert scale (0 = completely agree, 1 = somewhat agree, 2 = somewhat disagree, 3 = completely disagree) and were reverse scored and summed to create an index of cynical hostility. For all three measures of adult psychosocial functioning, higher scores indicate poorer psychosocial functioning.

Statistical analysis

The associations between early life and later life exposures and binge drinking were assessed using logistic regression analyses. In multivariate analyses, we started with a model that included childhood socioeconomic position and birthplace of the mother as model 1, and each exposure was added sequentially in subsequent models. Family structure, early life experiences, and education were added in model 2, model 3, and model 4, respectively. Model 5 included adulthood socioeconomic position indicators, and marital structure was added in model 6. The final model contained all

TABLE 1. Distribution of life-course exposures by imputed and unimputed data in 2,316 eastern Finnish men aged 42–60 years, 1984–1989

Characteristics	Imputed data		Unimputed data			
	No.	%	No.	%	No. missing	%
Father's education					109	4.7
Less than primary	1,289	55.6	1,231	55.7		
Primary–vocational	952	41.1	903	41.0		
Junior high school or more	75	3.2	73	3.3		
Mother's education					46	1.9
Less than primary	1,155	49.8	1,127	49.6		
Primary–vocational	1,072	46.3	1,055	46.5		
Junior high school or more	89	3.8	88	3.9		
Father's occupation					79	3.4
Unskilled manual	915	39.5	885	39.5		
Skilled manual	721	31.1	698	31.2		
White collar/professional	680	29.3	654	29.1		
Mother's occupation					21	0.9
Unskilled manual	1,323	57.1	1,310	57.0		
Skilled manual	769	33.2	762	33.2		
White collar/professional	224	9.7	223	9.7		
No. of rooms in childhood					14	0.6
1–2	1,189	51.3	1,187	51.5		
3–4	872	37.6	862	37.4		
5 or more	255	11.0	253	11.0		
Birthplace of mother					9	0.4
Savo	1,672	72.1	1,668	72.3		
Karelia	381	16.4	378	16.3		
Northwest Finland	76	3.2	76	3.2		
Southwest Finland	78	3.3	76	3.2		
Kainuu	28	1.2	28	1.2		
Elsewhere	81	3.5	81	3.5		
Family structure					9	0.4
Two biologic parents	2,156	93.0	2,154	93.3		
Other	160	7.0	153	6.5		
No. of siblings (mean, standard deviation)	3.4	2.4	3.4	3.4	9	0.4
Adverse life events						
Death in family	629	27.0	620	26.8	19	0.8
Parental illness	474	20.4	466	20.5	41	1.7
Parental divorce	46	1.7	40	1.7	10	0.4
Separation from parent because of war	830	35.8	819	35.6	13	0.5
Education, years (mean, standard deviation)	8.7	3.4	8.7	3.4	3	0.1
Occupation						
Farmer	325	14.0	323	14.1	36	1.5
Blue collar	1,029	44.4	1,006	44.1		
White collar	962	41.5	951	41.7		
Income, 1,000 Finnish markka (mean, standard deviation)	79.6	52.7	79.7	52.6	36	1.5
No. of material possessions (mean, standard deviation)	5.1	1.7	5.1	1.7	4	0.1
Marital status					4	0.1
Married/living as a couple	2,006	86.6	2,004	86.6		
Never married	140	6.1	138	6.0		
Divorced/widowed	170	7.3	170	7.3		
No. of organizational memberships					19	0.8
None	547	20.4	545	20.4		
1	688	25.6	686	25.7		
2–3	895	33.4	887	33.3		
4 or more	552	20.6	498	30.6		
Depression, score (mean, standard deviation)	1.9	2.0	1.8	2.0	31	1.3
Hopelessness, score (mean, standard deviation)	2.7	2.0	2.7	2.0	78	3.3
Cynical hostility, score (mean, standard deviation)	12.7	4.0	12.7	4.1	335	14.4

measures of early and later life exposures. All analyses controlled for age and the total amount of alcohol consumption.

RESULTS

There were 1,001 (43.2 percent) binge drinkers, including (nonexclusively) 274 men who reported bingeing on beer, 76 on wine, 97 on strong wine, and 929 on spirits. The prevalence of binge drinking was higher among younger men: 52.8 percent, 42.8 percent, 42.7 percent, and 36.8 percent at ages 42, 48, 54, and 60 years, respectively. Table 2 shows age- and total alcohol consumption-adjusted associations, estimated by odds ratios (ORs), between binge drinking and each exposure construct across the life course. There was a graded relation between early life socioeconomic position and binge drinking: Both lower childhood socioeconomic position ($OR_{mid} = 1.68$, 95 percent confidence interval (CI): 1.30, 2.18; $OR_{low} = 2.38$, 95 percent CI: 1.81, 3.13) and lower education ($OR_{mid} = 1.76$, 95 percent CI: 1.36, 2.28; $OR_{low} = 2.70$, 95 percent CI: 2.10, 3.47) were associated with the increased odds of binge drinking in adult life. Among other early life characteristics, a positive relation was found between the number of siblings and the likelihood of adult binge drinking. The birthplace of the mother was also associated with the risk of binge drinking in later life. Negative life events during childhood seemed to have no relation to the likelihood of binge drinking.

Adulthood socioeconomic position measures, income, occupation, and material possessions, were all associated with binge drinking after adjustment for age and total alcohol consumption. Men who were divorced or widowed showed increased odds of binge drinking compared with married men. Of adult psychosocial characteristics, a graded relation was found in organizational membership, which showed that greater organizational membership decreased the likelihood of binge drinking. Higher scores on depressive symptoms, hopelessness, and cynical hostility increased the likelihood of being an adult binge drinker.

Table 3 shows multivariate associations between binge drinking and life-course exposures. Model 1 revealed that lower childhood socioeconomic position ($OR_{low} = 2.23$, 95 percent CI: 1.68, 2.95; $OR_{mid} = 1.60$, 95 percent CI: 1.23, 2.08) was positively associated with the odds of binge drinking after controlling for age, total alcohol consumption, and birthplace of the mother. The increased risks of binge drinking remained unchanged when family structure and negative life events during childhood were taken into account in models 2 and 3, respectively. When all measures of early life exposures were simultaneously adjusted in model 4, the effects of childhood socioeconomic position ($OR_{low} = 1.70$, 95 percent CI: 1.26, 2.31; $OR_{mid} = 1.38$, 95 percent CI: 1.05, 1.81) were substantially attenuated with additional adjustment of education, but its contribution remained independent of other early life exposures.

Adult life exposures were added to the model containing early life factors in models 5 through 7. When adulthood socioeconomic position was additionally adjusted in model 5, the effects of low childhood socioeconomic position ($OR = 1.32$, 95 percent CI: 0.95, 1.81) and education ($OR = 1.43$,

TABLE 2. Crude associations by odds ratio* between binge drinking and each life-course exposure in 2,316 eastern Finnish men aged 42–60 years, 1984–1989

Exposures	Odds ratio	95% confidence interval
<i>Early life characteristics</i>		
Socioeconomic		
Low	2.38	1.81, 3.13
Middle	1.68	1.30, 2.18
High (referent)	1.00	
Birthplace of mother		
Savo (referent)	1.00	
Karelia	0.94	0.72, 1.23
Northwest Finland	0.58	0.33, 1.04
Southwest Finland	0.53	0.29, 0.95
Kainuu	1.29	0.54, 3.07
Elsewhere	0.48	0.36, 0.85
Family structure		
Two biologic parents (referent)	1.00	
Other	1.10	0.87, 1.41
No. of siblings	1.04	1.00, 1.08
Early life experiences		
Death in family	1.17	0.94, 1.46
Parental illness	1.14	0.89, 1.45
Parental divorce	0.46	0.20, 1.03
Separation from parent because of war	0.93	0.75, 1.14
Education (years)		
Low	2.70	2.10, 3.47
Middle	1.76	1.36, 2.28
High (referent)	1.00	
<i>Adulthood characteristics</i>		
Socioeconomic		
Occupation		
Farmer	1.79	1.34, 2.39
Blue collar	2.68	2.13, 3.37
White collar (referent)	1.00	
Income		
Quintile 1 (lowest)	4.07	2.88, 5.76
Quintile 2	4.14	2.96, 5.79
Quintile 3	2.54	1.82, 3.56
Quintile 4	2.16	1.56, 3.01
Quintile 5 (highest)	1.00	
No. of material possessions	0.79	0.75, 0.84
Marital structure		
Never married	1.37	0.90, 2.07
Divorced/widowed	1.97	1.36, 2.86
Married	1.00	
Psychosocial		
Organizational memberships		
None (referent)	1.00	
1	0.69	0.52, 0.93
2–3	0.47	0.36, 0.63
≥4	0.23	0.16, 0.32
Depression	1.05	1.01, 1.10
Hopelessness	1.14	1.08, 1.20
Cynical hostility	1.06	1.03, 1.09

* Odds ratios were additionally adjusted for age and total alcohol consumption.

95 percent CI: 1.04, 1.96) were further reduced. Blue collar occupation, low income, and fewer material possessions all contributed to the increased odds of binge drinking after controlling for early life characteristics. In model 7, life-course socioeconomic exposures, including childhood socioeconomic position, education, blue collar occupation, current income, and material possessions, increased the odds of bingeing. However, the relative effects of adulthood socioeconomic position were somewhat larger than those of early life socioeconomic position. Marital status was associated with the likelihood of binge drinking independent of life-course socioeconomic position and other adult psychosocial characteristics. Higher scores on cynical hostility also showed elevated risk, and greater participation in organizations showed strong protective effects on binge drinking independent of all life-course socioeconomic and psychosocial factors (OR = 0.68, 95 percent CI: 0.50, 0.94 and OR = 0.43, 95 percent CI: 0.29, 0.62 for 2–3 and ≥ 4 organizations, respectively).

We examined whether the associations between life-course exposures and binge drinking differed by the level of alcohol consumption by stratifying participants at the median value of total alcohol consumption. The results showed that the associations did not differ by the level of alcohol consumption. Similarly, there were no substantial differences in the associations by age in our sample.

DISCUSSION

This study showed that a variety of exposures across the life course were associated with adult binge drinking behavior. Among early life characteristics, low childhood socioeconomic position measured by parental education, occupation, and the number of rooms in the home and educational attainment all contributed to binge drinking in adulthood. Adulthood factors associated with binge drinking included lower socioeconomic position (income, occupation, and material possessions), marital status, less organizational membership, and poorer psychosocial functioning.

Results of multivariate analysis showed that there was a residual effect of childhood socioeconomic position on adult binge drinking, although the effect of childhood socioeconomic position was attenuated by adulthood socioeconomic position and psychosocial factors. It also suggested that the association of binge drinking with adulthood socioeconomic position was stronger than that with childhood socioeconomic position. The life-course socioeconomic position effects on binge drinking found in this study are consistent with those of other studies on the behavioral risk factors of cardiovascular disease where, depending on the study population, adult physical activity, diet, overweight, and smoking were influenced by both early life and adulthood socioeconomic position (21, 40, 41). More importantly, our findings revealed that adult binge drinking was a behavior that was influenced by multidimensional exposures (both socioeconomic and psychosocial factors) at different points across the life course.

Although we found increased risk of binge drinking among men with low childhood socioeconomic position,

non-white collar occupations, and low income, a somewhat different picture of associations emerged between the life-course socioeconomic conditions and total alcohol consumption. Men with a disadvantaged childhood socioeconomic position and non-white collar occupations as adults, who showed the increased risk of binge drinking, actually drank less alcohol per week compared with those who had higher childhood socioeconomic conditions and a white-collar occupation (data not shown). For example, there were 49 percent binge drinkers among men with a low childhood socioeconomic position, whereas 34 percent were binge drinkers among the high childhood socioeconomic position. However, the mean alcohol consumption was 72.7 and 77 g/week among men in the low and high childhood socioeconomic positions, respectively. This may suggest different developmental and contextual influences on binge drinking and total alcohol consumption in regard to socioeconomic conditions across the life course. The alcohol volume consumed is price sensitive (42), so it is plausible that those who are socioeconomically disadvantaged over the life course actually drink less in total but tend to binge when they do consume alcohol. Research on the Russian mortality crisis indicated that increased drinking of alcohol, home-made alcohol, and alcohol substitutes, such as medicines and ethanol-based aftershave, was one response to the severe economic stress and social instability that particularly affected poorly educated, male, manual workers (43, 44). A study in the United States also showed that the prevalence of binge drinking increased during economic downturns, while the drinking volume decreased during the same period (45).

Although parental divorce during childhood was found to be associated with problem drinking in adulthood in one study (46), we did not observe this association. Indeed, binge drinking was not associated with any of the adverse life events during childhood available in our data, although these may have been poorly measured in this study. The association remained absent when we used the number of adverse life events instead of using separate measures (data not shown). It is plausible that the adverse effect of negative life events may influence health-related outcomes in adulthood by indirect mechanisms such as economic hardship. We did not have any measures of other adverse experiences in childhood that may be important for adult health outcomes (47). We examined whether heavy drinking by the respondent's father and an atmosphere in the home during childhood characterized by parental strictness and dominance had effects on the respondent's binge drinking. However, these made no contribution to predicting the risk of binge drinking (data not shown).

There were strong protective effects of organizational participation on binge drinking in our study. In analyses not shown, we assessed whether going to religious meetings or being religious could explain the association between organizational membership and binge drinking, but this was not the case. It is possible that men participating in organizations are less likely to drink a large amount during a drinking occasion through the social control that is exercised among people participating in these organizations as shown among US college students (48). Alternatively, individuals who reported taking part in larger numbers of

TABLE 3. Multivariable associations* between binge drinking and life-course exposures in 2,316 eastern Finnish men aged 42–60 years, 1984–1989

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
<i>Early life characteristics</i>														
Socioeconomic														
Low	2.23	1.68, 2.95	2.18	1.64, 2.89	2.15	1.61, 2.86	1.70	1.26, 2.31	1.32	0.95, 1.81	1.35	0.98, 1.87	1.29	0.93, 1.79
Middle	1.60	1.23, 2.08	1.58	1.22, 2.06	1.57	1.20, 2.04	1.38	1.05, 1.81	1.18	0.88, 1.56	1.20	0.90, 1.60	1.17	0.87, 1.56
High	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Birthplace of mother														
Savo	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Karelia	0.98	0.74, 1.28	0.97	0.74, 1.27	0.97	0.74, 1.28	1.07	0.81, 1.42	1.05	0.78, 1.41	1.06	0.78, 1.42	1.04	0.77, 1.41
Northwest Finland	0.72	0.40, 1.30	0.73	0.40, 1.31	0.72	0.40, 1.30	0.87	0.48, 1.58	0.91	0.49, 1.71	0.94	0.50, 1.76	1.00	0.52, 1.90
Southwest Finland	0.62	0.34, 1.12	0.62	0.34, 1.12	0.62	0.34, 1.13	0.76	0.41, 1.39	0.86	0.46, 1.59	0.84	0.45, 1.57	0.83	0.44, 1.58
Kainuu	1.23	0.51, 2.97	1.22	0.50, 2.94	1.26	0.52, 3.03	1.38	0.56, 3.40	1.49	0.58, 3.80	1.49	0.58, 3.80	1.34	0.51, 3.47
Elsewhere	0.59	0.33, 1.06	0.60	0.33, 1.08	0.61	0.34, 1.10	0.75	0.41, 1.37	0.81	0.44, 1.49	0.81	0.44, 1.51	0.88	0.46, 1.66
Family structure														
Two biologic parents			1.00		1.00		1.00		1.00		1.00		1.00	
Other			1.08	0.84, 1.39	1.13	0.84, 1.53	1.11	0.82, 1.52	1.02	0.74, 1.41	1.02	0.74, 1.41	1.00	0.72, 1.39
No. of siblings			1.02	0.98, 1.06	1.02	0.98, 1.07	1.01	0.96, 1.05	1.00	0.96, 1.05	1.00	0.96, 1.05	1.00	0.95, 1.04
Early life experiences														
Death in family					1.02	0.78, 1.33	1.03	0.79, 1.34	1.07	0.81, 1.41	1.07	0.81, 1.42	1.08	0.81, 1.44
Parental illness					1.13	0.88, 1.45	1.14	0.88, 1.46	1.13	0.87, 1.46	1.12	0.86, 1.45	1.13	0.87, 1.48
Parental divorce					0.43	0.18, 1.04	0.46	0.18, 1.14	0.57	0.23, 1.42	0.57	0.22, 1.43	0.63	0.25, 1.61
Separation from parent because of war					0.98	0.79, 1.22	1.01	0.82, 1.26	1.09	0.87, 1.37	1.09	0.87, 1.37	1.11	0.88, 1.40
Education														
Low							2.19	1.66, 2.89	1.43	1.04, 1.96	1.44	1.05, 1.98	1.30	0.93, 1.80
Middle							1.50	1.14, 1.98	1.03	0.76, 1.40	1.02	0.75, 1.39	0.95	0.69, 1.30
High							1.00		1.00		1.00		1.00	
<i>Adulthood characteristics</i>														
Socioeconomic														
Occupation														
Farmer									0.93	0.65, 1.34	0.96	0.67, 1.38	1.01	0.69, 1.47
Blue collar									1.60	1.21, 2.11	1.59	1.20, 2.10	1.50	1.13, 2.00
White collar									1.00		1.00		1.00	
Income														
Quintile 1 (lowest)									2.30	1.50, 3.53	2.32	1.51, 3.56	2.02	1.30, 3.15
Quintile 2									2.41	1.63, 3.56	2.41	1.63, 3.57	2.12	1.42, 3.17

Quintile 3	1.58	1.08, 2.30	1.58	1.08, 2.31	1.44	0.98, 2.12
Quintile 4	1.59	1.11, 2.27	1.58	1.11, 2.25	1.47	1.02, 2.11
Quintile 5 (highest)	1.00		1.00		1.00	
No. of material possessions	0.87	0.82, 0.94	0.88	0.82, 0.95	0.90	0.84, 0.97
Marital structure						
Never married			0.79	0.48, 1.29	0.74	0.45, 1.21
Divorced/widowed			1.61	1.06, 2.46	1.50	0.97, 2.31
Married			1.00		1.00	
Psychosocial						
Organizational memberships						
None					1.00	
1					0.77	0.56, 1.06
2-3					0.68	0.50, 0.94
≥4					0.43	0.29, 0.62
Depression					1.00	0.94, 1.06
Hopelessness					0.99	0.93, 1.06
Cynical hostility					1.03	0.99, 1.06

* All odds ratios were additionally adjusted for age and total alcohol consumption.

organizations could represent a distinct subpopulation who have different overall behavioral risk profiles. In our data, men with more organizational ties were significantly more likely to take vitamins regularly; to eat more fruits and vegetables; to be nonsmokers; to have a higher level of cardiorespiratory fitness and lower levels of low density lipoproteins and total cholesterol; and to be much more likely to have a job considered to be of higher prestige in the community, such as doctor, lawyer, or business executive (data not shown). Therefore, the strong protective effect of organizational membership could partly be capturing the effects of a generally more favorable behavioral and health risk profile.

The limitations of our study include the use of recalled information on early life exposures that could be subject to bias. In a recent validation study, Batty et al. (49) found that the agreement between childhood socioeconomic position recalled in adulthood and that measured directly in childhood was moderate and that the association estimated by adult's recall on childhood socioeconomic position would underestimate the real effects of childhood socioeconomic conditions. Another limitation is related to the cross-sectional nature of our data. For example, although adult socioeconomic indicators such as lower income are associated with binge drinking in our results, we cannot rule out that binge drinking would have caused decreased income. However, the increased binge drinking was also observed among men with blue-collar occupations. Our measure of occupation was based not on current occupation but on reports of lifetime occupation. This may provide us more confidence on the direction of association between income and binge drinking in adulthood. Claussen (50) also found that unemployment caused problematic drinking patterns rather than the other way around in a Norwegian sample. It is also worth mentioning that, although we included multiple indicators to capture social and economic factors that reflect participants' multidimensional position within the social structure, it may not measure the social location, per se, which may be more relevant to the pattern of drinking. Finally, binge drinking in our study was derived from quantity measures of alcohol consumption rather than by specific questions on binge drinking behavior. Thus, our outcome may represent chronic binge (or heavy) drinking rather than episodic binge drinking. However, the estimates associated with binge drinking in our study were similar at different average levels of alcohol consumption. Consequently, our outcome would more represent whether individuals have a binge drinking pattern or not at a given volume of alcohol consumed. In addition, when we restricted our analytical sample to those who drank weekly or less often to exclude chronic binge drinkers, the results were unchanged.

This study demonstrates the complexity of understanding adult binge-drinking behavior, because it is associated with multidimensional behavioral developmental processes that operate across the entire life course. It shows that, consistent with other studies of some adult health behaviors (51) and risk factors (23) and their relation to early life characteristics, adult binge drinking may partly have its roots in early life conditions and then be reinforced by various socioeconomic and psychosocial factors in adulthood.

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