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Prevalence of population: An age-decomposition of binge drinking in the United States, 1991-2006

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Prevalence of population: An age-decomposition of binge drinking in the United States, 1991-2006

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Background

In the United States, problem drinking is a major concern. Excessive alcohol consumption is associated with a myriad of health risk behaviors, including sexual risk behaviors (Trocki & Leigh, 1991), serious injuries (Watt, Purdie, Roche, & McClure, 2004), and mortality (Mokdad, Marks, Stroup, & Gerberding, 2004). Hazardous drinking can also contribute to the fraying of family dynamics (Lang, Pelham, & Atkeson, 1999; Quigley & Leonard, 2000), employment problems (Sindelar, 1998), and criminal deviance (Fergusson & Horwood, 2000), making excessive alcohol use a problem that not only affects individuals, but families and the broader environment as well. Recently; a spate of studies have paradoxically suggested that the prevalence of hazardous drinking is both declining (e.g., Delnevo et al., 2007) and on the rise (e.g., Naimi et al., 2003). Additionally, several studies have pointed to the possibility of age and cohort effects related to the rates of problem drinking (Kerr et al., In press). The current study explores how the aging US population structure influences population-level estimates of hazardous drinking prevalence. Understanding the relationship between population structure and drinking rates may help clarify trends in the prevalence of problem drinking and illustrate to what extent the aging population structure contributes to such trends.

Methods

Sample. The current study utilizes data from the 2006 National Survey on Drug Use and Health (NSDUH), and its 1991 equivalent, the National Household Survey on Drug Abuse (NHSDA). Both datasets are public use files, and will be referred to as NSDUH, collectively, henceforth. NSDUH is a cross-sectional survey conducted each year by the U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. The 1991 and 2006 data were collected through a multi-stage area probability design. The 2006 surveys were administered face-to-face using computer-assisted interviewing techniques; the 1991 surveys were administered via face-to-face interviews, though questions pertaining to drug and alcohol use were self-administered to reduce response bias. Response rates for the 2006 and 1991 surveys were 74% and 84%, respectively. The final study sample includes 55,279 cases from 2006, and 32,594 cases from 1991, yielding a total unweighted study sample of 87,873 persons.

Measures. Respondents from the NSDUH studies were asked how many times in the past month they had consumed five or more drinks in a single episode. In the current study, respondents reporting one or more episodes of binge drinking within the past month were considered 'recent binge drinkers', and 'non-recent binge drinkers' otherwise. This approach included abstainers in the 'non-recent binge drinker' category. Evidence suggests that alcohol consumption patterns differ throughout the lifecourse by gender. Accordingly, age-decompositions were estimated for the entire sample as well as for men and women separately.

Data analysis. Weighted age-specific past-month binge drinking rates were estimated using Stata, v.10.1. The estimates were then combined with US age-structure data from the 1991 and 2006 NSDUH files using Microsoft Excel. Direct and indirect standardization and decomposition methods were employed to assess the impact of age structure on overall binge drinking rates (i.e., identify how much of the difference in overall binge drinking rates between 1991 and 2006 can be explained by differences in age-structure versus real changes in the prevalence of binge drinking). In direct standardization, the age-specific binge drinking rates of the 2006 sample are applied to the age-structure of the 1991 sample. Conversely, indirect standardization applies the age-specific binging rates to the 2006 age-structure. This allows comparison of the rates between 1991 and 2006 by removing compositional effects (Kitagawa 1955; Das Gupta 1978).

Results

Prevalence. Using weighted data, the comparison of overall recent binge drinking rates between 1991 and 2006 is astounding: 15.2% of respondents reported at least one drinking binge in the past 30 days in 1991 (95% CI=14.4, 15.9), compared to 22.8% in 2006 (95% CI=22.2, 23.4). Gender specific comparisons yielded the following estimates: 23.1% of men in 1991 reported recent binge drinking compared to 31.1% in 2006 (confidence intervals are non-overlapping). For women, 8% reported recent binge drinking in 1991 compared to 15.1% in 2006 (confidence intervals are non-overlapping).

When considering age-specific rates of recent binge drinking, every age group showed higher rates of binge drinking in 2006 than in 1991. Figure 1 illustrates the changing age-composition of the US population structure. Figure 2 shows the trends in age-specific binge drinking moving from 1991 to 2006.

Turning our attention to the compositional effects on binge drinking rates, we see that age-structure plays a minor role in the disparate drinking rates between 1991 and 2006. Table 1 provides the estimates from direct and indirect standardization techniques, where age-specific drinking rates from 2006 are applied to the age-structure in 1991 (direct), and where the drinking rates in 1991 are applied to the age-structure in 2006 (indirect).

Figure 1: Age composition of the US population: 1991-2006
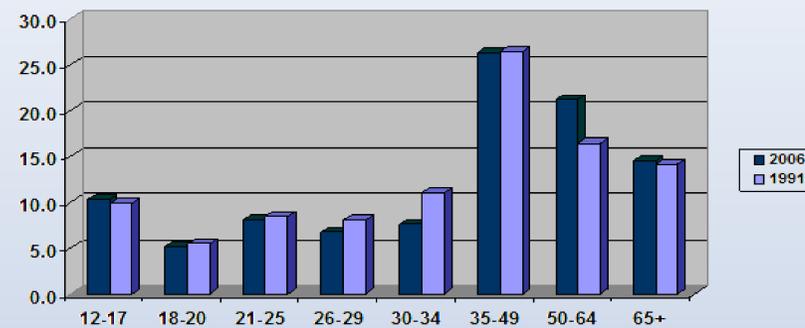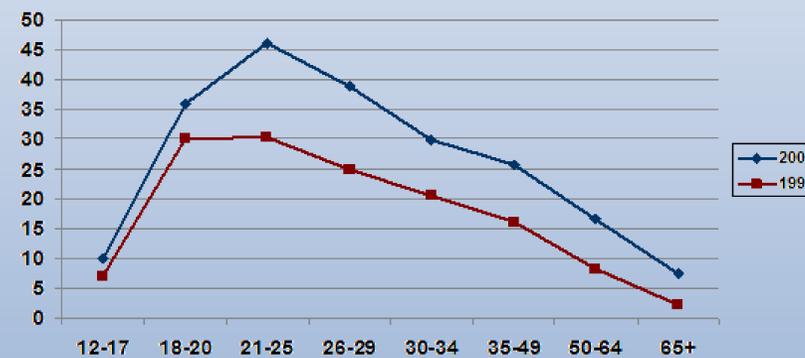

Figure 2. Age-specific recent binge-drinking rates: 1991-2006

The results suggest that, if the US had the same age-structure in 2006 as it did in 1991, the overall binge drinking rate would actually increase to 23.8 assuming the age-specific drinking rates of 2006. Conversely, if the age-structure in 1991 resembled that in 2006, the overall binge drinking rate would decrease to 14.3 (assuming age-specific drinking rates of 1991).

One last step in assessing the impact of age-structure on overall binge drinking rates is to 'decompose' age-specific drinking rates into their component parts (as a function of actual rates and population composition). Table 2 provides the results from these estimates. The findings suggest that, compared to changes in population structure, actual increases in age-specific binge drinking rates drive much of the difference between overall binge rates from 1991 to 2006. Specifically, increases in age-specific binge rates explain 113% of the difference between overall rates from 1991 and 2006, while changes in the age structure explain roughly -12% of the difference. Since the difference attributable to shifts in age structure is negative, we can take this to mean that if the population structure in 2006 was exactly like that of 1991, the overall binge drinking rate would be 12% *higher*. These findings are generally consistent with those from Table 1.

Discussion

This study had two general aims: (1) to apply demographic techniques to the study of population-level drinking trends, and (2) to identify how the changing age-structure in the United States influenced overall binge drinking rates between 1991 and 2006. Results suggest a modest impact of age-structure on overall drinking rates, where the overall binge drinking rate in 2006 would be higher if the population composition were identical to that in 1991. The results here clearly suggest that both the overall binge drinking rate and age-specific rates have increased since 1991, and especially for those aged 18-29. Similar findings have been reported elsewhere (e.g., Kerr et al.). Several possible explanations may shed light on this trend. First, increasing college attendance may contribute to increasing binge rates. The National Center for Education Statistics (2008) reports that, between 1995 and 2005, the rate of college attendance increased by 23%. Previous research has shown that college environments can facilitate risky drinking (Slutske et al., 2004; Timberlake et al., 2007). Second, increases in the production, marketing, and consequent popularity of flavored alcoholic and malt beverages (i.e., "alcopops") may contribute to higher risk-drinking rates, especially among younger populations.

Previous research has suggested that the marketing of malt beverages disproportionately targets certain demographic groups, particularly young persons and females (Mosher and Johnnson, 2005). Finally, possible cohort-effects may contribute to higher age-specific binge drinking rates, and especially among 18-29 year olds. Problem drinking rates reached their watermark in the 80s. Among those from the 2006 NSDUH data used here, exposure to the exceptional drinking rates of the 80s may yield a facilitative effect on current binge drinking.

The current study findings and inherent limitations point to several directions for future research. First, only age-structure is considered here as a potentially important compositional effect influencing binge drinking rates. Other important changes in population dynamics (e.g., delayed marriage, increased college attendance) should be considered as well. Second, while the current study clearly shows exceptionally high binge drinking among younger persons, it is not clear if this is a cohort effect, period effect, or the interaction of the two. Future studies focused on this current class of young drinkers should resolve whether these high rates continue through adulthood or decrease with age. Finally, while the current study aggregates both men and women into combined analyses, gender effects may contribute to climbing binge rates. Future studies should consider how certain social changes (e.g., increasing acceptability of drinking among women) may have influenced gender-specific changes in drinking behavior.

Table 1. Standardization of age-specific past-month binge drinking rates

Age	Age-specific rates 2006 (I)	1991 (i)	Composition 2006 (J)	1991 (j)	Difference Rate (I-i)	Age (J-j)	Standardization (I*j)	(i*J)
12-17	10.0	7.1	10.3	9.9	2.9	0.4	1.0	0.7
18-20	35.9	30.1	5.2	5.5	5.8	-0.3	2.0	1.6
21-25	46.0	30.3	8.1	8.5	15.7	-0.4	3.9	2.5
26-29	38.8	25.0	6.7	8.1	13.8	-1.4	3.1	1.7
30-34	29.9	20.5	7.6	11.0	9.4	-3.4	3.3	1.6
35-49	25.7	16.1	26.3	26.4	9.6	-0.1	6.8	4.2
50-64	16.5	8.4	21.2	16.4	8.1	4.8	2.7	1.8
65+	7.4	2.3	14.5	14.1	5.1	0.4	1.0	0.3
Total	22.8	15.2					∑=23.8	∑=14.3

Table 2. Decomposition of age-structure and age-specific binge drinking rates

Age	Average Rate ((I+i)/2)	Age ((J+j)/2)	Difference Rate (I-i)	Age (J-j)	Difference due to: Age	Rate
12-17	8.55	0.10	2.90	0.00	0.03	0.29
18-20	33.00	0.05	5.80	0.00	-0.10	0.31
21-25	38.15	0.08	15.70	0.00	-0.15	1.30
26-29	31.90	0.07	13.80	-0.01	-0.45	1.02
30-34	25.20	0.09	9.40	-0.03	-0.86	0.87
35-49	20.90	0.26	9.60	0.00	-0.02	2.53
50-64	12.45	0.19	8.10	0.05	0.60	1.52
65+	4.85	0.14	5.10	0.00	0.02	0.73
Total	19.00				-0.92	8.58

Difference in overall binge drinking rate: 7.6
Difference due to age-specific rates: 8.58 (113%)
Difference due to age-structure: -0.92 (-12%)
Percent of difference explained by both: 100%*
*Differences due to rounding

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