User Drinking Behaviors by Income Levels

Case of Market in Finland

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April 08, 2025

Introduction & Research Background

Data

ESS(European Social Survey) is a large-scale, general population survey based on face-to-face and conducted in many European countries every two years. Since 2001, the ESS measures people's attitudes,beliefs, and behavior patterns. The dataset I am going to analyze here is from ESS11 edition 2.0, published 21.11.24. The full dataset can be found here:https://ess.sikt.no/en/datafile/242aaa39-3bbb-40f5-98bf-bfb1ce53d8ef?tab=0 and "https://ess.sikt.no/en/datafile/242aaa39-3bbb-40f5-98bf-bfb1ce53d8ef/128?tab=0&elems=07f7e265-98eb-4ee6-b448-0e8d3b9e9bd3_6

Research question

This report presents an analysis of drinking behavior patterns in different income groups in Finland during 2023.

Alcohol plays different roles in today's life. It can be a way for fun, for socialization or business, and also work as a mirror of personal mental health, so that drinking behaviors can be very different from person to person, more than just an impact of the country drinking culture.

In this analysis, I am going to select Finland respondents data from ESS11 and research how the drinking behaviors are different from people in various income levels, including their drinking frequency, when they prefer to drink(weekend or weekday), and if gender, life satisfaction will have an impact or not.

Theory & Hypotheses

Different income level affects drinking patterns.High-income-level people usually spend time on business, tending to drive their alcohol consumption increase.

According to Bourdieu's (1984) theory of cultural distinction, social economic status shapes consumption patterns. Higher-income individuals usually engage frequently in social drinking settings, such as business events or networking gatherings. However, as for alcohol consumption, The Set Point Theory of Happiness ((Diener et al. 1999)) suggests that happiness levels remain stable despite changes in external conditions

like income.That means drinking patterns of high-income people can be different based on their sense of happiness.

As (Repke, Zervos, and O'Donovan-Bellante 2022) suggests, the quantity of alcohol consumed in all 21 European countries, men consume almost twice as many units as women, so gender also has an impact, so it further implies that under the same income level, female consumes less alcohol than male.

- **Hypothesis 1.1**:Higher income people will have higher drinking frequency, but it can be moderated by the level of happiness.
- **Hypothesis 1.2**: Alcohol consumption from females is lower than males, in the condition of same income level.

It's pointed by the Job Demand-Resource Model (Demerouti et al., 2001) that workplace demands influence stress levels and coping behaviors. High-income people may have more chances to access alcohol on weekdays at the level of financial avilablity.

- **Hypothesis 2**: High-income people are more likely to drink on weekdays, comparing with low & middle-income people.

Descriptive statistics

Variable

According to the research questions, here're some variables being selected from ESS11.

- "Alcfreq" is used to measure "how often to drink alcohol". It's an ordinal varaible ranging from 1-7. (01 Every day;02 Several times a week;03 Once a week;04 2-3 times a month;05 Once a month;06 Less than once a month;07 Never). To differentiate their alcohol comsumption frequency, this variable will be divided into 3 different levels: "High Alc"(at least once per week), "Low Alc(1-3 times per month)" and "Almost No(under"less than once a month")". From Table 1, we find 3 different drink frequency groups are distributed in a balanced way, so it has enough data for future models.
- "hinctnta" in ESS indicates "Household's total net income, all sources" and is used as the measurement of income. It has 10 deciles and the median is the fifth decile. As The 80-20 Rule, the top 20% will be catagorized into "High income". And the people who don't reach the mean value will be catagorized into "Low income", so the others will be grouped as ""Middle income".
- "happy" is "How happy are you", and is measured by 10 levels from 1("extremely unhappy")-10(extremely happy). In this analysis, I am define the people rating above and equal to 8 as "Happy" and set the dummy variable as "1", the rest of values will be "0".

Other control variables will be included are "female", "age" to see if there's any effect to influence alcohol drinking frequency.

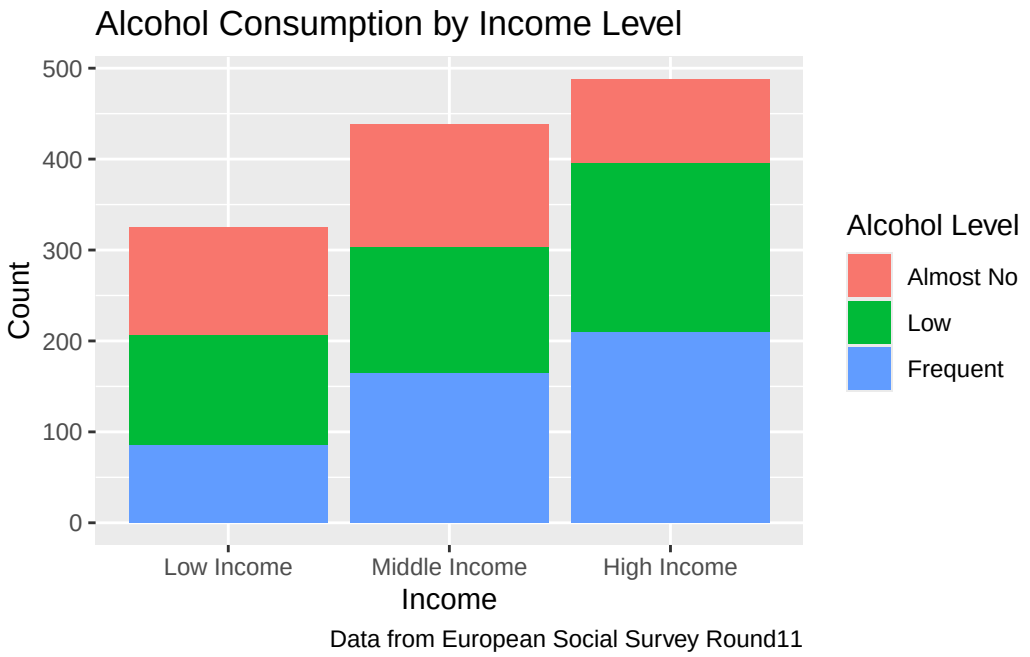


Table 1

Descriptive statistics

As seen from Table 2, the total sample size is 1251. Among 3 different drink frequency groups, 347 people almost don't like to drink frequently, 445 people drink in a low frequency, and 459 people drink oftenly. The average age of respondents are 52.3 years old and the group of frequent drinker has a bigger value of average age, 56.6. The average income from the sample is located in the 6.3.

	Alcohol level			
Variable	Almost No	Low	Frequent	Overall
N	347	445	459	1,251
Share	27.7%	35.6%	36.7%	100.0%
Female (%)	60.8%	52.6%	35.3%	48.5%
Age (Mean; SD)	51.2;(20.1)	48.8;(18.1)	56.6;(15.9)	52.3;(18.2)
Happy (%)	77.8%	76.4%	80.4%	78.3%
Income (Mean; SD)	5.6;(2.6)	6.4;(2.8)	6.8;(2.5)	6.3;(2.7)

Source: European Social Survey Round11

Table 2: Descriptive statistics for 2023 Finnish drinking patterns by income

Multinomial Logit Regression Model Results

	ModelA		ModelB	
	Low	Frequent	Low	Frequent
(Intercept)	0.83	0.72	1.78+	1.07
	[0.57, 1.22]	[0.48, 1.07]	[0.96, 3.27]	[0.54, 2.11]
	(0.16)	(0.15)	(0.55)	(0.37)
income	1.11***	1.19***	0.98	1.11+
	[1.05, 1.17]	[1.13, 1.26]	[0.88, 1.09]	[0.99, 1.24]
	(0.03)	(0.03)	(0.05)	(0.06)
female	0.73*	0.36***	0.74*	0.36***
	[0.55, 0.97]	[0.27, 0.48]	[0.55, 0.98]	[0.27, 0.49]
	(0.11)	(0.05)	(0.11)	(0.05)
happy			0.31**	0.56
			[0.15, 0.64]	[0.25, 1.25]
			(0.12)	(0.23)
income × happy			1.20**	1.11
			[1.06, 1.35]	[0.97, 1.26]
			(0.08)	(0.07)
Num.Obs.	1251		1251	
R2	0.036		0.039	
R2 Adj.	0.035		0.039	

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Odds ratios are reported with 95% confidence intervals.Data from European Social Survey Round11

Table 3

Operationalized method

Method1: Multinomial Logit Regression for H1

Hypothesis 1.1:Higher income people will have higher drinking frequency, but it can be moderated by the level of happiness.

Hypothesis 1.2: Alcohol consumption from females is lower than males, in the condition of same income level.

From hypotheses above, the analysis focus will be the relation between income level and drinking frequency, and the sense of "happy" will be interaction effect. Drinking frequency, as the outcome variable, includes 3 levels so that multinomial logit regression is chosen for modeling.

Both Model A and Model B shows "female" is less likely to drink more when comparing to "male".Female have around 27% lower odds to drink at low frequency, and 64% lower odds to drink at high frequency comparing to male. This supports H1.2.

In Model A, higher income people tend to drink. Comparing to "Almost no" drinker, "Low Alcohol" group has 11% higher odds per unit increase in income and "Frequent Alcohol" group has 19% higher odds per unit increase in income. However, when including "happy" in Model B, income will be not that significant and it is a bit significant for frequent drinkers. People who feel happy have 69% lower odds to have low-frequency of drinking , comparing to the "Almost no" drinker. A one-unit increase in income increases the odds of low-frequency drinking by 20%, while the effect on frequent drinkers is positive effect but not significant. Model B shows higher R2 and lower AIC result, so Model B fits better. Thus, H1.1 is supported partially.

Method2: Binary Logit Regression for H2

Hypothesis 2: High-income people are more likely to drink on weekdays, comparing with low & middle-income people.

Binary logit regression model will be used to see if high-income people tend to drink more on weekdays or not. "alcwkdy" in ESS refer to the gram amount of drinking last time during weekday."alcwkdy" will be the outcome varaible and set as a dummy variable, to see if specific income group of people drink or not, "0=No" and "1=Yes". To avoid the impact of alcohol drinking frequency, the interaction effect betweeen "income level" and "alcohol level" will also be included in the model.

Results in Table 3 show that female are still significantly less likely to drink on weekdays than male in any income-level groups. There's no significance to prove that income level and their weekday drinking behavior."High" income group shows a positive effect(OR:1.320) but it's not significant. However, the frequency of alcohol consumption matters. The interaction results show that alcohol consumption level significantly affects the relationship between income and weekday drinking.For example,"Low" income group with "Low" alcohol consumption have 3.392 times the odds of weekday drinking compared to the same group with "Almost No" alcohol consumption

H2 doesn't get supported, suggesting that workplace demands can't be proved to drive more drinking on weekday. Comparing with income difference, the frequency of alcohol consumption have a great impact on people who choose to drink on weekdays.

Model fit result

Comparing with Model 1 and Model 2 from H2, Model 2 has a higher Log-Likelihood value and lower AIC, so it's a better fit in Table 5.

Predictions for Model 2 in H2

Based on model fit results from Model 2, I will predict probability of weekday drinking by different income and drinking frequency groups, shown as **?@fig-1**. Female are less likely to drink alcohol than male in all income level groups. The higher drinking frequency, the higher probability to drink on weekdays.Generally "Low" and "High" income groups are more likely to drink on weekdays. In the "Almost No" and "Frequent" drinking groups, "High" income group has more possibility to drink more on weekday than the other 2 lower income groups. The "Middle" income group is at the position of the lowest probability.

Table 4: Binary Logistic Regression Results for Weekday Drinking

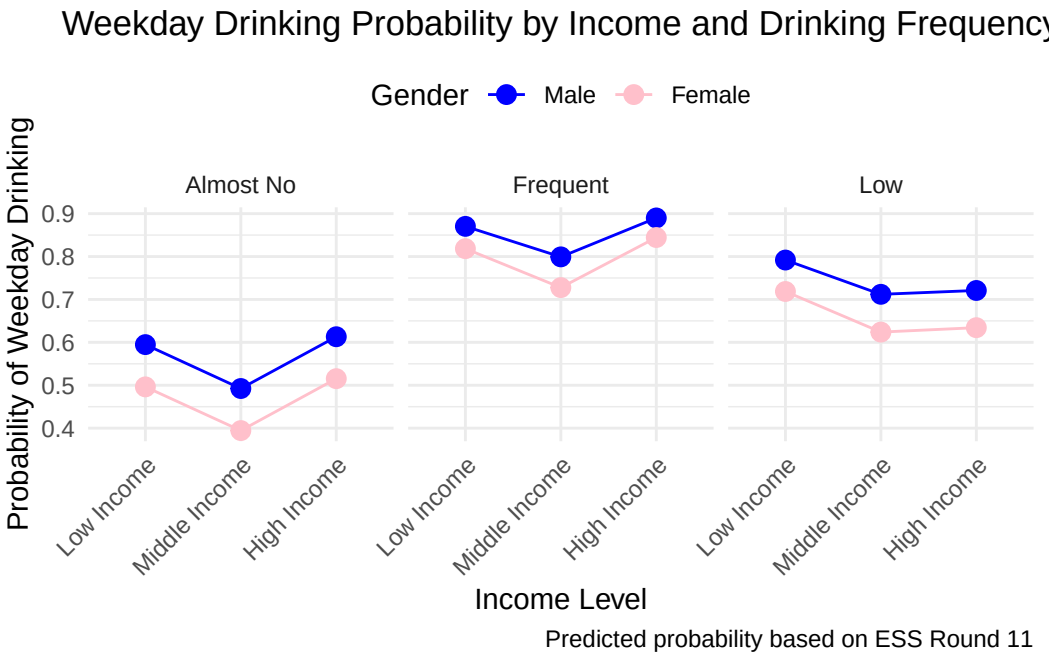
	Model 1	Model 2
Middle Income	0.719*	0.661
	(0.114)	(0.169)
High Income	1.179	1.080
	(0.190)	(0.304)
Female (ref: Male)	0.547***	0.671**
	(0.069)	(0.088)
Age	1.000	0.996
	(0.003)	(0.004)
Middle Income × Low		2.548***
		(0.642)
High Income × Low		1.630+
		(0.429)
Middle Income × Frequent		4.103***
		(1.060)
High Income × Frequent		5.100***
		(1.533)
Num.Obs.	1251	1251
AIC	1515.8	1437.8
BIC	1541.5	1494.2
Log.Lik.	−752.907	−707.892
F	8.584	11.047
RMSE	0.45	0.44

+ p \num{< 0.1}, * p \num{< 0.05}, ** p \num{< 0.01}, *** p \num{< 0.001}
Note: Estimates are odds ratios (OR).
Data from European Social Survey Round 11.

Model Fit Results for Models(H2)

Model	Log-Likelihood	AIC
Model A	-752.907	1515.815
Model B	-707.892	1437.785

Table 5



Method 3: K-means clustering to find out different groups' behavior patterns

To explore whether distinct clusters of drinking behaviors emerge among Finnish respondents, K-means clustering is applied to the ESS11 data. This method groups individuals based on similarities in income, drinking frequency (`alc_level`), gender (`female`), happiness (`happy`), and weekday drinking (`choice`). The goal is to identify natural segments that may align with or extend the findings from the regression models.

The number of clusters (k) is set to 3 to reflect the three income levels and drinking frequency categories, though this can be adjusted based on elbow method results. Variables are standardized to ensure equal weighting.

The K-means clustering graph in Table 6 reveals three distinct groups:

- **Cluster 1**: it shows high-income, frequent drinkers with higher weekday drinking probability, predominantly male.

- **Cluster 2**: it shows middle-income individuals with low drinking frequency and minimal weekday drinking.

- **Cluster 3**: it represents low-income, happier individuals with moderate drinking habits.

These clusters provide additional context to the regression findings, suggesting that income and drinking frequency interact with gender and happiness to form behavioral segments. This supports the idea that drinking in Finland may be socially driven rather than purely income-based.

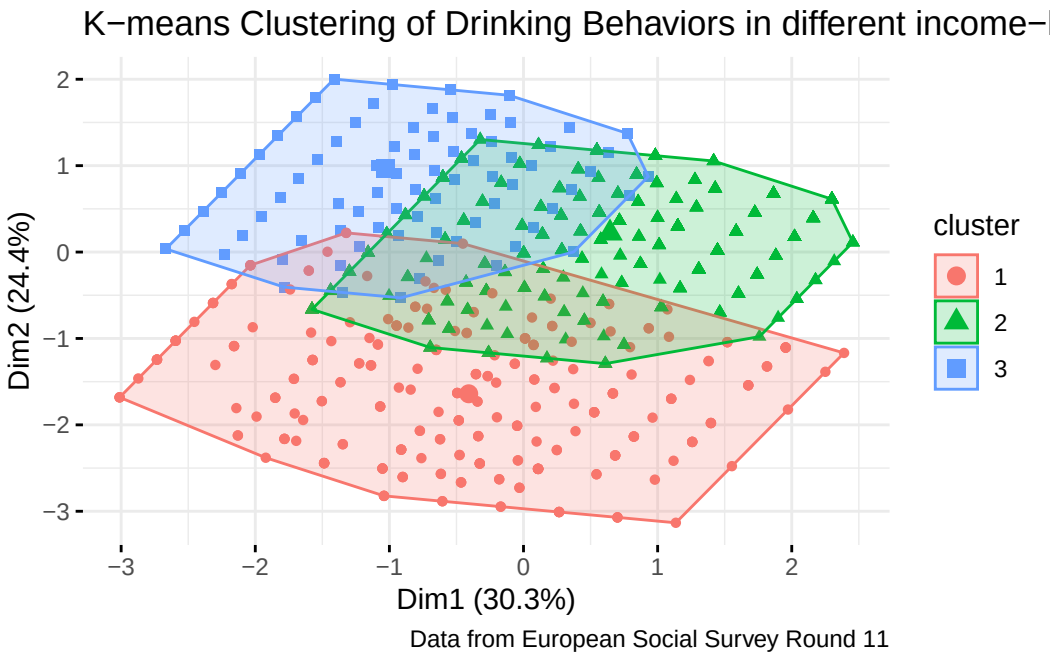


Table 6: Summary Statistics by Cluster(K-means)

Conclusion & Discussion

Hypothesis 1.1 and Hypothesis 1.2 get supported. H2 doesn't get supported, but this analysis provides valuable insights of Finnish drinking patterns for business or social alcohol management to make strategies.

Income vs Drinking frequency:Higher income drives with higher drinking frequency, but not necessarily on weekdays. And the drinking frequency can be moderated by the level of happiness feeling.

Male vs Female: As for alcohol consumption, female's consumption is lower than males in all the same income level groups and also less amount of weekday drinking.

Income vs Weekday drinking: Weekday drinking is mostly driven by frequent drinkers. Among 3 income-levels,middle-income people drink less frequently.

Business drinking vs Person drinking: Drinking in Finland may be more social and personal.

For the limitation of the analysis, the variable of "income" extracted from ESS11 is 'hinctnta', a decile-based household income measure, may differentiate individual income variations within households and lacks precision.

"alcfreq" and "happy" are also from self report, so it can be different in reality. To increase the precision, "income" variable in future research can be conducted by individual level instead of household level.

"alcqnt" only includes the amount respondents drink last time and the sampling is small. It's better to have more records of their avaerge amount drinks for weekday and weekend.

Age does not have an impact on drinking frequency or weekly drinking amount, but this can be the sample selection since the average respondents in each group are around 50 years old.

Causal effect between "Income" and "Happy" can be not clear. Higher income people can be happier because they have more resouces, so IV can be included in the next research.

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