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ORIGINAL ARTICLE

The relevance of macroeconomic conditions on concurrent and subsequent alcohol use – results from two Northern Swedish cohorts

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ABSTRACT

Background: The aim of this study is to examine the relevance of macroeconomic conditions (boom vs. recession) and own labor market status on alcohol use in youth and midlife.

Method: Two Northern Swedish cohorts, born in either 1965 (boom at age 21 years) or 1973 (recession at age 21 years), included all pupils attending the last grade of compulsory school in Luleå, in 1981 ($n = 990$) or 1989 ($n = 686$), respectively. Questionnaires were completed at ages 21 and 43/39 years. Alcohol use was measured as volume of consumption (cl/year) and heavy episodic drinking (HED).

Results: Women aged 21 years during the boom (Cohort65) consumed less alcohol and were less likely to be heavy episodic drinkers at age 21 years compared to those who were exposed to recession at the same age (Cohort73). In men there were no such cohort differences. Women, and to some extent men, in Cohort65 increased their consumption at midlife, whereas this decreased for those in Cohort73. HED decreased in both cohorts, but the decrease was steeper in the recession cohort. Analyses stratified by labor market status revealed between-cohort differences in consumption among women who were either employed or students at baseline; but not for men. Alcohol use for those unemployed did not differ between the cohorts.

Conclusions: In our study, comparing two cohorts that experienced either macroeconomic boom (1986) or recession (1994) at age 21 years in Sweden, the association between individual alcohol use and concurrent unemployment in youth was not affected by macroeconomic conditions.

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Alcohol; heavy episodic drinking; life course; recession; Sweden

Introduction

There is a broad literature on the effects of recession on health and health behaviors (Catalano et al. 2011; Karanikolos et al. 2016). Macroeconomic fluctuations are complex processes, much like their population and individual-level effects. The complexity of effects is especially evident regarding alcohol use (de Goeij et al. 2015; Dom et al. 2016), which several studies have shown to either increase or decrease during a recession (Dom et al. 2016). Increased use may be explained by an increase in the need to self-medicate stress and to cope with economic challenges during times of recession, whereas decreases have been linked to budget constraints limiting alcohol purchases (de Goeij et al. 2015). Consequently, exposure to recession may improve or exacerbate population health via changes in alcohol use, which has important consequences for public health (Hay et al. 2017).

Most evidence on the associations between poor macroeconomic conditions and alcohol use has been obtained from studies linking aggregate level unemployment with total alcohol consumption rates, suggesting consumption decreases when unemployment increases (Dom et al. 2016, Karanikolos et al. 2016). Conversely, some aggregate studies show that another indicator of drinking habits – heavy episodic drinking (HED) – increases under poor macroeconomic conditions (Mattei et al. 2017); however, aggregate studies do not take into account individual-level change in alcohol use or an individual's own labor market status. Individual-level studies have concluded that this increase in HED occurs particularly in certain subgroups (e.g. those unemployed or experiencing financial strain) (Harhay et al. 2014; de Goeij et al. 2015), suggesting that labor market status may be a mediator on a causal pathway from macroeconomic conditions to alcohol use later in life. Adding to this uncertainty are other studies that suggest HED decreases (Ásgeirsdóttir et al. 2017) or heavy drinkers consume relatively less (Ruhm and Black 2002) in times of recession. These findings highlight the importance of considering more proximal experiences in micro-level settings within the context of the more distal macro-level environment.

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Supplemental data for this article can be accessed here

Most studies have examined the direct impact of recession on alcohol use with repeated cross-sectional data, while studies examining the possible individual-level long-term changes in health and health behavior are rare (Karanikolos et al. 2016). In the few previous individual-level longitudinal studies published, the follow-up time has typically been quite short (Ásgeirsdóttir et al. 2014). Moreover, although there are alcohol studies examining age, period and cohort effects (Härkönen and Mäkelä 2011; Kraus et al. 2015), few studies focusing on recession have been able to make comparisons between different cohorts; although some repeated cross-sectional (Colell et al. 2015) and other (McCartney et al. 2016) studies have included different age groups. Drinking habits are typically adopted during adolescence and youth (before age 25) (McCambridge et al. 2011), and the peak in heavy drinking often takes place when people are in their twenties (Kuntsche et al. 2004). However, drinking habits adopted during youth can have long lasting effects on later alcohol use and health (McCambridge et al. 2011). Accordingly, the short-term and long-term associations between macroeconomic conditions and alcohol use differ by age group. The sensitive period concept from the life course perspective suggests that the drinking habits of youth may be especially susceptible to socio-historical events. It has been suggested that a higher unemployment rate at graduation is associated with poorer health later in life, including alcohol use (Cutler et al. 2015), but some studies have only found this among men (Maclean et al. 2015). A recession occurring at a sensitive period of development, such as during youth, could compromise the "natural" decrease in alcohol use toward midlife; that is, drinking habits adopted during youth could persist at an elevated level (without decrease), especially if drinking has been used as a way to cope with stress (de Goeij et al. 2015).

Increased heavy drinking during a recession may be more pronounced in men than in women (Latif 2014; Karanikolos et al. 2016; de Goeij et al. 2015, 2016, 2017), given that alcohol use is generally higher in men (Holmila and Raitasalo 2005). However, only a few studies have sex/gender differences as the main focus, despite the heterogeneity between countries in factors such as women's labor market participation and their role as a breadwinner. An individual-level longitudinal study from Iceland found heavy drinking decreased during recession for men (Olafsdottir and Ásgeirsdóttir 2015), while a Swedish study found individual-level unemployment was associated with higher alcohol use in women but not men (Hammarström et al. 2011).

In summary, the previously observed association between macroeconomic conditions and alcohol use appear to vary depending on the subgroup sampled, and the indicator studied (i.e., generally during a recession, volume or consumption levels decrease, while rates of HED increase). Therefore, it is important to employ a multidimensional measurement approach when examining associations between alcohol use and macroeconomic conditions (Bor et al. 2013; Frone 2016), and to take micro-level factors, such as labor market position, into account. Moreover, due to the commonly observed differences between men and women in both the amounts consumed and the ways of using alcohol (Erol and Karpyak 2015), it is important to separate men and women when analyzing associations between alcohol usage and macroeconomic conditions.

Bronfenbrenner's bioecological theory (Bronfenbrenner 1993) describes different contextual levels and their interplay with individual characteristics. The micro-level comprises the most proximal settings, such as family or workplace, while the macro-level is the outermost setting encompassing shared resources, hazards, opportunity structures and life course options (Bronfenbrenner 1993; Tudge et al. 2009). In this study, we focus on the interplay between the individual (measured as individual alcohol use and sex), the micro-level (measured as individual labor market status), and the macro-level (measured as national boom/recession).

Previous studies on alcohol use in different macroeconomic conditions have mostly used aggregate level data and have not been able to combine individual, contextual and life course perspectives. Drawing upon Bronfenbrenner's model as the theoretical framework, we examine alcohol use (measured as: i. volume of consumption, and ii. heavy episodic drinking) at both youth and midlife, in two cohorts that experienced different macroeconomic conditions at age 21 years. This study seeks to answer, separately for men and women: (1) are there differences in drinking behaviors, between those who were aged 21 years during the boom of the mid-1980s vs. those at the same age during the recession at the beginning of 1990s, (2) do these potential differences persist until midlife, and (3) what is the role of an individual's own labor market status in the associations between macroeconomic conditions and alcohol use. We hypothesized that: i. during times of recession, alcohol consumption at age 21 years would be relatively low, whereas HED would be relatively high, ii. at age 21 years, the association between alcohol use and macroeconomic conditions would depend on an individual's own labor market status (i.e., employed, student, unemployed, other), and iii. the level of alcohol use assumed during a recession decreases by midlife to a lesser degree than the level assumed during a boom.

Methods

Population and setting

The data comprise two cohorts from the same industrial town of Luleå in Northern Sweden. The cohorts were born in 1965 (Cohort65, boom at age 21 years) and 1973 (Cohort73, recession at age 21 years), and included all pupils attending the last grade of compulsory school (grade nine) at age 16 in 1981 ($n = 1083$) or 1989 ($n = 898$), respectively. The cohorts were investigated with a questionnaire at age 21 years and at approximately 20 years follow-up (age 43 years for Cohort65; age 39 years for Cohort73). The response rates at age 21 years were 97.9% for Cohort65 and 90.0% for Cohort73, and (of those still alive) 94.3% ($n = 1001$) and 85.6% ($n = 686$), respectively at follow-up. The study protocol has been approved by the Regional Ethics Vetting Board in Umeå. Participants were informed of the objectives of the study and participation was

voluntary. Participants were requested to indicate their consent by answering the questionnaire.

Measures

Macro-level

The macro-level economic context (boom vs. recession) was measured as the national unemployment rate at age 21 years for each of the cohorts. The mid-to-late 1980s has been described as a time of prosperity in Sweden, when the already low unemployment rate continued to decrease. In 1986 the rate was 3.4%, but due to the global recession at the beginning of the 1990s, it increased to 10.6% in 1994 (Statistics Sweden 2018b). The increase in unemployment among youth (ages 16–24 years) was even steeper, rising from 6.7% in 1986 to 22.7% in 1994 (OECD 2002). National unemployment rates were representative of those in regional areas (Statistics Sweden 2018b).

Individual-level: Alcohol consumption and heavy episodic drinking, ages 21 and 43/39 years

Respondents reported the frequency of drinking occasions (on a 5-point scale) and their average intake of beer (number of bottles), wine (number of glasses), and strong alcoholic beverages (number of drinks) on each occasion at ages 21 and 43/39 years. Alcohol consumption was measured in centiliters (cl) of absolute alcohol; the reported amount and frequencies of intake per beverage were computed to estimate average annual intake.

The heavy episodic drinking variable was constructed as a dichotomous variable (yes/no). Respondents who reported drinking on average ≥5 bottles of beer, ≥5 glasses of wine, or half a bottle (37 cl) or more of strong beverages in one occasion and drinking at least 'a couple of times monthly' were classified as heavy episodic drinkers ('HED group'). The respondents who reported drinking up to these amounts more rarely, or who reported not drinking, were classified into the 'no HED group'.

Micro-level: Labor market status, age 21 years

Labor market status was measured as current status at age 21 years and classified as i. 'employed', ii. 'student', iii. 'unemployed', or iv. 'other'. The 'other' group included mainly those who were on parental leave or in compulsory military service.

Statistical analyses

Due to previously reported sex differences in levels of alcohol use, the analyses were conducted for men and women separately and then additionally stratified by labor market status. The differences in alcohol consumption and HED were examined cross-sectionally using *t*-tests or χ^2-tests. The effects of cohort and labor market status across the two time points (ages 21 and 43/39 years) on alcohol consumption were assessed by considering interactions in repeated measures ANOVAs, while HED was assessed using likelihood ratio tests of the generalized linear mixed models. In order to reduce the effects of outliers, the *t*-tests and ANOVAs were performed with log-transformed consumption variables. The analyses were performed using IBM SPSS v25.

Results

The proportion of those employed at age 21 years was more than half in Cohort65, compared to only about a third in Cohort73, while the proportion of those classified as students, unemployed and others was higher in Cohort73.

Further descriptive statistics are displayed in Appendix Table 1, along with the cohort and sex specific levels of alcohol consumption and HED. At age 21 years, volume of consumption was higher for women in the recession cohort compared to the boom cohort ($p < 0.001$), and HED was likewise more prevalent in the recession cohort ($p = 0.007$). Conversely, for men the cohort differences were non-significant (consumption, $p = 0.539$; HED, $p = 0.283$). In the follow-up at ages 43/39 years, consumption was higher for both women and men exposed to the boom conditions at age 21 years ($p < 0.001$ for women, $p = 0.015$ for men), and they were also more often classified as heavy episodic drinkers ($p < 0.001$ for both women and men).

Figure 1 illustrates the changes in volume of consumption and HED status by cohort. In women, directions of the changes are significantly different (time*cohort interaction: for consumption $p < 0.001$ and HED $p < 0.001$). Similar patterns of change are seen in men (time*cohort interaction for consumption $p = 0.009$ and HED $p = 0.001$). All interactions remained statistically significant when labor market status was added to the models.

Consumption stratified by labor market status is shown in Table 1. In general, those who were unemployed displayed the highest volume of consumption. In women, those who were either employed or students in Cohort65 consumed significantly less than their counterparts in Cohort73 at baseline; however at follow-up the consumption patterns had reversed. Among women who were unemployed or had an 'other' labor market status, the between-cohort differences were non-significant both at baseline and at follow-up. When assessed longitudinally (Figure 2), the labor market groups do not differ significantly (cohort*status*time interaction, $p = 0.918$). In men (Table 1), the between-cohort differences in consumption were non-significant in all labor market status groups, both at baseline and at follow-up; differences between the groups regarding change in consumption were also non-significant ($p = 0.228$) (Figure 2).

Labor market status stratified analyses of HED (Table 2 and Figure 3) revealed that the between-cohort difference at age 21 years was significant ($p = 0.038$) only in the case of women who were students (more common in Cohort73). At follow-up, the only statistically significant between-cohort difference for women was observed for those with an 'other' labor market status. In men, the between-cohort differences were also non-significant at follow-up. When assessed longitudinally, HED decreased in all labor market status groups in both cohorts, except for female students in Cohort65 where

Table 1. Alcohol consumption (cl/year) by labor market status.

	Women				Men			
	Age 21 years		Age 43/39 years		Age 21 years		Age 43/39 years	
	Cohort65	Cohort73	Cohort65	Cohort73	Cohort65	Cohort73	Cohort65	Cohort73
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Employed	112 (133)	176 (239)	196 (325)	114 (142)	695 (1647)	413 (533)	530 (1101)	340 (556)
Student	100 (143)	162 (253)	186 (228)	100 (116)	376 (535)	396 (471)	382 (478)	262 (332)
Unemployed	176 (274)	345 (507)	430 (1792)	124 (150)	1721 (4362)	586 (854)	1035 (3023)	461 (1125)
Other	221 (536)	159 (202)	169 (253)	91 (132)	718 (2788)	495 (827)	605 (1994)	404 (978)

Alcohol consumption (cl/year) of women and men at age 21 years and at age 43/39 years, stratified by labor market status at age 21 years, in Cohort65 and Cohort73.

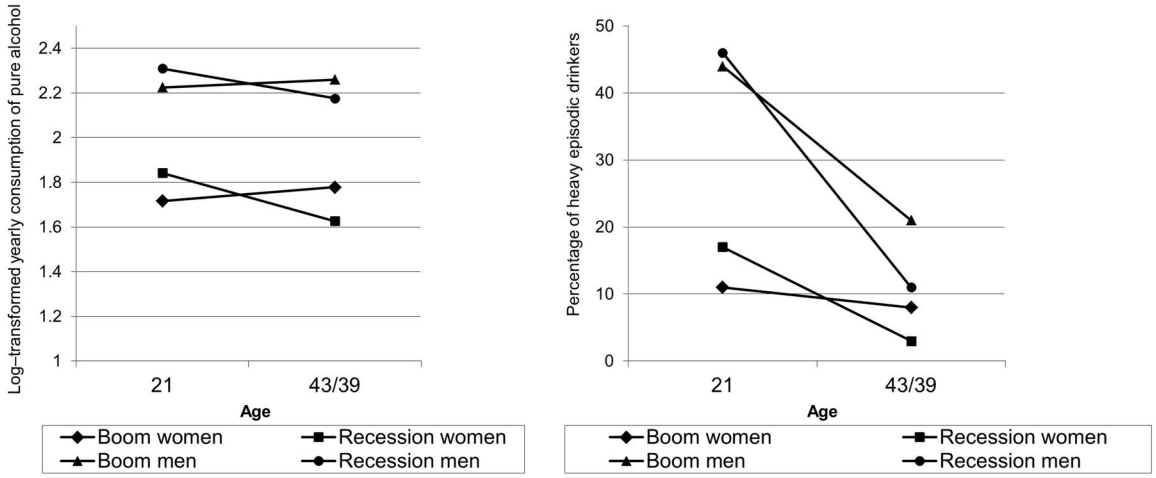

Figure 1. Alcohol consumption (log-transformed) and HED (%), in youth and midlife, stratified by sex and macroeconomic conditions.

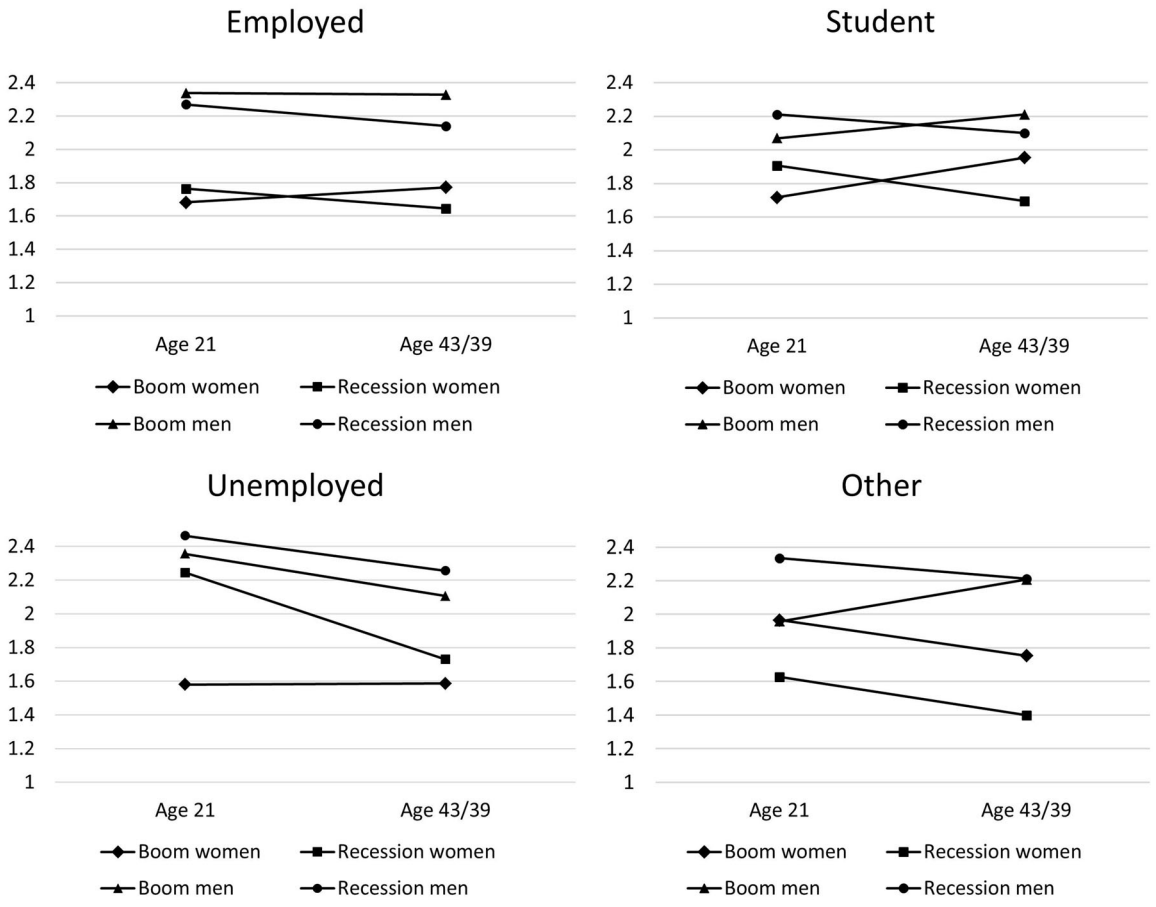

Figure 2. Alcohol consumption (log-transformed) in youth and midlife, stratified by sex, own labor market status and macroeconomic conditions.

Table 2. Prevalence of heavy episodic drinking by labor market status.

	Women				Men			
	Age 21 years		Age 43/39 years		Age 21 years		Age 43/39 years	
	Cohort65	Cohort73	Cohort65	Cohort73	Cohort65	Cohort73	Cohort65	Cohort73
	%	%	%	%	%	%	%	%
Employed	12	15	8	3	48	49	24	11
Student	5	13	5	1	37	43	10	6
Unemployed	18	29	8	10	47	49	25	15
Other	12	23	10	0	36	44	18	14

Prevalence of heavy episodic drinking for women and men at age 21 years and at age 43/39 years, stratified by labor market status at age 21 years, in Cohort65 and Cohort73.

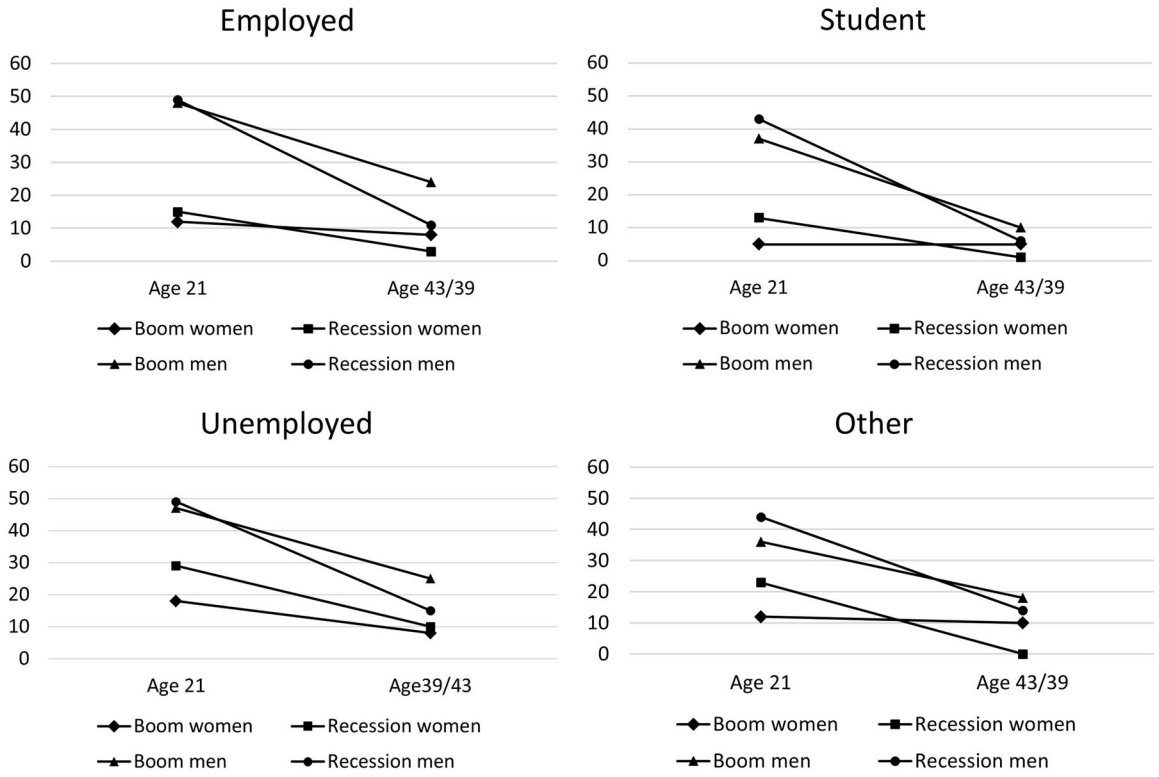

Figure 3. Heavy episodic drinking (%) in youth and midlife, stratified by sex, own labor market status and macroeconomic conditions.

it remained unchanged (low at both time points). However, the cohort*status*time interaction was not statistically significant for either women ($p = 0.153$) or men ($p = 0.083$).

Discussion

This study integrated individual, contextual, and life course perspectives to examine changes in alcohol use from youth to midlife in two cohorts that were exposed to either economic boom (1986) or recession (1994) at age 21 years in Sweden. Separating men and women, and stratifying further by individuals' labor market status (employed, student, unemployed, other) at age 21 years, the study addressed the following three topics.

Alcohol use at age 21 years during boom and recession

Based on previous studies and bioecological theory, which suggests that individual development is embedded in the surrounding environment (Bronfenbrenner 2005), we hypothesized that alcohol consumption (volume) at age 21 years would be relatively low during times of recession, whereas heavy episodic drinking would be relatively high. Contrary to our hypothesis, both of our indicators (consumption and HED) show higher alcohol use for those experiencing recession at age 21 years, compared to those who experienced economic boom at the same age, although significant between-cohort differences in consumption and HED were only observed for women. Between the years 1986 and 1994, alcohol consumption among the total Swedish population remained stable (CAN 2001), highlighting the importance of looking deeper than just the aggregate level data. Contrary to our results, a study examining the 2008 recession in Iceland found HED to be less common during recession. This difference in findings highlights the importance of taking macro-level contextual factors (e.g., country specific) into consideration. In Iceland, alcohol prices increased 49% during the 2008 recession, which is believed to have played an important role in minimizing the effect of the economic crisis on HED (Ásgeirsdóttir et al.

2014). Conversely, alcohol prices in Sweden decreased between the years 1986 and 1994, although the price change (decrease) was not as large as that (increase) in Iceland (CAN 2001).

Alcohol use at age 21 years during boom and recession by labor market status

Our second hypothesis focused on the possible interplay between the individual, and their micro- and macro-level exposures. For women, consumption and HED rates at age 21 years were higher for the students in the recession cohort compared to those in the boom cohort. However, this was not observed for men. Moreover, the difference observed for women was mainly due to significantly higher drinking among those who were employed or students in the recession cohort. Women were especially more likely to be students during the recession compared to the boom. In times of recession, studying may be an alternative when opportunities for employment are limited. In addition, younger cohorts in general tend to gain higher education more so than older ones, and this was the case in Luleå (Statistics Sweden 2018a); therefore the group with higher education in the recession cohort is not as highly selected as those in the older (economic boom) cohort. However, the same sex-based discrepancy in the differences between cohorts was also observed among those employed, suggesting that there is likely some confounding trend in alcohol use underlying these associations. Notably, alcohol use increased relatively more in women than men over the corresponding time period (CAN 2007).

Previous studies of the same cohorts have found youth unemployment to be associated with alcohol use later in life for both women (Hammarström et al. 2011) and men (Virtanen et al. 2016). In the present study, those unemployed at age 21 years typically displayed the highest level of consumption when crude figures were compared with the other labor market categories in the respective cohorts; and they were also more likely to be heavy episodic drinkers – although these differences were not always clear and differences in HED status were not observed for men. There were no significant differences in consumption or HED between the cohorts among those who were unemployed. This suggests that the association between alcohol use and concurrent own unemployment in youth is not affected by macroeconomic conditions, when the latter is measured as the national unemployment rate. This is in agreement with other Swedish studies that did not find recession to play a role in the associations between unemployment and mortality or ill health (Novo 2000, Garcy and Vågerö 2013). Still, variation in unemployment measures may explain differences between other studies. A previous study using the same data as the present study, but another measure of unemployment (long-term unemployment), found higher alcohol consumption for those who were long-term unemployed during times of boom when compared to their counterparts in times of recession (Novo 2000). During economic boom, health selection may play a more important role, as those long-term unemployed are likely to be a more homogenous and selected group than those during a recession when unemployment is more common. Labor market status may be a mediator in the association between the macroeconomic conditions and alcohol use (Supplementary File 1). However, this was not the focus of the present study, since it was not possible to distinguish between the timing of the macroeconomic conditions and individuals' labor market status, as they were both measured at age 21 years.

Changes in alcohol use from youth to midlife

Finally, by integrating contextual and life course perspectives, we sought to answer whether the differences in alcohol use at age 21 years would persist up until early midlife. This was done by testing interactions between time, and micro- and macro- levels of context. We hypothesized that the drinking pattern assumed during recession would not follow the general decreasing trend later in life as it would for those exposed to boom conditions at age 21 years. Our findings do not support this hypothesis; consumption was stable or increased in the boom cohort from youth to midlife for both men and women, whereas it decreased for those in the recession cohort. Moreover, the extent of the change in consumption (decrease) was even greater for those exposed to recession rather than boom at age 21 years. In that sense, exposure to recession at age 21 years does not seem to have a detrimental influence on later alcohol use. However, that does not mean that macroeconomic conditions are irrelevant. Those who were unemployed at age 21 years during economic boom consumed higher levels of alcohol in midlife compared to other groups within that cohort and this long-term association has also been demonstrated (in men) in previous studies with this data (Virtanen et al. 2016).

Notably, women of the boom cohort deviated from the typically found decreasing trend in alcohol use; on average their consumption increased and HED rates from youth to midlife remained constant. This increase in consumption was evident for those who were employed or students at age 21 years, while for those who were unemployed the consumption level was stable, and for those in the 'other' group consumption decreased. For women, this 'other' group included mostly those on parental leave. Similar overall increases in alcohol use from youth to midlife among female cohorts born in the 1960s have also been reported in a previous Finnish study (Härkönen 2013). Some studies have found differing associations for different alcohol use groups; typically heavy drinkers have been found to reduce their drinking while typically light drinkers tend to increase their drinking during a recession (Ruhm and Black 2002). Women of the boom cohort had the lowest overall consumption and HED levels at age 21 years and it may be that in the time between these cohorts there was a shift in women's drinking where the boom cohort increased their drinking while the recession cohort decreased. Correspondingly, a Finnish study found no cohort differences in alcohol use among men born between 1946 – 1977, while differences for

women were found between every cohort, so that for each new cohort heavy drinking was more common than for the earlier ones, with the exception of the two youngest cohorts born after 1970 (Härkönen 2013).

Previous studies have found mixed findings regarding sex differences in relation to the effects of macroeconomic changes on alcohol use. An Icelandic study found a decreasing course in alcohol use for both sexes in response to recession conditions, but women appeared to reduce their frequency of consumption and heavy drinking occasions more so than men. The same study also showed that men generally had a greater decrease in rates of HED and alcohol dependence (Olafsdottir and Ásgeirsdóttir 2015). The authors of that study concluded that changes in individual income explained most of the reduction in drinking for men, but not women. However, their focus was on short term changes, and increases in alcohol prices during the recession in Iceland may somewhat obscure comparisons with other studies. This may suggest that sex modifies the effect of macroeconomic conditions on drinking. In this study we followed Bronfenbrenner's classification of sex as an individual level characteristic. However, a broader view on gender indicating social order and contextuality is also important. For example, gender segregation in the labor market may explain why more men than women were unemployed in the recession cohort, but not in the boom cohort. Men in the Luleå region were often employed in heavy industry, which was especially hit by recession. In addition, macro-level cultural variation, for example in gender-specific roles, is associated with alcohol use.

In this study, we could not separate different macro-level phenomena such as the time trend in increasing alcohol use and the period effects of macroeconomic conditions. Regardless of the economic recession there was an increasing trend in drinking at the population-level between 1980 and 2004, although between 1986 and 1994 no large changes occurred in total consumption, which suggests that the effect of the time trend is stronger regarding the changes in alcohol use between the follow-ups than for between the cohorts at the baselines (age 21 years). Since 2004 alcohol consumption in Sweden has generally decreased at the national level (CAN 2014). Some alcohol policy changes occurred in Sweden between the 1986 and 1994 baselines (CAN 2014). Notably in 1995, when Sweden joined the European Union, several liberations were made to the alcohol control system, resulting in lower prices and increased availability of alcohol (Raninen et al. 2016).

The two cohorts of the present study were born 8 years apart, which means that the cohort that experienced economic boom at age 21 years also experienced the recession at the end of their twenties, albeit at an older age than the younger recession cohort. As such, the recession also likely had an impact on the older cohort but likely not to the same extent since it occurred at a more sensitive period of the development for the younger cohort. Furthermore, another milder recession occurred in 2008–2009; however, most of the follow-up data had already been collected for Cohort65 before the recession started, so it is unlikely to have had a significant effect on their responses. For Cohort73, follow-up was collected in 2012, some years after the 2008–2009 recession.

Methodological considerations

The main strengths of this study include the opportunity to use individual-level prospective data with very high participation rates at baseline in both cohorts. In Cohort65 the participation rate has continued to be extraordinarily high. Even though a lower response rate was achieved in Cohort73, the participation rate was still very good. A previous analysis has shown that alcohol consumption at age 21 years in the recession cohort might be underestimated due to non-response related to alcohol consumption (Novo et al. 1999). Compared with national levels of annual consumption, the level of volume reported in this study is somewhat lower, but still rather comparable in women (193 cl vs. 127 cl in 1986, 292 cl vs. 183 cl in 1994, respectively). However, contrary to the present study, for men the national survey indicated higher levels of consumption for those in their twenties in 1994 compared to those at that same age in 1986 (528 cl vs. 743 cl in 1986, 717 cl vs. 458 cl in 1994). The reason for this difference could be that in the present study those with very high volume participated in the study in 1986, whereas there has been attrition in the national survey (Lindén-Boström and Andersson 2000). Regional-level differences between our study and the national survey (e.g., rural vs. urban) may also play a role.

Another strength of the present study was the multidimensional approach to the measurement of alcohol use, which comprised: i. volume of consumption, and ii. HED. However, HED might be underestimated in this study since we did not take into account cases when HED occurs but the amounts per beverage do not exceed the defined limits. However, comparisons with other Swedish population based studies measuring HED more specifically, indicate that frequencies are rather similar using this measurement (CAN 2014).

As to the design, we point out the strengths of the longitudinal elements of the study. It represents an attempt to combine the life course approach, focusing on changes in the alcohol usage, with the macro-level context, focusing on the national economy in the spirit of Bronfenbrenner's bioecological theory. Moreover, labor market status at age 21 years may be considered as a proxy of individual level socioeconomic context across the life course, from childhood family background to adulthood occupational class. Considering this, we explored labor market status as a potential confounder of the association of interest, and also conducted sensitivity analyses stratified by labor market status. Nevertheless, there are other unmeasured confounders, in particular events during the life course from age 21 years to midlife, which we have not been able to take into account.

Conclusions

Differences in alcohol use between the cohorts that were exposed to either economic boom or recession at age 21 years varied somewhat by sex and the nature of the alcohol use indicator considered. Over an approximate 20-year follow-up period, alcohol consumption increased for women and remained stable for men in the cohort who experienced boom conditions at age 21 years, while decreasing for both men and women in the cohort that experienced recession at age 21 years. Heavy episodic drinking decreased from youth to midlife among all groups except women from the boom cohort, for whom prevalence of HED remained constant from youth to midlife. Micro-level analyses regarding changes by labor market status revealed no between-cohort differences for men, whereas differences for women were seen among those who were either employed or students at baseline. These results highlight the importance of considering the longitudinal interplay between the individual and the micro- and macro-level contexts in the prevention of detrimental alcohol use.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Data availability statement

The dataset generated during and/or analyzed during the current study are not publicly available due to legal restrictions (The Swedish Data Protection Act 1998:204) and the nature of the data (individual level data). Data are available upon request. Data is available upon request from the Principal Investigator Anne Hammarström (anne.hammarstrom@umu.se), pending ethical approval.

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Appendix Table 1

Descriptive characteristics of the cohorts.

	Cohort65 (boom at age 21 years)		Cohort73 (recession at age 21 years)	
	Women, ($n = 479$)	Men, ($n = 511$)	Women, ($n = 340$)	Men, ($n = 346$)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Consumption (cl/year), age 21	127 (229)	743 (2198)	183 (277)	458 (665)
Consumption (cl/year), age 43/39	211 (591)	569 (1514)	105 (132)	357 (665)
	% (n)	% (n)	% (n)	% (n)
Heavy episodic drinking, age 21	11 (52)	44 (228)	17 (58)	46 (160)
Heavy episodic drinking, age 43/39	8 (38)	21 (106)	3 (8)	11 (39)
Employed, age 21	63 (305)	57 (298)	35 (118)	33 (114)
Student, age 21	17 (82)	14 (74)	38 (129)	25 (88)
Unemployed, age 21	8 (40)	9 (45)	9 (31)	17 (59)
Other, age 21	11 (51)	20 (102)	18 (62)	25 (85)

Characteristics of participants in Cohort65 aged 21 years during boom, and Cohort73 aged 21 years during recession.