MEASUREMENT AND DISTRIBUTION OF DRINKING PATTERNS AND PROBLEMS IN GENERAL POPULATIONS

by

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Pp. 61-87 in: G. Edwards, M.M. Gross, M. Keller, J. Moser and R. Room, eds., *Alcohol-Related Disabilities*. Offset Publication No. 32. Geneva: World Health Organization, 1977.

1. Categorizations of drinking patterns

Although earlier antecedents can be found, survey research on drinking patterns and problems is primarily a phenomenon of the last 30 years. In a relatively short period of time, surveys have become an important element in our understanding of drinking practices and problems in the general population. By now, results are available from studies on drinking practices on a more or less detailed basis in a majority of European countries, in North America, in several locations in South America, and in a few places in Africa, Asia, and Australia. In some countries, primarily in North America and Scandinavia, several surveys stretching over a period of years have been conducted; their findings permit some analysis of shifts in drinking patterns with time. Surveys of problems related to drinking have not been so common, but by now the data derived therefrom are also available for a number of countries.

Most drinking surveys have been primarily descriptive; a typical survey will describe the distribution of the population on a summary indicator of patterns of drinking, and variations between subgroups of the population defined by such demographic differentiations as sex, age, social class, and ethnoreligious groups. Often, the survey report will include an analysis of variation by pattern of drinking in relation to the locale and company in which the drinking was done, the reasons respondents give for their drinking, and attitudes towards drinking. This table of contents of a typical drinking survey report results partly from general conventions about the survey research report and partly from the particular traditions of studies on drinking practices. In general, the result has been, as Bacon (1969) puts it, what "could be called a demographic analysis of beverage alcohol users /which/ only considers the sociocultural settings in broad, almost abstract categories", and not the "styles, procedures and qualities" of customary drinking behaviours (pp. xx, xxiii). As Bacon also notes, the surveys have usually attempted, of course without complete success, to operate totally inductively, without reference to the very strong assumptions that characterize most thought on drinking patterns and problems; "/the survey data/ are not theoretical or policy statements; they are potentially useful statements of fact expressed in sophisticated and verifiable fashion" (p. xxii).

1.1 Diversity of categorizations

A large number of categorizations of drinking behaviour have been used in surveys. This diversity reflects a number of factors. In the first place, the behaviour which the categories seek to summarize is very complex and diverse, encompassing the consumption of a wide range of alcoholic beverages of varying strength in various quantities and under a variety of conditions. Most studies have focused on a summary of the drinking patterns of the individual in current time. However, in household-budget studies usually and market-research studies often, the household is used as the unit of analysis in investigations of consumption; and a study of drinking practices among Africans in Rhodesia found that (as perhaps in the case of sociable marijuana use in the United States of America) the amount of drinking could only reliably be estimated for a drinking group as a whole (Wolcott, 1974). Observational studies of drinking in bars have sometimes had as their implicit unit of analysis the "person-occasion" rather than the person as a continuing entity (see Room & Roizen, 1973, pp. 27-30). The time period covered by "current" has ranged from one day (Sadoun et al., 1965) to three years (Cahalan & Room, 1974); a few studies have also measured "ever" and "past" patterns; and longitudinal studies, of course, provide data on drinking patterns for the same individual in more than one specific period of time.

1.2 Eliciting information on and measuring drinking behaviour

In the second place, the diversity of categorizations reflects differences in the means of eliciting information on or measuring drinking behaviour. There have been two major methods of eliciting information: by obtaining information on specific drinking occasions, sometimes by observation or by the use of diaries, but usually by retrospective recall of occasions; and by asking respondents to give summary judgements of their drinking patterns. There have been limited methodological studies of the differences in results with the different methods (see references cited in Room & Roizen, 1973); though each method has its virtues, it appears that the summary-judgement method tends to yield a higher estimate of drinking. Within each of

these major methods, there have been differences in methods of asking questions and recording and summarizing answers which often result in incompatible characterizations. Genevieve Knupfer has remarked on the timidity which often characterized early attempts to measure drinking patterns and the resulting failure to ask about sufficiently large amounts of drinking.

1.3 Purposes of characterization of drinking behaviour

In the third place, the diversity of characterizations reflects the different purposes for which the characterizations have been used. Thus studies done by temperance-oriented insurance companies have tended to concentrate on the dichotomy between drinking and abstention, both in the insurance company mortality studies of the last century and in the recent surveys commissioned by the Ansvar group of insurance companies (Lindgren, 1973). Proponents of the "single-distribution" theory have also shown an interest primarily in survey data on the proportion of abstainers (De Lint & Schmidt, 1971), since the theory in question requires only these survey data in combination with social statistics data on per capita consumption to predict the distribution of consumption in a population. Many surveys of drinking practices have been concerned primarily with a descriptive partitioning of the population into usefully sized drinking groups, and studies with this aim have often used quite complicated and inclusive definitions of "heavy drinking", in a compromise between face validity and adequate numbers for useful analysis. Studies associated with the alcoholic beverage industries and those carried out in environments where heavy drinking is customary, such as in France, have tended to use an overall measure of volume of drinking in a given period or time - say a day or a month - since this measure is most directly related to total consumption. Volume measures have also been popular with epidemiological health studies, perhaps partly because of the ease of manipulation of such a single continuous variable in multivariate statistical analysis. Noting that intoxication and the attendant risks result from the clustering of drinks on drinking occasions rather than from the overall volume of drinking, many studies have distinguished a dimension of at least occasional heavy drinking (Straus & Bacon, 1953; Knupfer, 1966; Cahalan & Cisin, 1968). A concentration on heavy drinking or intoxication both as a phenomenon of interest in its own right and as an indicator of potential drinking-related problems has led several research workers to use measures of the frequency of drinking occasions on which a specified number of drinks was consumed or a specified blood-alcohol level attained (Room, 1972; Bruun, 1969).

The particular characteristics of drinking in the population under study have also undoubtedly influenced the categorizations chosen. And lastly, as Brun-Gulbrandsen (1973) has remarked, some of the variation in categorizations also probably results from the pressures on investigators to show originality in their work.

1.4 Distinction between abstention and drinking

The most widely used and available categorization of drinking behaviour is, of course, the distinction between abstention and drinking. Information on the proportion of drinkers among adults in the USA, for instance, is available from more than a dozen Gallup polls dating back to 1945 (Cahalan et al., 1969, p. 20), and these data have been reanalysed in terms of trends and cohort patterns (Glenn & Zody, 1970). Even this apparently simple distinction between drinking and abstaining, however, harbours some complexities of measurement (Knupfer & Room, 1970, pp. 110-112). Several studies have shown that there is a difference for many respondents between characterizing oneself as a "drinker" or "abstainer" and stating whether one has had a drink in a given period (Lindgren, 1973; Roizen, 1974); cross-national comparisons suggest that in environments where drinking is traditionally light, some respondents will characterize themselves as "abstainers" even though they sometimes take a drink, while in places where drinking is heavier, some will not call themselves "abstainers" even if they have not had a drink in the last year (Lindgren, 1973; Nelker, 1973).

1.5 Measurement of time period of drinking

There has been considerable variation in the time period used to define respondents as drinkers or abstainers. In many studies, the operative questions are simply asked in the present tense, so that the time period covered varies according to the respondent's definition of the present tense, and occasionally one will come across a respondent who is an "abstainer" because he gave up drinking the day before. Sadoun et al. (1965) defined nondrinking in their study of France by patterns for a single day, while general-population studies in the USA have varied the time frame from one month (Knupfer & Room, 1970) to three years (Cahalan & Room, 1974), according to the logic of the analysis.

In general, in designing measures of drinking versus abstention, it is worth keeping in mind whether it is a self-characterization or a description of behaviour which is sought, and the time period which is to be used to define "drinking". The questions should also make it clear that drinking rather than drunkenness is the referent (to call someone a "drinker" in popular parlance is ambiguous) and that wine and beer as well as distilled spirits are covered by the inquiry (Haberman, 1970).

1.6 Measurement of drinking frequency

Probably the next most widely available categorization of drinking patterns is frequency of drinking occasions. While there is variation between studies in the response categories available, and some measurements of frequency have been in terms of time between drinking occasions, most studies are keyed to the basic Western calendar units, so that comparisons in terms of at least yearly, at least monthly, at least weekly, and daily drinking are possible. A number of studies have collected data on frequency for each of three classes of beverages (beer, wine, and spirits); in a few of these studies, an overall frequency is available only approximately by aggregation from the three classes. While frequency is in general positively associated with volume of drinking and with quantity drunk on occasion, the relationship with quantity among drinkers is not strong in many populations, so that frequency is not an adequate measure of "heavy drinking" as it is usually conceptualized. However, frequency of drinking is an indicator of whether drinking is a part of a person's everyday life, or a regularly recurring activity, or a special or infrequent event. In studies of the contexts of drinking, which tend to focus on the regular occurrence of social gatherings as part of the person's drinking milieux, measures of frequency of drinking are especially appropriate (Roizen, 1972).

Frequency has usually been measured in terms of the average or general pattern for the respondent, and, except for some limited attention in Finnish studies (Ekholm, 1968; Mäkelä, 1971b), the respondent's variability in frequency has not been studied. For drinkers who drink in a spree pattern - i.e., periods of frequent drinking at infrequent intervals, a question on average frequency is bound to elicit a misleading response.

Measures of frequency of drinking depend upon the respondent's own definition of what constitutes a drinking "occasion", and this is likely to result in uncertainties, particularly for respondents who drink every day. Does an aperitif before dinner, wine with dinner, and brandy after dinner count as one or three occasions per day? We may expect that for most respondents, separate occasions are separated by time and often by space, but some variation on this issue is undoubtedly built into conventional measures of frequency.

1.7 Measurement of quantity of drinking

There has been a wide variation in measures of what is often called the "quantity" dimension of drinking, reflecting the complexity inherent in the dimension. A difficulty shared by all methods - short of taking a reading of the respondent's blood-alcohol level - is the necessity of asking respondents about the form in which the beverages were consumed, when some investigators explicitly, and all apparently implicitly, conceptualize quantity in terms of the absolute alcohol consumed. In many studies, the unit of measurement has been the "drink" or "glass". There is some justification in adopting this approach: a "drink" in the USA might be thought of in terms of 53 ml of spirits, or 140 ml of table wine, or 420 ml of beer, which all have about the same alcoholic content. (This rough equivalence of doses is in itself interesting; Gilbert of the Addiction Research Foundation of Ontario has remarked that

the normal single dose of socially accepted psychoactive drinks appears to be about half the average daily quantity for regular users.) But clearly there is much variation from these standards; a bar drink of spirits is likely to contain 35 ml while a drink poured at home may contain 140 ml. Alcohol consumed as beer is particularly likely to be overcounted by the assumption of the equivalence of drinks, since many drinks of beer are in the range of 210-280 ml and relatively fewer at the 560 ml level. Some studies (Straus & Bacon, 1953; Mulford & Miller, 1960a) have asked instead about "bottles" of beer; but this solution no longer helps in the USA with the proliferation in recent years of different sizes of bottles and cans.

In more recent studies, within the limits of maintaining comparability with earlier studies, questionnaires used by the California Social Research Group have shifted to more exact enumerations of equivalency at given levels of alcohol intake. These enumerations have included specifications of "bottles", "pints", etc., since heavy drinkers often think more in these terms than in "drinks" (Bailey et al., 1966). Studies which collect data on particular drinking occasions can, of course, collect the information in whichever terms the respondent offers it.

The amount drunk on an occasion gives a good general picture of the degree of intoxication on that occasion, but a more exact calculation of the blood-alcohol level attained requires knowledge also of other factors - at the least, of the time during which the drinking was done and of the respondent's bodyweight. Relatively few surveys have analysed their data in these terms (Bruun, 1969; Mäkelä, 1971b), although categorizations of drinking have been proposed that would require such data (Ewing, 1970).

One commonly used measure of quantity of drinking, particularly in earlier surveys and in surveys with only a few questions on drinking, has been the usual quantity of drinking. For analytical purposes, the measure has considerable attractions; apart from using it on its own to indicate the level of intoxication usually attained by the respondent, the analyst can multiply it by the frequency of drinking to get an estimate of the overall volume of drinking. Nevertheless, estimates of quantity based solely on the usual quantity of drinking should be avoided where possible in surveys of drinking, because of the substantial underestimate of quantity the measure yields for some specific fairly common patterns of drinking. In many countries, a rather substantial proportion of the population drinks small quantities at frequent intervals but larger quantities less frequently - for instance, one drink every day but 8 drinks twice a week. Those with such patterns will respond quite accurately that their usual quantity of drinking is one drink, so that they will appear to drink smaller quantities on an occasion than those who drink only according to the pattern of 8 drinks twice a week, and will also appear to have the same overall volume of drinking as those drinking only one drink a day, although in the example we have used the true volume would be three times that of the one-drink-daily pattern.

A dimension of quantity of drinking that is available from many surveys is the respondent's maximum quantity - the highest amount consumed on an occasion within a given period, often one year. In many surveys, including the US national drinking practices surveys (Cahalan et al., 1969), the operative question is whether the respondent drinks a specified amount as often as "once in a while"; in the US national survey in particular, the question is asked for each beverage-type, but only for those who drink the particular beverage-type at least once a month. Comparison of results where both this method and a direct question on the greatest amount drunk in the last year were used suggests that respondents will often report higher quantities drunk in the last year than they will report as part of their current drinking patterns on even a "once in a while" basis.[1]

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[1] Thus in the 1964 San Francisco sample, 23% of respondents reported drinking 6 or more drinks at least "once in a while", but 34% reported drinking 6 or more drinks "the time when you had the most of all" to drink in the last year.

1.8 Frequency-quantity measures of drinking

Maximum quantity of drinking obviously does not lend itself easily to estimating overall volume of drinking, and neither does it indicate the frequency of heavy drinking, but it does indicate whether a respondent ever drinks to levels which put him at risk of intoxication and elevate his risk of social consequences of drinking. For a country such as the USA, with many light and infrequent drinkers, an adequate sectioning of the population for analysing general drinking patterns, but not for analysing heavy drinking, can be constructed using just frequency of drinking and maximum quantity - for example:

A. Abstainers and very infrequent drinkers

B. Infrequent low-maximum drinkers - less than once a week, never 5+ drinks on an occasion

C. Infrequent high-maximum drinkers - less than once a week, 5+ drinks on an occasion at least once in a while

D. Frequent low-maximum drinkers - at least once a week, never 5+ drinks on an occasion

E. Frequent high-maximum drinkers - at least once a week, 5+ drinks on an occasion at least once in a while.

Such a sectioning preserves a distinction between the frequency and quantity dimensions of drinking, which have been found to have different correlates (Knupfer, 1966; Cahalan et al., 1969, App. I), but uses only the limited information which is perhaps most likely to have been collected in roughly comparable form by different studies.

Combined frequency-quantity measures of drinking have by now a 20-year history in alcohol studies, and a variety of such measures have been used since Straus & Bacon's pioneer Q-F index (1953). (See the accompanying table.) The measures draw on one or both of two basic rationales:

(1) an overall summarization of drinking behaviour, often into "heavy", "moderate", and "light" categories (see Cahalan et al., 1969; Edwards et al., 1972a);

(2) a summarization which preserves a distinction between frequency and quantity dimensions (see Straus & Bacon, 1953; Knupfer et al., 1963; Cahalan et al., 1969, App. I).

Many of the measures combine the two principles; thus Edwards et al. preserve a distinction between "frequent light" and "infrequent light", and Knupfer et al. distinguish two levels ("heavy" and "frequent moderate") within the more frequent and heavier quadrant.

The five measures cited are not comparable with each other for a variety of reasons: incompatibilities in the questions used, different principles of construction, and different cut-off points. Often even formally similar categories will have been formed by different rules of precedence; for example, Straus & Bacon (1953) and Edwards et al. (1972a) defined the respondent's Q-F category in terms of the most frequent beverage-type (three types for Straus & Bacon, 15 types for Edwards et al.) while Knupfer et al. (1963) used the category defined by the beverage-type yielding the "highest" category.

Table of Usage of
Frequency-Quantity Measures of
Amount of Drinking in General-Population Surveys

Straus & Bacon's QF:

United States college students (Straus & Bacon, 1953)
Iowa State (Mulford & Miller, 1960a, 1963)
USA nationwide (Mulford, 1964)
Cedar Rapids, Iowa (Mulford & Wilson, 1966)

Knupfer et al.'s F/Q:

Berkeley, California (Knupfer et al., 1963)
San Francisco, California (Knupfer & Room, 1964)
Sydney, Australia (Encel et al., 1972)

Cahalan et al.'s QFV:

Hartford, Connecticut (Cahalan et al., 1965)
USA nationwide (Cahalan et al., 1969)
Three British Columbia cities (Cutler & Storm, 1973)

Cahalan et al.'s Volume-Variability

USA nationwide (Cahalan et al., 1969, App. I)
San Francisco, California (Room, 1972)
Three British Columbia cities (Cutler & Storm, 1973)

Jessor et al.'s Q-F:

Triethnic community in Colorado (Jessor et al., 1968)
(This is a straightforward volume measure built from the same items but with somewhat different assumptions from Cahalan et al.'s Volume dimension of Volume-Variability)

Edwards et al.'s QF:

Camberwell, England (Edwards et al., 1972a)

These various incompatibilities make very substantial differences in who gets denominated a "heavy drinker" and affect considerably the correlates of heavy drinking (Room 1971b). But the various measures are based conceptually on a relatively small number of dimensions:

(1) frequency of drinking (all measures except "volume-variability", Cahalan et al., 1969, which uses "volume" based jointly on frequency and quantity);

(2) "Usual" quantity (Straus & Bacon, 1953; Mulford & Miller, 1960b), "modal" quantity (Knupfer et al., 1963; Cahalan et al., 1969) or "usual upper limit" (Edwards et al., 1972a);

(3) "maximum" quantity (Knupfer et al., 1963; Cahalan et al., 1969) or "variability" (Cahalan et al., 1969, App. I).

One further frequency-quantity measure of drinking adds another dimension to its typology of drinking: a differentiation between current and past patterns (Knupfer & Room, 1970).

It should be noted that shifting conceptualizations and the desirability of maintaining comparability have resulted in an increasing distance between the direct questions asked and the measures based on them: thus "volume-variability", conceptually composed of the volume of drinking and the maximum quantity, is constructed from the standard 12 questions in the studies

of Knupfer et al. and Cahalan et al., which ask, for each type of beverage, the frequency of drinking and the proportion of occasions on which 5+, 3-4, and 1-2 drinks are consumed.

Recent studies using categorizations of drinking practices in the general population have tended to focus more specifically on patterns of heavy drinking, defined at more stringent levels than in former studies. This is perhaps partly because of trends in behaviour in the general population, both towards more relatively heavy drinking and towards a greater validity in self-reports of drinking (Room & Beck, 1974). But primarily the tendency results from a shift in the concerns of investigators towards measuring behaviour which is likely to be substantially implicative of the social, psychological and health consequences of drinking, and towards measuring the relation between the behaviour and the consequences.

These concerns have led to a focus on the frequency of drinking relatively substantial amounts of alcohol, often measured more directly than in the earlier studies. A number of reports of studies by Cahalan and coworkers have used measures of heavy drinking incorporating a "frequent heavy drinking" measure of how often the respondent drinks 5 or more drinks on an occasion (Cahalan, 1970; Room, 1972; Cahalan & Room, 1974).

This measure is related to earlier measures used in work on drinking problems by Clark (1966) and Knupfer (1967). Contemporaneously, Bruun (1969) and Mäkelä (1971a) have used a measure of the frequency of attaining a blood-alcohol level of .10 or .15. Measures of the occurrence and frequency of very heavy drinking episodes, which in earlier work had been treated as symptoms rather of "pre-occupation with alcohol" (Mulford & Miller, 1960c), have also been used in United States studies as indicators of drinking behaviour (Clark, 1966; Knupfer, 1967; Cahalan, 1970; Cahalan & Room, 1974), and some work has been done using a typology of interactions between the two types of "heavy" drinking (Cahalan & Room, 1974). The measures of heavy drinking behaviour have been primarily of the frequency of drinking at particular specified levels, which tends to yield greater detail on the frequency than on the amount-of-drinking dimension; a good argument could be made for constructing questions to measure instead the greatest amount consumed at a sitting in particular time-intervals - in a usual (or the preceding) day, in a usual (or the preceding) week, in a usual (or the preceding) month, in a usual (or the preceding) year.

2. Demographic variations in drinking patterns

As we have noted, variations in drinking patterns by the commonplace social differentiations often referred to as "demographic variables" have usually been the next item on the survey analyst's agenda after the construction of a categorization of drinking patterns. Generalizations in this area are difficult to make and liable to falsification, for two good reasons. In the first place, the results can differ according to the measures used. Thus different measures of "heavy drinking" based on the same survey data can yield opposite results in analyses of patterns by social class (Room, 1971b). The measurement of the demographic variables can also affect results; thus income often shows a closer relationship to frequency or amount of drinking than do other measures of socioeconomic status (Knupfer et al., 1963).

In the second place, the relationships between social differentiations and drinking patterns vary according to time and place, and according to circumstances and interactions with other social differentiation variables. This applies even to what seem the safest generalizations. References can be found in the older British and United States literature to circumstances in which it was assumed that heavy drinking was commoner among women than among men (Heron, 1912; Bailey, 1922). A survey in Poland suggests that heavier drinking is commoner there in the countryside than in the city (Święcicki, 1972). In the USA, the general association of abstention with lower status seems to be reversed in parts of the country where drinking is light (Room, 1972).

A third consideration to keep in mind is the relatively small proportion of the world population in which drinking surveys have been done. Generalizations which can be made must be based essentially on parts of Europe and the English-speaking world, and should not be assumed to apply universally.

2.1 Variations by sex

Keeping all of these cautions in mind, we can nevertheless describe some general patterns. Women today seem generally less likely to drink and less likely to drink heavily than men. This tendency seems to extend over the whole range of drinking, but to be more marked at heavier levels of drinking. While there is evidence of historical changes towards more drinking by women in line with general emancipation trends, these changes occur more at moderate than at heavy drinking levels. Survey data do not usually correct for the difference in average weight between men and women, but it is clear that the differences in consumption are greater than would be explained by such a correction.

These sex differences have been described in terms of general norms of conformance for women (Clark, 1964) as the "culture-bearers" in Western European societies, or conversely in terms of "licence" for men, particularly young men (Knupfer & Room, 1964). It has been pointed out that the consumption of alcoholic beverages has traditionally been prohibited or limited for those seen as being in a dependent or subservient status - women, children, slaves, prisoners, etc. (Knupfer & Room, 1964).

2.2 Variations by age

Cross-sectional data by age, of course, confound cohort effects, historical changes in patterns, and the effects of ageing and age status in the individual respondent's life. Current data for the USA generally show a concentration of abstainers in the older age groups and, of course, in the childhood and adolescent years. Abstention appears to be declining among teenagers, and it may well also be declining in older persons, as these latter age groups cease to be dominated by cohorts brought up during the Prohibition era, and in the wake of modest tendencies to emancipate the old from expectations of constraint.

Among regular drinkers, the modal pattern of drinking after age 30 appears to be frequent light drinking, while among the young the modal pattern appears to be less frequent but heavier drinking. Thus "steady fairly heavy" patterns predominate among heavier male drinkers in all except the youngest adult age group (Cahalan & Room, 1974, p. 152). There are a number of possible factors underlying these differences. Certainly ageing processes place physiological limits on the amount consumed on an occasion, while on the other hand, older people are likely to lead lives of greater regularity. Younger people, particularly those under the legal age for drinking, are likely to have less regular access to alcohol, to lack the financial resources to support an overall high volume of drinking, and thus perhaps to operate more on a festive or special-occasion principle by which all available supplies are consumed on the spot. Relatively heavy drinking is primarily associated with sociability, and sociability may well occupy a larger portion of our time in youth than in middle age.

These different patterns of regular drinking among older and younger people mean that comparisons of prevalences of "heavy drinking" are likely to depend a great deal on the particular categorization chosen: measures emphasizing high frequency or volume of drinking will tend to find "heavier" drinking among the middle-aged than among the young, while measures emphasizing large quantity drunk on an occasion will find "heavier" drinking among the young (e.g., "high volume" versus "high maximum" in Cahalan et al., 1969, p. 216).

2.3 Variations by marital status

The relations of drinking patterns with marital status have not been as commonly investigated as the relations with sex and age. In the United States national data, the married were more likely than the unmarried to drink regularly and not to drink heavily, but this difference was fairly specific to those aged under 45 and of lower socioeconomic status (Cahalan et al., 1969, p. 34). Clark's analysis of San Francisco data (1964) suggests that heavier drinking among the married is related to differences in styles of socializing between the married and the unmarried: the unmarried were very much more likely to patronize taverns and to go to parties regularly.

2.4 Variations by social class

The relationship of drinking behaviour with social class is more equivocal than the relationship with sex and age. In the USA, abstention is associated with lower socioeconomic status in those areas of the country where drinking is traditionally heavier but with higher status in at least some of the areas where it is lighter, while the opposite patterns appear for relatively heavy drinking, at least for some measures and in some segments of the population (Cahalan et al., 1969, p. 43; Room, 1971b, 1972). In particular, people of higher socioeconomic status in areas of heavier drinking seem more likely to engage in frequent light drinking and to show greater sexual equality in drinking patterns, while patterns of heavy intake per occasion are more characteristic of persons of lower socioeconomic status (Cahalan & Room, 1974, p. 152). The same general distinction of different types of high consumption in upper and lower groups has also been found in Finland (Mäkelä, 1971a, p. 3) and in England (Edwards et al., 1972a, p. 87), although the fact that cirrhosis mortality is negatively correlated with class in the USA but positively correlated in Great Britain (Terris, 1967) suggests that heavy drinking occasions may be less common generally among lower-status people in Great Britain than in the USA.

Although the findings for the USA do not suggest a strong relationship of amount of drinking with social class, the data do seem to hint at different class styles of drinking. Community studies of small towns in the USA make it clear that in this limited kind of milieu there are very clear class differences in drinking styles. In part, these styles have to do with finances; it is notable that the dimension of status with the strongest positive relation to frequency of drinking is income. The poor, like the young, have special reason to try to get the most for their money and some among them would consider money spent on a drink wasted unless the drink were sufficiently intoxicating. But irrespective of financial questions, the styles may also reflect differences between class subcultures of long historical standing, as Edwards et al. suggest (1972a, p. 88). This may be especially true in England, with its tradition of class segregation even in the same tavern; in the USA, on the other hand, the relevant literature places some emphasis on the tavern as a meeting-place for people of different classes.

It is worth keeping in mind the strong possibility that apparent class differences for the USA are but a pale image of much stronger differences for particular occupational groups. Although business and professional occupations are conventionally considered as being of equal status in measures of socioeconomic rank, Cahalan et al. (1969) found that heavy drinking among businessmen was half as much again as that among professional men (p. 30). This difference may well be of long standing: in a mail survey conducted in 1895, John Billings found twice as many "regular moderate drinkers" among businessmen as among professional men (Billings, 1903, pp. 309-338). Towards the other end of the status scale, there are also marked differences between specific occupations (Hitz, 1973). Many occupations isolated geographically or by the nature of the work from the larger society, such as those of loggers, miners, longshoremen and seamen, which are also distinguished by their strong historical tendencies to strike (Kerr & Siegel, 1954), appear to have a tradition of heavy drinking as a part of their strong occupational subculture. In many of these occupations, and some others, the structure of the job itself dictates the nature of the drinking pattern, with long periods at sea or in the woods or on the range broken by brief periods of what is known in US military parlance as "rest and recreation". The "explosive drinking" of the Finnish lumperjack parallels the traditional drinking bout of the American cowboy or the sailor on shore leave.

General-population data on the relationship of specific occupations with particular drinking patterns is very sparse. This is primarily because of the very wide variety of occupations and the relatively small numbers of those engaged in even the most common of them, which precludes the use of conventionally sized survey samples. Thus the question of whether there are general class patterns of drinking beyond the patterns of specific occupational groups has not been faced.

2.5 Variations related to urbanization

The relation of urbanization to patterns of drinking appears to vary from place to place. The proportion of abstainers was substantially higher in the country than in the cities in only 6 of the 11 countries tabulated by Lindgren (1973). A survey in France found that both the percentage of drinkers in the population and the average level of consumption varied very little with the size of the community (Sadoun et al., 1965, p. 36); a survey in Finland found both consumption and heavy consumption more common in the cities and towns than in the rural communes (Mäkelä, 1971a); a survey in Poland found rural males more likely to drink heavily at a sitting than urban males (Święcicki, 1972, p. 5). In the USA, rural areas are quite strongly associated with abstention and an absence of heavy drinking, in all regions of the country, as regards both high volume and high maximum of drinking (Room, 1971a).

In Finnish studies, relative lack of drinking in rural areas has been linked to difficulties of availability, and certainly in the rural South of the USA - the only section of the country where there remain strong variations in availability - drinking at all, though not drinking heavily, varies with availability (Room, 1971a). But the availability is itself to some extent a reflection of community sentiment, and it is worth noting that "small-town America" was a stronghold of the Prohibition movement (Gusfield, 1963) and that, whether or not they drink, rural respondents today are still more likely than their urban counterparts to respond "nothing" when asked what are some of the good things about drinking (Room, 1971a). In general, the association of rurality with abstention appears to be the most marked in countries with the strongest historical temperance movements.

2.6 Variations by region

Urbanization is to some extent interrelated with the other primary geographical variable, region. Regional variations in drinking patterns are quite large in many countries and are well known to the alcoholic beverage industries, but are not often analysed in survey data. The most obvious regional differences are in choice of beverage - beer, cider and spirits versus wine in France, wine versus beer and bourbon versus Scotch whisky in the USA - but there are also differences in general categories of amount of drinking. The survey of France found that regions varied in their reported 24-hour consumption per respondent from 26 ml to 48 ml. United States national data show strong regional differences in the proportions of abstainers and heavy drinkers. The country can in fact be split into two sets of census regions, an area of greater availability of alcohol and an area of lesser availability where the former shows half as many abstainers and twice as many heavy drinkers as the latter (Cahalan & Room, 1974, p. 80). The area of lesser availability was the stronghold of the classical temperance movement, and has a long-standing cultural association of heavy drinking with socially disruptive behaviour. Explosive drinking and intermittent very heavy drinking appear to play a larger role in heavy drinking patterns in this area (Cahalan & Room, 1974, pp. 152, 172). These comparisons within the USA to some extent mirror Christie's comparisons in Scandinavia, particularly between Denmark, where alcohol is readily available, and Finland, where it is not (Christie, 1965). As Christie notes, "a strict system of legal and organizational control of accessibility to alcohol seems to be related to low alcohol consumption, but also to a high degree of public nuisance" (p. 107) - with the causal chain going in both directions. I have elsewhere sketched in some of the likely dynamics of this interaction.[1]

2.7 Variations by cultural or ethnoreligious group

The major remaining demographic variable used in studies of drinking practices is cultural or ethnoreligious group. Cross-national comparisons are, of course, one form of this variable; and it can plausibly be argued that regional differences within a country are akin to ethnoreligious differences; the South of the USA - in fact, the numerically predominant fraction of the area of lesser alcohol availability - has often been treated as a separate protoethnic subculture.

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[1] "Sociocultural aspects of alcohol use and problems: a normative perspective"; paper presented at the Addiction Research Foundation, Clinical Institute Lecture Series on the Sociology of Drug Dependence, Toronto, 1974.

It is well recognized that there are marked differences between ethnoreligious groups in their patterns of drinking. Comparisons of data for the population of the USA have shown low rates of abstention among persons of Italian origin and Jews, but high rates among those of British, Irish and Latin American ancestry and among blacks, while the differences in the respective proportions of heavy drinkers were smaller (Cahalan et al., 1969, pp. 52-55; Cahalan & Room, 1974, pp. 99-109). Comparisons of data from studies of individual communities where ethnic origin is less ambiguous show heavy drinking to be most prevalent among men of Irish, nonJewish Eastern European, and Latin American ancestries (Cahalan & Room, 1974, p. 203; Knupfer & Room, 1967).

Comparisons between countries based on survey data are in a far more rudimentary state, although it is clear that there are big differences between countries in the proportion of abstainers (Lindgren, 1973). Recent work (Stivers, 1971) cautions us against too easy an assumption that differences between ethnic groups in the USA will necessarily mirror differences between their respective nations of origin.

3. Measurement of drinking problems

3.1 Constituent items in measures of drinking problems

Survey studies of drinking problems have been less widespread and generally less developed than studies of drinking patterns. The approach has generally been explicitly eclectic and the measures used have often originally derived from clinical and other sources. To a remarkable degree, the constituent items of measures of drinking problems can be traced back to Jellinek's analysis (1946) of a questionnaire constructed by Alcoholics Anonymous for use among their own members, a questionnaire which drew on the common experience of AA members and often on the folk wisdom of bar-room lore ("take a drink first thing in the morning" = "the hair of the dog that bit you").

As in Jellinek's analysis, in the famous WHO definition of alcoholism (WHO Expert Committee on Mental Health, Alcoholism Subcommittee, 1952), and generally in much clinical thought, the items in the survey inventories of drinking problems were usually assumed to be characteristics of the individual, rather than properties of the interaction of the individual and his social environment. Seeley (1959) pointed out the oddity of taking social disabilities as indicators of a disease state, and survey analysis of drinking problems has often underlined the interactive nature of social problems with drinking; for instance, a given level of drinking patterns is associated with a much greater probability of social consequences of drinking in areas of lesser alcohol availability than in those of greater availability in the USA (Cahalan & Room, 1974, p. 178). But the technology of surveys has tended to reinforce the view of drinking problem items as properties of the individual, since the conventional methodology of probability sampling is designed to yield a sample of isolated individuals with a minimum chance of interactions between each other.

3.2 Drinking problems measured in surveys of the general population

Because of their general characteristics, sample surveys of the general population are also much better equipped to handle some sorts of drinking problems than others. Many drinking problems which figure in public discussions of alcohol problems exist more at system than at individual levels and are not easily glimpsed in individual interviews - e.g., loss of production due to drinking. Some kinds of problems are difficult areas for respondents to give use-useful information on - e.g., health problems due to drinking, where the connexion between the condition and drinking behaviour may not be recognized by the physician, let alone communicated to the respondent, and where, on the other hand, questions on the respondent's own thoughts on the topic often yield projections of inflated fears and dreads. Other kinds of problems which have a vivid existence in the clinical milieu are unmeasurable in the general-population survey because of their rarity, a difficulty whose solution would require extraordinarily large samples.

Studies carried out among the general population have an extremely important role to play in our understanding of alcohol problems, precisely because of the difference between the clinical milieu and the outside world. Much of our knowledge of alcohol problems is based on

clinical research, and if we are seriously to try to build an adequate treatment and service system, and even more if we are seriously to undertake the prevention of alcohol problems in the population at large, we need to know the relation between clinical reality and reality in the general population. The search for a "core entity" of alcoholism needs to take into account the issue of numbers, for it may be quite possible to define a "core entity" which characterizes only a very small proportion of those with one or another kind of alcohol problem. In this case, the difficulty remains of clarifying the status of the legions of those with alcohol problems; past experience would suggest that we may fall back on two equally unsatisfactory expedients: forgetting about all those not falling into the special category with the "core entity"; or making the unjustified assumption that they are all "prodromal" cases of the "core entity".

3.3 Measures used in surveys of drinking problems

Measures used in surveys of drinking problems can be regarded as falling into four major conceptual areas. The following discussion of the measures should be read in conjunction with chapter 2 of the book by Cahalan & Room (1974).

(1) Measures of drinking behaviour per se

This category includes measures drawing on the heaviest patterns revealed by the Q-F series of questions on drinking patterns discussed above, and measures of drinking bouts ("binge drinking") - i.e., of the duration and frequency of lengthy drinking episodes.

The status of measures of drinking per se as "problem" measures is of course thoroughly arguable, and investigators' unease over this issue is often betrayed by wordings such as "problematic intake" and undocumented arguments that the behaviour is likely to be indicative of future problems. The use of these measures in problem scores raises quite explicitly the issue of who is to define what is a "problem" - the investigator or the respondent - and in what sense we mean "problem". In certain instances drinking patterns which would certainly fit survey "problematic intake" criteria are arguably a "problem" to no one. On the other hand, the survey measures do conform to the recognition of particular drinking patterns as problems in everyday discourse: it is the blood-alcohol level attained, and not one's behaviour "under the influence", which defines the crime of drunken driving; and Chafetz (1967) has proposed that anyone who becomes intoxicated at least four times a year ought to be regarded as a problem drinker. And from the point of view of aggregate-level social problems, the frequency of episodes of intoxication is certainly relevant to arguments about an alcoholized society (Faris, 1974).

(2) Measures of behaviour while drinking

This is the area in which the measurement and conceptualization have been weakest. In the hands of various analysts, the same behavioural item has often been interpreted as having very different meanings, and items in this area have often been treated as components of various sorts of personal and social alcohol problems.

The measures of behaviour while drinking which are of particular interest in measuring "drinking problems" are those which potentially put the respondent at odds with his social environment or endanger his health. As with the drinking behaviour itself, it is illegitimate to assume that these behaviours actually indicate perceived problems for the respondent: fighting while drunk or drinking on the job may be acceptable and expected in his milieu, and skipping meals while drinking or experiencing hangovers and self-medicating them with alcohol may not have any further health consequences.

Belligerence. One area of behaviour which has been measured in a number of studies, although often with rather weak items, is belligerence while drinking. Unfortunately, available measures are not sensitive to the issue of whether the respondent is equally belligerent when drinking as when sober or whether he is perhaps less belligerent when under the influence of alcohol: a respondent who "gets into fights while drinking" may also do so when sober. No other aspects of general characterizations of drinking behaviour which is potentially obnoxious or dangerous have been systematically measured as part of drinking

problems scores, although clearly there are other aspects of individuals' reactions to alcohol which can be problematic in given circumstances - inappropriate sleepiness, boisterousness, chance-taking, flirting, affability, melancholy, vomiting, etc. A really worthwhile area for study which is at present essentially untouched is the conditions and correlations of the relations between pattern of drinking, behaviour while drinking, and social consequences of drinking. Knupfer (in preparation) has argued that social norms for drinking are more directed at behaviour during or after drinking than at the amount of drinking per se.

Work-related problems. Other aspects of behaviour during drinking which have figured to a greater or lesser extent in surveys of drinking problems are directed at the situational appropriateness of the drinking behaviour, but have commonly not been interpreted in terms of this face meaning. Items concerned with what is presumed to be inappropriate drinking behaviour with respect to the job role (drinking on the job, going to work drunk, being late for work or reporting sick because of a hangover) have sometimes been treated as parts of "job problems" scores, although it is clear that these behaviours often do not in fact cause "problems" for the individual respondent, and depending on circumstances may also not be a tangible "problem" at aggregate levels. Like belligerence and other qualities of behaviour, they presumably increase the risk to the respondent of suffering tangible social consequences of his drinking, but the conditions governing this risk and the variations to which it is subject have been little explored.

Driving after drinking. Another dimension of situationally inappropriate behaviour, which has been investigated in special-purpose surveys (e.g., Wolfe, 1974) rather than in general drinking-problem surveys, is driving after drinking. Roadside breath-test surveys and other drinking-driving surveys are essentially concerned with measuring a problematic behaviour during or after drinking, a behaviour which is not itself a problem to the respondent nor necessarily to others unless it is observed by a policeman or has an untoward consequence (e.g., an accident). In the light of the importance of drunken driving both in the public consciousness and in terms of its contribution to the economic costs of drinking, it would be desirable if future problem-drinking surveys devoted more attention to this area.

Other situationally vulnerable behaviours. The list of situationally vulnerable behaviours during or after drinking which might well be explored in surveys of drinking problems could be very profitably extended, although, of course, the questionnaire cannot cover everything one wants to know. The frequency of appearing drunk in public is clearly related to general problems of public nuisance and order and to potential individual problems (arrest, etc.) for the respondent. The general issue of default on role responsibilities could well be expanded beyond the focus on limited aspects of the job role to include family and other social roles. (At least one clinical discussion treats missed doctor's appointments as a symptom of alcoholism!) Other risk-taking behaviour induced by alcohol, besides drunken driving, might be explored, as also might child battering and other manifestations of violence which are unlikely to be caught by items on "fights while drinking", and such inconspicuous but problematic behaviours as falling asleep in bed with a lighted cigarette after drinking.

It might be noted here that there are essentially two dimensions of risk involved in a given drinking-related behaviour or demeanour: one is the exposure to risk offered by the behaviour or demeanour itself, the other is the vulnerability to tangible consequences which the situation and the individual's social position impose on a given behaviour or demeanour. The second dimension is obviously not solely a property of the individual involved. This is an issue to which we shall return later.

Behaviour affected by social constraints. A further category of measures of behaviour during drinking derives essentially unchanged from Alcoholics Anonymous orthodoxy by way of the Jellinek (1946) analysis: indicators of disjunction between the individual's drinking behaviour and his social environment as revealed by the individual's sneaking or hiding behaviour - "taking a few quick drinks before a party to make sure I'll have enough", "sneaking drinks when no one is looking", etc. These items can be and usually have been interpreted as indicators of the respondent's state of control over his drinking behaviour: they are part of the list of "bad signs" of dependence on alcohol established by conventional wisdom and professional opinion, and surveys have variously classed them into scales of "addictive symptoms" (Knupfer, 1967), "preoccupation with alcohol" (Mulford & Miller, 1960c), and "symptomatic drinking"

(Cahalan, 1970). But it is clear that besides signalling the respondent's commitment to drinking in spite of the existence of social constraints, these items also measure the existence and strength of the social constraints; given the presence of a spouse who is sensitized to the respondent's drinking behaviour, it may well be that only one drink at a time is taken surreptitiously.

Short-term physiological consequences of heavy drinking. A final set of behaviours during or after drinking which is not so situationally affected, but which is also commonly featured on lists of "bad signs", are items indicating the short-term physiological consequences of heavy drinking: hangovers, waking the next morning with no recollection of the night before, hand tremors, etc. These items again may be interpreted several ways: as harbingers of more permanent impairment of health as a consequence of drinking, as indicators of physiological dependence, as indirect indicators simply of the fact of heavy drinking, or as health problems in their own right. Survey research experience suggests some caution in the interpretation of these items: on the one hand, some "naive" respondents apparently assent to these items with the intent of conveying a meaning other than the very significant connotations often found in the literature on alcohol (for example, "woke next day unable to remember the night before" may imply that someone put the respondent to bed when he fell asleep - not that he had an "alcoholic blackout"); on the other hand, the items on the list of "bad signs" have been so widely diffused that they become merely signals of admission to a drinking problem - thus Jellinek found some evidence of overclaiming of such symptoms among Alcoholics Anonymous members (Jellinek, 1960, p. 38).

(3) Measures of the psychological loading on the drinking behaviour

Items in this category have a long history in drinking surveys, particularly in the USA, perhaps because of strong concerns in that country with motivations for problematic behaviours, and certainly because of the classical definition of alcoholism in United States literature in terms of the existential problems of self-recognized loss of control over drinking behaviour.

Motivations for drinking. Questions on motivations for drinking have appeared regularly in surveys of drinking behaviour since Riley et al.'s pioneer report in 1948. Various labels have been attached to scales based on these questions - "definitions of drinking" (Mulford & Miller, 1960b), "use of alcohol for coping" (Knupfer, 1967), "personal-effects reasons" (Jessor et al., 1968), "psychological dependence" (Cahalan, 1970), "ataraxic motivation" (Edwards et al., 1972b) - but the interpretation of the items has remained constant: social reasons for drinking are considered nonproblematic, while "personal-effects" reasons, and particularly the use of alcohol as a mood modifier or to forget worries, are considered problematic. Both Knupfer et al. (1963) and Cahalan et al. (1969) used the combination of heavy drinking and "escape" motivations for drinking as a problematic-drinking category standing in for a full measure of drinking problems; in later work, the correlation of such a measure with a full "overall drinking problems" score (including the components of the heavy-escape measure) turned out to be substantial (.71) but clearly not enough to assume identity (Cahalan, 1970, p. 115).

Recently, the Hobbesian assumption underlying the automatic identification of social reasons for behaviour as good and personal reasons as bad has come to be recognized, as has the puritanical concept that mood-modification is bad (Cahalan & Room, 1974, p. 20). Yet the measure is clearly closest to traditional psychiatric conceptualizations of neurotic drinking, etc., and is a clear indication of the psychological loading the respondent himself puts on his drinking behaviour. The theoretical status of these items is thus perhaps best described as being subject to constant modification.

Self-perception of drinking problems and degree of control. Apart from the interpretation of items concerned with behavioural and physiological effects as indicating addiction (see above), the other major type of item indicating the psychological loading to be put on the drinking behaviour is the direct measurement of the respondent's self-perceived problems with and degree of control over his drinking. This dimension originated with Genevieve Knupfer's predilection for simple and direct measures - that one very good way to find out if someone had a problem was to ask him. In its original form (Knupfer, 1967) it drew on open-ended responses to such questions as whether the respondent ever felt he should cut down on drinking and why,

indicating much concern or fruitless efforts at control. In later work (Cahalan & Room, 1974) it has developed more into an attempt to operationalize and measure in partly behavioural and partly self-perceptional terms the concept of "loss of control over drinking" which figures so heavily in conceptions of alcoholism as a disease, in order to test the fit of this "alcoholism paradigm" to data derived from the general population.[1]

(4) Measures of the consequences of drinking behaviour

Social and health damage. This dimension of drinking problems has a long history in survey studies, appearing perhaps for the first time in Straus & Bacon's study (1953) as "social complications", being used as the prime indicator of alcoholism in the New York Washington Heights studies (Bailey et al., 1965), and formulated by Mulford as a "troubles" index (Mulford & Miller, 1960c), which he also came to view as a prime indicator of alcoholism (Mulford & Wilson, 1966; Mulford, 1968). The long-standing tendency in surveys to identify the consequences of drinking as the primary indicator of alcoholism is in line with classical formulations of the disease concept, as most explicitly stated by Keller (1960), who equates a definition of alcoholism in terms of loss of control with an "operational definition" in terms of the consequences of drinking. Keller's argument depends on an assumption that all normal people are completely rational: that the social and physiological penalties of unrestrained drinking are so severe and so obvious to all rational men that anyone who repeats such behaviour must have lost control of his drinking. Unease over this equation and a desire to avoid wrangling over what constitutes "real" alcoholism have led some survey analysts to prefer to talk instead of "problem drinking" (Knupfer, 1967; Cahalan, 1970). In any case, the emphasis on consequences of drinking as the heart of our concern with alcohol problems has, if anything, been sharpened in recent years, and Bruun (1973) has argued that an enumeration of the social and health damages caused by alcohol obviates the need for any separate consideration of alcoholism as an addictive state. The formulations of the concerns of the National Institute on Alcohol Abuse and Alcoholism (NIAAA) in the USA have tended to gravitate towards a concentration on social and health damage, although they are still expressed in an increasingly transparent verbalization in terms of disease (Chafetz, 1971).

Extent of causal involvement of alcohol. One unsolved problem with measures of the consequences of drinking, in surveys as elsewhere, is the extent to which alcohol is causally involved in the problem. We know that the role of alcohol is likely to be underestimated in many situations, for instance in many chronic illness conditions. But in a society such as the USA, where drinking alcohol does potentially carry a moral onus which differentiates it from drinking water or soft drinks, there is also a strong tendency to assume that alcohol is the primary cause if it is present in any problematic situation, resulting in overestimations of the role of alcohol. This tendency is institutionalized in some states of the USA by defining the drinking driver in an accident as automatically at fault. The tendency is a basic operating assumption in the recent report to NIAAA, entitled Economic Costs of Alcoholism (Policy Analysis, Inc., 1974), in which it is assumed that the difference in average income between moderate-drinking and problem-drinking males is due to their difference in drinking behaviour. This cultural proclivity contrasts, for example, with attitudes in Bulawayo, Rhodesia, where it appears that adults do not think of alcohol as causing a problem, even if the problem arises when the person is intoxicated (Wolcott, 1974).

Attribution of problem to alcohol. Survey items on consequences of drinking have tended to rely on one of four "authorities" in attributing the problem to alcohol:

(i) the respondent himself/herself (e.g., "do you feel that drinking was harmful to your friendships and social life");

(ii) a significant or authoritative other person (e.g., "a doctor told you to cut down on your drinking");

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[1] W. Clark & D. Cahalan, in a paper entitled "Changes in problem drinking over a four-year span", presented at the annual meeting of the American Public Health Association, San Francisco, 1973.

(iii) a definition on the part of legal or certifying authorities (e.g., "arrested for drunken driving");

(iv) an assumption on the part of the survey analyst that a drinking behaviour constituted a problem (e.g., "came to work drunk").

If not our common sense, then labelling theory should sensitize us to the fact that these "authorities" are not necessarily in agreement. Yet very little work has been done on the empirical relation between these different types of attributions. Obviously, there is room for considerable disagreement over whether a "problem" exists at all; thus, for instance, a respondent may not recognize that a friend has quietly dropped him because of impatience with his drinking, or conversely the survey analyst may impute the existence of a problem where the behaviour was not in fact problematic. Beyond this, the question of the role of alcohol in causing the problem is often quite ambiguous and as much a matter of social and situational definition as of any pharmacological or physiological mechanism.

Probing for a connexion between alcohol and problems. Despite these issues, most surveys of drinking problems have used direct measures which probe for a specific verbalized connexion between the problematic situation and the respondent's drinking behaviour. The issue of attribution of responsibility for the situation to alcohol can be avoided by switching to a correlational analysis of life problems and drinking behaviour, where the "dependent" variable to be explained is life problems rather than alcohol-related problems, and where alcohol's role in the problematic situation is imputed statistically by some such measure as "relative risk", rather than measured directly. General-population studies of the relation of drinking patterns to mortality (Room & Day, 1974) have taken this approach, and the triethnic study by Jessor et al. (1968) comes close to taking it for a generalized measure of deviance. But this approach yields a measure of relation between alcohol and problems only for the population or subgroups rather than for individuals, and alcohol is not sufficiently strongly identified with most life problems for survey analysts to be willing to use "factor scores" or similar strategies to ascribe associational patterns in the group to the constituent individuals.

Temporal association between alcohol and problems for the individual. Another approach, which has not been much used, presumably because of the complexity of data required, is an analysis which measures the temporal association of drinking behaviour and problematic events or conditions in the life of the individual respondent. In this case, the unit of observation is each of a series of epochs or periods in the respondent's life, and the result would be a relational rather than causal statement about the joint occurrence of drinking and problems in each respondent's life. This approach is, of course, possible only when the "problem" under consideration is a repeatable event or sporadic condition; it would not be useful for studies of mortality nor, probably, of cirrhosis. Nevertheless, some such approach would be worth exploring as a means of progressing beyond the present practice of the unexamined attribution of causal relation involved in measuring "drinking problems".

Long-term physiological consequences of drinking. As we have already mentioned, long-term physiological consequences of drinking are perhaps the most difficult area for which to elicit valid data from a respondent. Surveys have used several types of measure: the respondent's self-estimation of a health problem due to drinking; a doctor's order to reduce intake; a putatively alcohol-related disorder such as cirrhosis; and a report of an alcohol-related accident or hospitalization. A combination of at least two of these enhances our confidence in the validity of the data, although the result is still not foolproof.

Social consequences of drinking. Measures of the social consequences of drinking have tended to centre around the respondent's significant role-sets: marriage and home-life; job and occupational life; friendships and social life. In addition, of course, what might be called consequences in the respondents' citizen-role - trouble with the police - have been measured. In each of the three major role-sets, the archetypal "problem" has been assumed to be a break in relationship, and complaints, arguments, and suggestions on reducing alcohol consumption from others have been assumed to be a more minor problem but on the same dimension as a break in relationship. Each of these assumptions may well break down in specific cases: for some respondents, a break in relationship is a solution rather than a problem, and in some relationships, complaints indicate no increased risk of a break. Nevertheless, however

arbitrary the assumptions, studies by Knupfer (1967), Cahalan (1970) and associates have at least consistently tried to measure differences in recency and in severity in each problem area, whereas many surveys have made do with "ever" items and one item per problem area.

Financial problems due to drinking. A problem area that has tended to lie uneasily between a drinking-related behaviour and a consequence of drinking is financial difficulties due to drinking. This has generally been poorly specified and measured: Mulford's item mixed it with family troubles in the wording of the item (Mulford & Wilson, 1966, p. 43), while the measure used by Cahalan and associates has combined "spent too much money on drinking, or while drinking" - a behavioural measure - with "felt drinking was harmful to my financial situation" - which understandably correlates well with job problems (Cahalan & Room, 1974).

4. Aggregations and interrelations of drinking problems

4.1 Reason for aggregating items

In spite of the deficiencies we have noted, and others that could be named, the dimensions of drinking problems that we have outlined have required dozens of items in the more extensive survey schedules. A number of methods of aggregating these items have been used by different investigators, but a feature they have in common is that they attempt to balance three different requisites:

(1) The need for a relatively simple and explicable conceptual scheme, tending to result in the use of summary scores and typologies.

(2) The need for sufficient numbers. Most survey analysts want not only to estimate prevalences but to describe characteristics of "problem drinkers". Hence they need a respectable number of "problem drinkers". This is not easy to manage with conventional survey sample sizes.

(3) The need for face validity. The cut-off points for the scores or typologies used in the analysis need to have some inherent plausibility.

The influence of the need for sufficient numbers for analysis should not be underestimated. For instance, the cut-off point for defining "problem drinkers" in Cahalan's book (1970) was set by balancing the competing demands of requisites (2) and (3). This cut-off point was later used by NIAAA to project the figure of 9 000 000 alcoholics in the USA. It is not entirely a jest to say that if Cahalan's sample had been twice the size, there would be half as many alcoholics in the USA today.

4.2 Need for a variety of definitions

This consideration underlines the arbitrariness of cut-off points in problems scores and measures, and suggests the necessity of offering, as for instance Clark (1966) did, a variety of definitions and measures to encourage understanding of the negotiability of prevalence statistics. As Bruun (1970) puts it, "One way to avoid the negative effects of the black-white thinking easily introduced by the dichotomy alcoholics/non-alcoholics is to try to use not only one but two or three measures thereby indicating the vagueness of our definitions . . . This will force the users to discuss what is behind these measures".

4.3 Disjunctive and conjunctive measures

Another way of emphasizing the issue of numbers is to note that survey measures of drinking problems are almost universally disjunctive, that is, "problem drinkers" are defined in essence by saying "yes" to one or two or three of a much larger number of items. But classical descriptions of the disease concept of alcoholism were conjunctive - Jellinek described a whole list of symptoms which were added to each other in a determinate sequence in his famous 1952 article. Even in 1960, his definition of "gamma alcoholism" is essentially conjunctive. A research worker dealing with general-population data once tried out a literal interpretation of Jellinek's approach: he applied a conjunctive definition requiring the

simultaneous presence of a list of items, but found that "to employ indicators for all the descriptions of the species given by Jellinek soon eliminates virtually all cases" (Mulford, 1968, p. 10). Once again, we are reminded that clinical reality does not correspond to reality in the general-population milieu.

It might be noted here that recent clinical definitions, faced with the administrative necessities of a large-scale treatment system, have also tended to move to essentially disjunctive definitions as in the "Criteria for the Diagnosis of Alcoholism" sponsored by the National Council on Alcoholism (NCA) (1972). It is also noteworthy that earlier studies of drinking problems made sustained efforts to preserve some conjunctivity in their measures, as in Mulford's H-Technique Guttman scales (Mulford & Miller, 1960b, c); but even these loosely conjunctive scales failed the conventional tests for scalability (Room, 1966), and Mulford's final recommendation for a measure identifying problem drinkers combined (disjunctively) a disjunctive social troubles score with disjunctive items indicating loss of control (Mulford, 1968, p. 27).

4.4 Overall drinking problems scores

The overall drinking problems scores used in various studies have varied considerably in the number and nature of items used, in the time period covered, and the details of aggregation of the scores. But stripped of their essence, nearly all of them have been additive scores where the cut-off criterion for "problem drinking" or "alcoholism" is set relatively low, resulting in an essentially disjunctive definition of "problem drinking": a problem drinker is someone who gives response A, or response B, or response C, etc. Most of the scores have included measures of social consequences of drinking - troubles with the police, job, spouse, relatives, friends; the primary difference between scores has been in the extent to which the scores drew also on areas beyond the ambit of social consequences.

The most inclusive scores used have been the Overall Problems Scores originally conceptualized by Knupfer (1972) and adapted by Cahalan (1970). These scores include items from each of the four general areas of items discussed above. Knupfer's perspective in designing the score was essentially clinical: all items on behaviour or consequences were to be treated as potential symptoms by which the respondent could tell us of his underlying drinking problem. Since, as the levels of severity have been defined, the measures of heavy drinking, of use of alcohol for coping (or psychological dependence), and of symptomatic behaviour tend to be among the most prevalent "problem areas", social consequences items tend not to play a great part in determining whether the respondent satisfies the minimum "problem drinking" criteria.

Other surveys have used scores which reach considerably beyond the ambit of social consequences of drinking. Besides short-term and long-term health consequences, Edwards et al.'s Troubles with Drinking Score (1972b) includes symptomatic behaviour items, loss of control items, and even an item - the most productive by far - on drinking behaviour "Have you ever been 'under the influence'?"). Mulford's final "Loss of Control Index" (1968) includes, as we have said, loss of control items besides items on social and health consequences of drinking.

Most other investigators, as well as some of those named above, have used criterion scores essentially based on social and health consequences of drinking. A good argument can be made for separating the social and health aspects in the analysis, since they seem to have different meanings and different correlates in the population.

4.5 Methods of aggregation for summary scores

With some exceptions, little attention has been paid in constructing summary scores to the methods of aggregation used - the general rule is one point per drinking problem item or area, irrespective of the mix of items or areas available in the questionnaire. Knupfer's (1972) more refined system of points according to severity of problems does not alter the fact that each problem area in the list of areas covered is weighted essentially equally. Scores such as Edwards et al.'s (1972b), which do not subaggregate into scores for individual problem areas, can be viewed as effectively weighting areas of content according to the number of items in each area.

4.6 Incommensurability of items in summary scores

Overall summary scores are a tremendous convenience: they provide adequate numbers for analysis, and they form interval scales which are easily manipulable in multivariate analysis. The tendency in studies carried out by the Social Research Group, at least in recent years, has been to move away from them. Even a score limited to "social consequences" contains quite incommensurable items: e.g., an arrest, an expression of concern by a spouse, and drinking while on the job.

Because of this felt incommensurability, and because of a desire, as Knupfer put it, "to turn assumptions into hypotheses to be tested", studies of drinking problems by Knupfer and coworkers and Cahalan and coworkers, since Clark's pioneer article in 1966, have tended to place considerable emphasis on a roster of a dozen or so drinking problem-area scales, each based on between two and a dozen questionnaire items, both as tools for description and as the materials for an analysis of interrelations between "drinking problems".

4.7 Indicators of drinking problems

Most general-population surveys of drinking problems, since Manis & Hunt's original report (1957), have used indicators of problems in various areas as a descriptive device (see compilations of earlier survey results in Clark, 1966, and Knupfer, 1967). A number of implicative regularities seem to emerge from all United States studies of drinking problems: e.g., problems with spouses are much more common than problems with friends and other social problems generally; drinking bouts, job problems and police problems (drunken driving or public drunkenness) are generally the rarest occurrences; police problems tend to arise with persons in the younger age groups and health problems with older persons; data on the time ordering of problems (Cahalan & Room, 1974; Fillmore, in preparation) show that drinking bouts, police problems and symptomatic behaviours both start and remit before problems arise with health, friends, relatives and spouse, which suggests that social frictions continue for a while even after the remission of problematic drinking behaviours. Perhaps the most crucial finding is that all drinking problems and problematic behaviours are more prevalent, at least among men, in the early twenties than at any later age; this finding contrasts with the typical age distribution - 35-60 years - in clinical populations.

4.8 Interrelationship of drinking problems

In terms of interrelations between drinking problems, the general findings of Clark's 1966 paper have held up well in later analyses (Cahalan, 1970, p. 40; Cahalan & Room, 1974, chap. 3; Clark & Cahalan, 1973; Cahalan & Roizen;[1] Fillmore, in preparation), as the analysis has been extended across time as well as cross-sectionally across problems. In the general population of the USA, having any particular drinking problem is only a modest predictor of having any other particular problem, and having a problem at one particular time is only a modest predictor of having the same problem at another time. The picture that seems to emerge is of a relatively large fraction of the population - perhaps 20% - which drinks enough to be at substantial risk of drinking problems, this fraction accounting for over three-quarters of all alcohol consumed (Room, 1970). There is a considerable turnover in a period of a few years in the persons who are in this relatively heavy-drinking fraction of the population (Cahalan, 1970, chap. 6; Room, 1972; Cahalan & Roizen[1]), so that over the course of their lifetime a somewhat higher proportion of persons (including perhaps a majority of males) have at one time or another been in this "at-risk" population. Among those drinking relatively heavily at any particular time, the occurrence of particular problems with drinking may be as much a matter of situational and social factors and of chance as one of relatively permanent characteristics of the individual's psychological state and life style. Conventional survey research methods, which as we have noted focus on the isolated individual usually measured at one point in time, allow only refracted measurement of factors other than those assumed to be relatively permanent properties of the individual respondent. The individual psychological and life-history variables most amenable to survey analysis do indeed show a substantial relation with drinking problems (Cahalan & Room, 1974), but fall far short of accounting for most of the variance in drinking problems.

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[1] In a paper entitled "Changes in drinking problems in a national sample of men", presented at the North American Congress on Alcohol and Drug Problems, San Francisco, 1974.

5. The two worlds of alcohol problems

The classical description of alcoholism proposed a coherent entity marked by phases and symptoms which occurred in a regular, progressive order (Jellinek, 1952). Alcoholics were seen as presenting "prodromal signs" at younger ages, but the process typically culminated in the full-blown case only after age 30. This description was based on experience in clinical and other special populations in the USA, notably Alcoholics Anonymous.

Later analysis suggested that even in clinical populations, the coherence and unidimensionality of the entity had been overestimated (Trice & Wahl, 1958; Room;[1] Park, 1973). However, the general clinical picture of a relatively coherent phenomenon marked by a lengthy drinking history in a population composed mostly of persons aged 35-60 remained fairly consistent.

As we have just noted, the picture in the general population seems markedly different. Drinking problems are generally more common at ages 21-24 than in middle age, and the overlap between different problems and in the same problem across time periods is markedly less than in clinical populations.

5.1 Studies comparing alcohol problems in clinical and general populations

There are by now several studies which apply the same measures to clinical and general populations and allow a direct comparison of the characteristics of alcohol problems in the two populations. Mulford & Wilson (1966) used the same measures of drinking behaviour and problems on a hospitalized population of alcoholics, on a sample of persons known to community agencies as having alcohol problems but domiciled in the community, and on a sample of the general population in the same community. As might be expected, the "known alcoholics" gave positive responses to drinking-history items intermediate between the high prevalences and positive responses in the hospitalized sample and the low prevalences in the general-population sample. But there was a very much greater overlap between a positive response on one drinking-history scale and a positive response on another scale for the "known alcoholics" than for the general population (Mulford & Wilson, 1966, pp. 28-29; see Room, 1966). Room (1968) found that it was only the subgroup of the general population with the most severe social problems with drinking, comprising less than 1% of the total adult population, who reported drinking patterns roughly commensurate with those reported in clinical samples. Similarly, Armor et al. (1975) found that the small subgroup (about 3%) of a nationwide sample defined as "problem drinkers" on the basis of a criterion including heavy drinking had a mean consumption level only about half that of clinical samples of alcoholics.

These studies add further support to the conclusion that there is a wide gulf between reality in the context of the general population and clinical reality. General-population measures as they have been used do not define a population which is equivalent in its alcohol-related behaviour to clinical populations. Measuring behaviour which is equivalent would require sample sizes far beyond any that have yet been contemplated.

5.2 Measurement error

In expressing this conclusion we are, of course, ignoring the issue of measurement error. It is known that alcohol consumption is underestimated in surveys of the population at large (Room, 1971c) and that, in general, there is some tendency for discreditable behaviour to be underestimated or backdated. But presumably, if a "denial factor" were operating, it would operate relatively consistently for all drinking problems, and therefore would tend to increase the overlap between problems among those who did report any problems. Thus the reported overlapping of problems in the general population is likely to represent, if anything, an overestimate.

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[1] In a paper entitled "Assumptions and implications of disease concepts of alcoholism", presented at the 29th International Congress on Alcoholism and Drug Dependence, Sydney, 1970.

On the other side of the comparison, it may well be that the overlap of the various problems is overestimated in clinical populations. Clinical data are usually collected at the time of admission, when there is often a strong material incentive for the potential client to create a particular impression, which may well be that of a person with a host of problems. The influence of ideology and a general "admission factor" may also be felt. Trice & Wahl (1958) found that an Alcoholics Anonymous sample showed a higher overlapping of problems than a hospitalized sample of persons who did not belong to Alcoholics Anonymous, and Jellinek remarked on the occurrence of false positive responses among Alcoholics Anonymous members (1960, p. 38). A recent study in matched pairs of hospitalized patients found to be alcoholics showed that those who identified themselves as alcoholics responded positively to more drinking-history items than those who did not (Kaplan et al., 1974). These effects may have produced the considerably higher prevalences of drinking-history items for the hospitalized alcoholics than for the "known alcoholics" resident and interviewed in the community in Mulford & Wilson's study (1966).

5.3 Differences between estimates of problems among clinical and general populations

As Mulford & Wilson's study shows, it is unlikely that elimination of any clinical over-reporting would substantially bridge the gap between clinical and general-population findings. It remains to interpret the meaning of these findings. On the one hand, it is clear that projections of the number of "alcoholics" on the basis of results for the population at large are gross overestimates if the term "alcoholics" implies "persons like those in treatment for alcoholism". On the other hand, it is clear that the search for the "hidden alcoholic" and the increasing emphasis on case-finding and "secondary prevention" are doomed to failure if these efforts are predicated on the existence of a large hidden population many times greater than the number in clinics but resembling clinical populations in every way except that they are not hospitalized. Disjunctive definitions such as problem scores in the general population and the NCA criteria (1972) cast a fine net but catch many small fry; conjunctive definitions, such as classical disease concepts of alcoholism, cast a wide-meshed net and yield only a small catch in the general population. Any syndrome rigorously defined on the basis of clinical research and experience will apply to only a small group of all those in the general population with one or another kind of alcohol problem.

Beyond these truisms, we are in the realm of speculation. The processes by which individuals "leave" the general population and enter the clinical population have not been explored at all fully. Edwards (1973), in a report contrasting measures of alcohol problems used in a survey of the general population with those of a reporting agency in a single suburb, remarks on the importance of informal social mechanisms in the control of drinking problems in the general population: "society will respond to [the troubled drinker] through the actions of varieties of important noninstitutionalized persons such as his family, his neighbors, his employers, and the man at the bus stop" (p. 133). Presumably admission to a clinic often involves a lengthy process of wearing out the patience of everyone in the potential client's immediate environment; the clinic is a last resort when all social resources have been exhausted, often after the client has lost both spouse and job. Frequently the major potential function of the clinic for the client who wishes to re-establish himself is to serve as a vouching agency which may help to revive his credibility and social credit with those outside the clinic door.

5.4 "Problem drinking" as a poor predictor of "clinical alcoholism"

The disparity in age between alcoholic patients in clinics and "problem drinkers" in the general population is suggestive of another possible perspective. The lesser accumulation of problems and the younger ages of the latter group are sometimes taken as evidence that they represent simply an earlier stage of the full-blown entity seen in the clinic. In a limited sense this assumption is almost bound to be true: most clinical cases were indeed once in the general population, were once younger, and once had fewer problems. But there are so many more "problem drinkers" in the general population than there are clinical cases that "problem drinking" cannot be a very good prediction of clinical alcoholism: matching his survey with clinical and agency data, Edwards (1973) found that the number of persons he defined as "problem drinkers" on the basis of survey questions covering behaviour in a one-year period was nine times greater than the number of persons known as alcoholics to any "apposite" community agency.

Furthermore, the disparity in age between problem drinkers in the population at large and alcoholics in clinics is too great to fit a progressive model easily. If the former group were a prodromal form of the latter, we should expect a closer overlap in the age distributions. The considerable age gap we find suggests another mechanism is at work. Perhaps drinking problems among young men in the general population should be interpeted instead as a kind of "normal" or tolerated deviance. If young men are at liberty to drink heavily (Knupfer & Room, 1964), perhaps the scrapes and problems that result should not be regarded or treated too severely. Thus young men have quite a wide margin of social credit concerning the consequences of impulsive or risky behaviours, in the sense that the consequences tend not to be held permanently against them. However, the social norms decree that as time passes, the young man should settle down, get a steady job, marry, and abandon or at least modify his rash behaviour. Most men follow this general path in the course of time, and the prevalence of drinking problems accordingly decreases in the late twenties, gradually removing the protection of numbers from those who retain their youthful heedlessness and drinking styles. The labelling of middle-aged problem drinkers and their extrusion from the general milieu and incorporation into the clinical population thus derive not only from the fact that they are now old enough to have a considerable if often sporadic history of problems - which is in itself seen as implicative - but also from the fact that their behaviour is now uncommon and considered inappropriate to their age group. The middle-aged heavy drinker may indeed have changed his drinking style as part of his gravitation into an enclaved subculture, but the more important fact is that those around him have changed their drinking habits. The emphasis on surreptitious drinking in the classical Alcoholics Anonymous drinking history is an indication of this ecological problem for the middle-aged heavy drinker.

It should be recognized that what have been offered here are plausible interpretations and not conclusive analyses of the apparent gap between realities pertaining to the clinical population and those pertaining to the general population. There seems now to be some international agreement between workers in the field of alcohol research, at least in Finland, the United Kingdom and the USA, on the importance of focusing on these issues, and more definitive assessments of the relations between the two worlds may be expected in the future.

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