

Alcohol Health and Research World 16:183-190, 1992. (The published version has to be consulted for the figures and final version of the table).

EPIDEMIOLOGY OF ALCOHOL CONSUMPTION

Lorraine Midanik* and Robin Room**

*Alcohol Research Group, Medical Research Institute of San Francisco
and School of Social Welfare, University of California, Berkeley

**Addiction Research Foundation, Ontario, Canada

Acknowledgement: Preparation was in part supported by an NIAAA National Alcohol Research Center grant (AA 05595) to the Alcohol Research Group, Medical Research Institute of San Francisco, Berkeley, California.

Alcoholic beverages can be viewed from a number of perspectives. To a market economist, beer, wine, spirits and other alcoholic beverages are one more category of consumer products, one which is used more widely than caviar, say, but less widely than soap. To a cultural anthropologist, alcoholic beverages are a widely-used medium of sociability (Partanen, 1991), carrying a wild diversity of symbolic meanings -- consider, for instance, the diverse associations in our culture of "demon rum" and "champagne breakfast". From a public health perspective, alcoholic beverages are an agent of morbidity and mortality. Drinking alcohol beverages, that is, increases the drinker's risk of a variety of adverse health outcomes -- road traffic and other casualties, chronic health problems like cirrhosis and cancer, mental disabilities including alcohol addiction -- as well as social problems like failure in work, family and other roles, and harm to those around the drinker. Against this burden, there is some evidence that small amounts of alcohol may play a protective role in heart disease.

From all these perspectives, the distribution of drinking patterns in the population at large is of interest. But the different perspectives will tend to emphasize different aspects of drinking. An economic analysis may be more interested in the price of the beverage than its percentage of alcohol content. An ethnographic analysis may be more interested in the symbolism and structure of the drinking occasion than in how much is being drunk. A public health analysis is well advised to take account of these other aspects of drinking, since they put drinking in its socioeconomic context and offer important evidence on potential avenues of harm reduction. But a public health analysis will also certainly pay strong attention to how much alcohol is being consumed. For the alcohol content of the beverages tends to be the key risk factor in the various adverse consequences: as a biochemical agent in the etiology of chronic health problems, as a

psychoactive drug and intoxicant in casualties and other acute problems, and as a dependence-causing substance in addiction and other chronic problems. Our primary emphasis here is on this public health perspective on drinking patterns in the population at large.

Drinking patterns in the population are measured in two main ways: from production and distribution statistics for alcoholic beverages as market commodities, and by asking samples of the population questions about their drinking behavior.

ALCOHOL CONSUMPTION STATISTICS AND THEIR USES IN EPIDEMIOLOGY

Statistics on alcohol production and distribution, collected as a byproduct of governmental interest in taxing alcoholic beverages, are commonly viewed as indicators of alcohol consumption levels. Not quite all the beverage alcohol which is produced is actually consumed, of course. On the other hand, illicit alcohol production, home production, and tax-free personal imports will all usually escape registration in the official statistics. On balance the statistics thus usually underestimate actual consumption. In the present-day U.S., this unrecorded consumption is relatively small, probably well below 10% of the recorded consumption, but in developing countries with strong traditions of home production, or in small countries with high alcohol taxes, the unrecorded consumption is often relatively large.

In principle, alcohol consumption statistics reflect the total volume of consumption of the population located in a particular geographic area. They give no indication of how the consumption is distributed between individuals or social categories in the population. The relatively small segment of the population which drinks very heavily will greatly affect the total volume; one person drinking 10 drinks a day will contribute as much to the total volume as 70 persons having a single drink once a week. Since it is estimated that one-tenth of the adult population consumes over half the alcohol, to a considerable extent trends in total consumption in a population can be regarded as an indicator of trends in very heavy drinking.

For comparative purposes, alcohol consumption statistics are usually converted to a per-capita basis, often with infants and children excluded from the population base (conventionally in U.S. statistics, the population aged 14 and over is used). Sometimes adult abstainers, with numbers estimated from survey responses, are also excluded, yielding a per-drinker consumption level. Separate statistics by general type of beverage (beer, wine, spirits) are usually available; using estimates of percentage ethanol content these are also aggregated to statistics on consumption of absolute (100%) alcohol. Sometimes distinctions by type of container are available, implying for instance a distinction between on-premises and off-premises sales. Otherwise, the main subdivisions of consumption statistics are by geography and by time. U.S. statistics are available at least on an annual basis and state by state; in some states, particularly where the state monopolizes the wholesaling of alcoholic beverages, finer distinctions, for instance by county and month, are available.

Alcohol consumption statistics tell us something about patterns of drinking at a societal or cultural level. We can speak of "wine", "beer" and "spirits" drinking countries, for instance, on the basis of the predominant beverage. Figure 1 shows that there has been an overall tendency towards convergence and homogenization of beverage preferences in recent years in industrialized countries, though the remaining differences are still large. As the figure shows, beer has increased its dominance in the United States, although spirits drinking also remains an important

component. There is considerable variation between developed countries in the overall level of alcohol consumption; in such a chart, the United States ranks about the middle. Within the U.S., the per-capita consumption level varies by region, so that one can talk of "wetter" and "drier" regions, although these regional differences have somewhat diminished in recent years (see Figure 2).

Cross-sectional correlational analyses have often related other characteristics of regions, states, countries, etc., to levels of alcohol consumption. Such analyses have also related alcohol consumption levels to rates of social and health problems. While analyses like these can offer intriguing leads for further research, they are not very strong evidence of a causal relationship, since it is impossible to control for all the many other cultural and societal differences which could explain the patterns found. A more convincing approach is to study patterns over time in one or more societies, since much of the sociocultural variation is "controlled out" by comparing repeated observations in the same society. Using sophisticated time-series analyses, researchers have shown, for instance, that alcohol consumption levels are responsive to price in the short term even when long-term trends in consumer preference are pulling in another direction (Skog, 1986), and that rates not only of death from cirrhosis, but also of homicide and of suicide follow quite closely trends in levels of alcohol consumption, at least in some societies (see references in Norström, 1989; Skog and Elekes, 1992). Such analyses are important evidence on the causal role of drinking in many social and health problems.

MEASURING DRINKING PATTERNS IN POPULATION SURVEYS

The other main method of measuring drinking patterns in the population at large is by interviewing samples of the general population. The methods of survey research were first applied to detailed questioning about drinking in a pioneering survey of college students in 1949 (Straus and Bacon, 1953). Starting in the 1960s (Cahalan, Cisin and Crossley, 1969), nationwide surveys on drinking practices have applied full probability sampling methods, so that the results can be projected with a known level of confidence to the whole adult household population. Periodic surveys since then (e.g., Clark and Hilton, 1991) not only keep our knowledge of American drinking practices up to date but also allow us to analyze and understand trends and patterns of change in drinking.

Survey data on drinking patterns have both disadvantages and advantages in comparison to using alcohol consumption statistics. One disadvantage of surveys is that there are typically fewer data-points from them than from consumption statistics, which are updated at least annually. A more important disadvantage is that survey data underestimates the total alcohol consumption of a population, usually accounting for from one-half to two-thirds of the alcohol sold. Not only do surveys miss some heavy drinkers (for instance, those living in a hotel or shelter), but also respondents to surveys tend to give themselves the benefit of the doubt, shading their reported amount of drinking downward. A lively methodological literature seeks to improve the coverage of alcohol consumption in surveys.

The great advantage of survey data over consumption statistics is that each individual's patterns are recorded separately. An individual's drinking pattern can thus be related to other personal characteristics and behaviors. Patterns in all subgroups of the population can also be studied, while such analyses of consumption statistics are limited to geographically-defined

subgroups.

A further advantage of survey data is that it allows a detailed examination of different facets of drinking behavior. Many drinkers have a quite complex pattern of drinking. Let us consider a week's drinking by a relatively heavy-drinking respondent (less than five percent of the population reports drinking as much as this). The pattern might look like this:

- one drink after work on Monday with a work associate;
- two drinks with family dinner on Monday, Tuesday and Thursday;
- two drinks on a Saturday afternoon, relaxing in the backyard;
- four drinks out at dinner with friends on Saturday evening;
- eight drinks out at a party Friday night.

The respondent's pattern can be summarized in a number of ways. In terms of volume of drinking (the dimension tapped in aggregate statistics), the respondent drinks on the average 3 drinks a day. In terms of frequency of drinking, he or she drinks nearly every day -- 5 days out of 7. But neither of these summaries give a sense of the variability in the drinking pattern -- of the fact that the respondent drinks relatively moderate amounts on most days, but sometimes drinks much larger amounts. This aspect of drinking can be covered by a measure of dispersion, or with a summary of how often the respondent drinks more than a certain amount: for instance, this respondent probably falls into the often-used category of those drinking 5 or more drinks on an occasion at least once a week.

Which aspect of the drinking pattern is emphasized in the data collection and analysis will depend in part on the purpose of the research. As a risk factor for many long-term physical consequences of drinking -- cirrhosis of the liver, for instance -- the overall volume of drinking is probably the most important aspect. But as a risk factor for casualties or social disruptions associated with drinking, it is the "spikes" of intoxication which are most important. The greatest immediate risk associated with our sample respondent's drinking week, for instance, would probably be if he or she drove home on Friday or Saturday night. For studies attuned to such consequences, the average number of drinks per day is less important than the frequency of drinking to intoxication. Someone who drank every day one drink at lunch and two with dinner, for instance, would be at less risk of problems associated with intoxication than our sample respondent, although the overall volume of drinking would be the same.

There have been three main ways in which survey researchers have asked about drinking patterns (Clark and Hilton, 1991:26-50). One tradition, particularly common in European studies, asks respondents about the details of recent drinking occasions. This approach allows great flexibility in building summaries of drinking patterns, and lends itself also to collecting information on the context of drinking, but it requires many detailed questions and assumes that recent occasions are typical of the respondent's drinking.

The usual North American approach has been to ask the respondent to summarize his or her own drinking patterns. One version of this, the simplest, is to ask how often the respondent drinks, and how much he or she usually drinks on an occasion. Because of its brevity and its direct relation to the presumptively key dimension of volume of drinking, this has been the commonest approach in medical epidemiological studies, which typically are measuring many other factors as well as drinking in relation to some disease outcome such as breast cancer. But this approach ignores the dimension of variability in drinking, and is especially likely to result in

underestimating the amount of drinking. Consider for instance our sample respondent above, who has the quite common pattern of drinking smaller amounts more frequently than larger amounts: he or she should quite truthfully report a usual quantity of two drinks, when the actual average is three drinks a day.

The other main approach has been called a "graduated frequencies" approach, because the respondent is asked about the frequency of drinking different amounts: for instance, how often he or she has 12 or more drinks, and then 8-11, 5-7, 3-4 and 1-2 drinks. This approach yields direct estimates of the frequency of drinking above particular thresholds, as well as estimates of volume and other facets of the drinking pattern. But it does ask quite a difficult summarizing task of the respondent. While the "usual amount" approach results in lower estimates of drinking, the "recent occasions" and "graduated frequencies" approaches seem to yield quite comparable results.

It should be recognized that any single approach will do less than full justice to the complications of drinking behavior. Asking in terms of "drinks" of beer, wine and spirits, for instance, assumes an equivalence in alcohol content which is approximately true for bar drinks but often untrue for drinks poured at home. If what is really sought is an estimate of blood-alcohol levels achieved, then the time over which the drinking is done and the body weight (more exactly, the body water content) need to be taken into account. In particular, comparisons of men's and women's drinking, it has been argued (Dawson and Archer, 1992), should take account of gender differences in weight and body water content.

VARIATIONS IN DRINKING PATTERNS BY U.S. SOCIAL DIFFERENTIATIONS

From one perspective, drinking is a widely diffused behavior in American life. Two-thirds or so of all adults drink an alcoholic beverage in the course of a given year. From other perspectives, however, drinking is quite enclaved in everyday life. Most drinking is done at particular times of the week (Arfken, 1988) and in particular settings (Clark, 1985). Across the categories of major social differentiations in American life -- such as gender, age, socioeconomic status, religious affiliation, ethnicity, and region and urbanicity of residence -- there is considerable variation in the proportion of drinkers. Even more strongly, social differentiations predict who will be drinking frequently or heavily.

Table 1 illustrates this point for variations by gender, age, and two measures of socioeconomic status -- education and family income, using data from a 1984 national survey of drinking by adult Americans (Clark and Hilton, 1991). The table also illustrates that, depending on the measure of heavier drinking which is chosen, the patterns and distributions can look quite different.

The five different drinking patterns in the table, which substantially overlap each other, are chosen to illustrate different aspects of drinking which have been used in many analyses or which have been shown to be particularly related to drinking problems. The first column for each gender shows the proportion of current drinkers, that is, those who report having had a drink in the last year. The next column is a straight frequency measure: it shows those who report drinking at least once a day. While daily light drinking (the pattern of a subclass of daily drinkers) is often put forward as a culturally and even medically desirable pattern, it has been pointed out that this pattern is in fact relatively uncommon in American society (Knupfer, 1987).

The third column shows a drinking volume-based measure, roughly equivalent to the category called "heavier drinking" in analyses of surveys from the 1970s (see Clark and Hilton, 1991:129-134). The fourth column shows those reporting drinking 5 or more drinks on an occasion at least once a week, a level sometimes termed "frequent heavy drinking". Unlike the measures in the second and third column, this measure disregards the overall frequency of drinking in favor of attending to whether the respondent regularly drinks potentially intoxicating amounts. The last column sets a still higher standard in terms of quantity of drinking: drinking eight or more drinks in a day at least once a week. Knupfer (1984) has shown that this criterion of heavy drinking is particularly strongly associated with indicators both of social consequences of drinking and of symptoms of alcohol dependence.

The data in the table confirms the common finding that men are somewhat more likely to drink at all than women, but are particularly more likely to drink frequently and heavily. Dawson and Archer (1992) show that the male predominance in heavy drinking is somewhat reduced but by no means eliminated when body weight and water content are taken into account.

In both genders, drinking at all is more likely among the young and middle-aged than among those aged 60 and over. But the patterns by age vary for the other drinking measures. Frequency of drinking tends to increase with age, while amount consumed on an occasion tends to decline. The interplay of these conflicting trends can be seen in the table: all ages up to 60 report about the same rate of high-volume drinking (60 drinks/month), reflecting the trade-off with increasing age of higher frequencies for lower quantities. The two measures attuned to heavier drinking occasions show declining rates with increasing age; drinking 8 or more drinks in a day seems to be particularly a young man's game.

On both measures of socioeconomic status, education and family income, drinking at all is associated with higher status. Those with higher incomes are also likely to drink high volumes of alcohol, reflecting in part their greater ability to afford purchasing the alcohol, while high volume is not clearly associated with educational level, except that it is less common among women with less than a high-school education. For the most stringent measure of heavy drinking, drinking 8 or more drinks in a day, the relationship with educational level is reversed, at least among men, with those attending at least some college less likely to report this. The lack of clear relation among males of family income with drinking 8 or more drinks in a day at least once a week contrasts with the clear positive relation of high-volume drinking with family income. These results, along with finding that roughly equal-status occupational groups such as professionals and managers differ in their rates of heavy drinking (Cahalan, Cisin and Crossley, 1969:30), suggest the need for careful distinctions in the status measures as well as the drinking measures in describing the interplay of drinking patterns and socioeconomic status.

In general, the considerable variations in Table 1 in rates of heavy drinking by major social differentiations conform to results found in other studies. What has not been often noted, however, is the extent to which patterns of relationship can be muted and even reversed according to the measure of heavier drinking chosen. As we have noted, there has been a strong emphasis in the literature, and particularly in the medical epidemiological literature, on volume of drinking as the dimension of choice. On the other hand, it is clear both from population surveys and from other sources that it is the amount drunk on an occasion, even for relatively less frequent occasions, which is most strongly related to casualty and social consequences of drinking, and

apparently also to dependence symptomatology. Table 1 shows that for two crucial dimensions of social differentiation -- age and socioeconomic status -- measures of high volume of drinking and of heavy drinking occasions show quite different patterns. In any study involving measurements of alcohol consumption, then, it is important to think through before designing the instrument and planning the analysis which dimensions of drinking behavior are of greatest relevance and interest.

DEVELOPMENTS IN POPULATION SURVEYS OF DRINKING

By now, general population survey studies of drinking patterns have been carried out in many countries, often with a full analysis for English-language readers (e.g., Simpura, 1987; Harford and Towle, 1988). The availability of comparable data in different societies has given birth to a tradition of cross-national and cross-cultural analyses of drinking patterns (see Harford and Towle, 1988:22-24). As in the U.S., in a few other countries the lengthening tradition of general-population surveys has made it possible to analyze trends in drinking patterns, and even to undertake formal cohort analyses comparing the drinking of different age-cohorts, reaching the same life-stage at different historical moments (Neve et al., 1992).

Another approach to studying temporal changes in drinking patterns has been through longitudinal studies measuring changes in drinking over the life-course (see Temple and Leino, 1989). The accumulation of longitudinal studies of drinking in different societies has become the raw material for an ambitious meta-analytic study (Fillmore et al., 1991).

In a public health perspective, these analyses of cultural and temporal variations in drinking patterns promise to increase our knowledge of how to reduce alcohol-related problems, since cultural variations in patterns of drinking are associated with different mixtures of alcohol-related problems (Mäkelä et al., 1981:60-62), and in a given society rates of alcohol-related problems tend to rise and fall with changes in the level of consumption (Bruun et al., 1975; Room, 1992). Several other developments in survey studies of drinking also have the potential to contribute to reducing the rate of alcohol-related problems. Social psychological studies of alcohol expectancies and attributions, often using survey methodology, seek to explain drinking patterns and associated behavior in terms of the roles of perceptions and expectancies surrounding drinking (Leigh, 1989). Studies of norms and contexts of drinking (Simpura, 1991), with their focus on the circumstances of the drinking occasion, have the potential to suggest not only ways to modify the drinking but environmental approaches to limiting the harm from drinking.

A crucial area for further development is in studies of the relation of different levels and patterns of drinking to alcohol-related problems. While this area has received considerable attention in social epidemiological research (Mäkelä, 1978; Clark and Hilton, 1991:194-248), medical epidemiologists have tended to confine themselves to a single drinking measure in their prospective studies. Most often the choice has been volume of drinking, a dimension apparently easily measured, as we have noted, and with convenient statistical properties for multivariate analyses. But even for some chronic physical consequences of drinking -- FAS, for instance -- there is some evidence that the patterning of drinking, and not just the cumulative volume, may be important. As attention turns increasingly to alcohol's role in casualties and in social problems, the need for a multidimensional approach to measuring alcohol consumption, and for attention to the norms and contexts surrounding the drinking occasion, will become urgent.

References

- ARFKEN, C.L. Temporal patterns of alcohol consumption in the United States. Alcoholism: Clinical and Experimental Research 12:137-142, 1988.
- BRUUN, K., EDWARDS, G., LUMIO, M., MÄKELÄ, K., PAN, L., POPHAM, R.E., ROOM, R., SCHMIDT, W., SKOG, O.-J., SULKUNEN, P. and ÖSTERBERG, E. Alcohol Control Policies in Public Health Perspective. Helsinki: Finnish Foundation for Alcohol Studies, 1975.
- CAHALAN, D., CISIN, I. and CROSSLEY, H. American Drinking Practices: A National Study of Drinking Behavior and Attitudes. New Brunswick, NJ: Rutgers Center of Alcohol Studies, 1969.
- CAHALAN, D. and ROOM, R. Problem Drinking among American Men. New Brunswick, NJ: Rutgers Center of Alcohol Studies, 1974.
- CLARK, W.B. Alcohol use in various settings. Pp. 49-70 in: Single, E. and Storm, T., eds., Public Drinking and Public Policy. Toronto: Addiction Research Foundation, 1985.
- CLARK, W.B. and HILTON, M.E., eds. Alcohol in America: Drinking Practices and Problems. Albany: State University of New York Press, 1991.
- DAWSON, D.A. and ARCHER, L. Gender differences in alcohol consumption: effects of measurement. British Journal of Addiction 87:119-123, 1992.
- FILLMORE, K.M., HARTKA, E., JOHNSTONE, B.M., LEINO, E.V., MOTOYOSHI, M. and TEMPLE, M.T. Preliminary results from a meta-analysis of drinking behavior in multiple longitudinal studies. British Journal of Addiction 86:1203-1210, 1991 (see also related articles on pp. 1211-1298).
- HARFORD, T. and TOWLE, L., eds. Cultural Influences and Drinking Patterns: A Focus on Hispanic and Japanese Populations. NIAAA Research Monograph No. 19. Washington, DC: USGPO, 1988.
- HORGAN, M.M., SPARROW, M.D. and BRAZEAU, R. International Survey: Alcoholic Beverage Taxation and Control Policies, 6th ed. Ottawa: Brewers Association of Canada, 1986.
- KNUPFER, G. The risks of drunkenness (*or, ebrietas resurrecta*): a comparison of frequent intoxication indices and of population subgroups as to problem risks, British Journal of Addiction 79:185-196, 1984.
- KNUPFER, G. Drinking for health: the daily light drinker fiction. British Journal of Addiction 82:547-555, 1987.
- LEIGH, B.C. In search of the seven dwarves: issues of measurement and meaning in alcohol expectancy research. Psychological Bulletin 105:361-373, 1989.
- MÄKELÄ, K. Level of consumption and social consequences of drinking. Pp. 303-348 in: Israel, Y., Glaser, F., Popham, R., Schmidt, W., Kalant, H. and Smart, R., eds. Research Advances in Alcohol and Drug Problems, vol. 4. New York: Plenum Press, 1978.
- MÄKELÄ, K., ROOM, R., SINGLE, E., SULKUNEN, E. and WALSH, B., with 13 others, Alcohol, Society, and the State: 1. A Comparative Study of Alcohol Control. Toronto:

- Addiction Research Foundation, 1981.
- NEVE, R.J.M., DIEDERIKS, J.P.M., KNIBBE, R.A. and DROP, M.J. Developments in drinking behavior in the Netherlands from 1958 to 1989, a cohort analysis. Presented at the 18th Annual Alcohol Epidemiology Symposium, Kettil Bruun Society for Social and Epidemiological Research on Alcohol, Toronto, June 1-5, 1992.
- NORSTRÖM, T. The use of aggregate data in alcohol epidemiology. British Journal of Addiction 84:969-977, 1989.
- PARTANEN, J. Sociability and Intoxication: Alcohol and Drinking in Kenya, Africa, and the Modern World. Helsinki: Finnish Foundation for Alcohol Studies, 1991.
- ROOM, R. Region and urbanization as factors in drinking practices and problems. Pp. 555-604 in: Kissin, B., and Begleiter, H., eds. The Pathogenesis of Alcoholism: Psychological Factors (The Biology of Alcoholism, vol. 6). New York: Plenum Press, 1983.
- ROOM, R. The impossible dream?-- routes to reducing alcohol problems in a temperance culture. Journal of Substance Abuse 4:91-106, 1992.
- SIMPURA, J., ed. Finnish Drinking Habits: Results from Interview Surveys Held in 1968, 1976 and 1984. Helsinki: Finnish Foundation for Alcohol Studies, 1987.
- SIMPURA, J. Studying norms and contexts of drinking. Contemporary Drug Problems 18:477-498, 1991.
- SKOG, O.-J. An analysis of divergent trends in alcohol consumption and economic development. Journal of Studies on Alcohol 47:19-25, 1986.
- SKOG, O.-J. and ELEKES, Z. Alcohol and the 1950-90 Hungarian suicide trend -- is there a causal connection? Presented at the 18th Annual Alcohol Epidemiology Symposium, Kettil Bruun Society for Social and Epidemiological Research on Alcohol, Toronto, June 1-5, 1992.
- STRAUS, R. and BACON, S. Drinking in College. New Haven: Yale University Press, 1953.
- TEMPLE, M.T. and LEINO, E.V. Long-term outcomes of drinking: a 20-year longitudinal study of men. British Journal of Addiction 84:889-899, 1989.
- WILLIAMS, G.D., STIMSON, F.S., BROOKS, S.D. and NOBLE, J. Apparent Per Capita Alcohol Consumption: National, State and Regional Trends: 1977-1988. Surveillance Report # 16, Alcohol Epidemiology Data System. Washington: National Institute on Alcohol Abuse and Alcoholism, February 1991.

[legend for Figure 1:] National beverage preferences for beer, wine and spirits, and trends in preference 1964-1984

Each country is located in the triangle in terms of the proportions of total alcohol consumption accounted for by beer, by wine and by spirits. A country which drank all its alcohol as beer would be at the apex of the triangle, while one which split its consumption equally between beer, wine and spirits would be at the asterisk at the triangle's center. Thus a "beer" culture like Denmark is in the upper part of the triangle, a "spirits" culture like Poland in the lower right, and a "wine" culture like Italy in the lower left.

The tail of each arrow represents the mixture of beverages in a country's drinking pattern in 1964, while the head is the mixture in 1984. (Note that this figure says nothing about whether the overall level of consumption has gone up or down.) In general, there is a tendency towards more homogeneous drinking patterns in recent decades, as populations in different countries develop a taste for other people's favorite beverages, often as a symbol of cosmopolitan aspirations.

This type of figure was first developed by Pekka Sulkunen (Bruun et al., 1975). The present figure is from Horgan et al. (1986).

[legend for Figure 2:] Per-capita consumption (based on population aged 14 and over), nine census regions of the conterminous U.S., in 1940, 1964, 1979 and 1988.

In 1940, there was a sharp division within the U.S. between "wetter" regions (the three in the Northeast, and the Pacific region) and the "dryer" regions of the southern and plains areas. This split corresponded to sentiment against repealing prohibition in 1932, which continued to be reflected in population surveys in the 1960s in more negative opinions on alcohol and in higher proportions of abstainers in "dryer" regions (Cahalan and Room, 1974:79-80).

The figure shows that in all U.S. regions, no matter whether "wetter" or "dryer", the trends in per-capita consumption in recent decades were broadly the same: consumption went up between 1940 and about 1980, and then declined in the 1980s.

Over the course of five decades, there was some convergence between the regions in consumption levels. The New England and Pacific regions stayed consistently at the "wetter" end, while the two South Central and the West North Central regions stayed at the "dryer" end. By the late 1980s, the Mountain region had moved to the wetter end of the spectrum, while the remaining regions were bunched in the middle.

Population survey data suggests that the proportion of abstainers did not change much in the period since the late 1940s. Most of the long increase in consumption, and the more recent decrease, thus reflects changes in how much drinkers were consuming (see Room, 1983; Clark and Hilton, 1991:262).

The data for 1940 (based on the population 15+), 1964 and 1979 are from Room (1983); the data for 1988 is recalculated from Williams et al. (1991:20-21). Alaska and Hawaii are excluded from the Pacific region.

[legend for Table 1:] Percentages reporting five patterns of drinking by gender, age, educational level, and family income, U.S. general adult population, 1984.

The 1984 sample included a large oversampling of Black and Hispanic respondents. The percentages are based on weighted data, making the sample representative of the adult household population of the 48 conterminous states of the U.S. Ns shown are unweighted, including the large oversampling of Black and Hispanic respondents. Note that there is considerable overlap among the five measures of drinking used in the table. Data in the table is drawn from Clark and Hilton (1991:75, 77-81).

Table 1. Percentages reporting five patterns of drinking by gender, age, educational level, and family income, U.S. general adult population, 1984.

	MALE							
	Drinks at all	Daily drinker	60+ drinks/month	5+ per occasion weekly +	8+ per day weekly +	(N)	Drinks at all	Daily drinker
Total	76	12	21	24	8	(2093)	64	4
Age								
18 - 29	82	9	24	33	13	(621)	74	2
30 - 39	87	11	22	26	8	(511)	69	5
40 - 49	78	12	25	26	6	(305)	62	5
50 - 59	71	16	22	20	4	(235)	62	3
60 and over	58	14	14	8	2	(413)	49	5
Education								
less than high school	63	14	19	20	7	(802)	45	3
high school graduate	78	10	24	26	11	(625)	67	4
some college	77	8	19	24	5	(374)	70	4
completed college +	88	16	22	23	4	(286)	79	4
Family Income								
up to \$10,000	67	13	18	20	8	(702)	49	3
\$10,001 - \$20,000	69	11	19	19	7	(563)	65	4
\$20,001 - \$30,000	77	7	17	20	8	(321)	72	3
\$30,001 - \$40,000	82	9	27	29	7	(210)	68	5
\$40,001 and over	91	16	32	35	8	(173)	81	5

* less than 0.5%.

