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**The distribution of customary behaviour in a population:
The Total Consumption Model and alcohol policy¹**

Robin Room^{a,b} and Michael Livingston^a

^aCentre for Alcohol Policy Research, La Trobe University, Melbourne, Australia;

^bCentre for Social Research on Alcohol and Drugs, Stockholm University, Sweden

Introduction

This paper is concerned with a particular strand of thinking that has been interwoven in sociological alcohol research for half a century, and has in some times and places had a strong influence on policy. I will describe the inception and development of the model, the political context in which it emerged and was fought over, and various strands of development building on the model over the decades. The paper then proceeds to consider some limits on and anomalies in the model as they have emerged and been debated over the years. It is concluded that the model has always been inherently sociological in its framing, being concerned with change both at the level of interpersonal interaction and at the level of patterns in a society as a whole, and with the relationship between changes at the different levels.

Contesting paradigms for the societal handling of alcohol issues

Alcoholism: the dominant Anglophone model of alcohol problems 1940—1980

When, in 1963, as a graduate student in sociology, the first author got a summer job in alcohol studies, he came into a field which, at least in the U.S. and other Anglophone countries, was defined by the concept of alcoholism. Alcoholics were afflicted by a mysterious “predisposing X factor” (Jellinek, 1952) which meant that they could not control their drinking. According to this conceptualization, in the adult population that drank at all, there were thus two separate populations of drinkers, alcoholics and social drinkers. How heavily the rest of the drinkers in the population drank was seen as irrelevant to the question of how many alcoholics there were, since alcoholism was foreordained by a preexisting factor, whether the factor turned out to be a matter of genetics or childhood factors.

This alcoholism model was shaped by the historical and cultural politics of alcohol. The revolt of middle-class generations against temperance thinking had left very little cultural-political space for talking at all about the role of alcohol in social and health problems. Even the medical and public health literature was affected by the ideological currents, with arguments, for instance, that alcohol consumption was not a factor in liver cirrhosis (Herd, 1992). In this sociopolitical context,

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the alcoholism model became the only path forward for seeking support for research in the area (Roizen, 1991). Providing treatment and looking for a cure for those fated to be alcoholics was a goal that the alcohol industry interests, members of the “wet generations”, and even the public health field (Room, 1984a) – seeking to put behind it a history of sympathy with the prohibition movement – could agree on. The policy implication of the alcoholism model, indeed, was that there was a need to provide treatment – indeed, build a treatment system – to serve and control the alcoholics among us, but no need for attention to the availability of alcohol and the level of use in the population at large.

The model attained dominance in the field by 1950, and versions of it – for instance, the “brain disease” model -- are of continuing importance today. It may be noted that in quiet ways, from the 1950 onward, many of the north American sociologists contributing to the field dissented from this alcoholism model, and published work which tended to undercut it (Room, 1983).

An alternative model: alcohol problems and the “total consumption model”

An alternative “alcohol problems” model, now often described as a “new public health” approach in parallel with developments in other public health fields, gradually came together in the 1960s and 1970s (Room, 2015), with substantial contributions from sociology. One aspect of this model was the view that levels and patterns of drinking in the population as a whole affected the rates of drinking-related problems in that population (Rose and Day, 1990). Stated in this way, the proposition seems a truism, but there was substantial resistance to such an idea, since it implied that alcohol’s availability and marketing to the population at large was a matter for public health concern (and for that matter for social welfare and justice concern). In Nordic countries, where such ideas were somewhat more congenial, this became identified as the “total consumption model”, and had substantial policy influence, becoming official orthodoxy in Sweden (Sutton, 1998), and being cited as justification for restrictive policies in Norway. Elsewhere, an alcohol problems approach to alcohol issues, including substantial attention to alcohol availability and marketing controls, became dominant in public health thinking, but had considerably less traction at the level of national and international policies (Room, 1984a; Room, 1984b; Room et al., 2008).

A crucial territory of dispute between the two framings of alcohol issues was a main element underlying the “total consumption model” – an element which became known as the “distribution of consumption” model, among other designations. Focusing on the distribution of alcohol consumption in the population as a whole, the model proposed that there was a relationship between the per-capita consumption among drinkers in the population as a whole and the rate of very heavy drinkers in the population. This proposition fundamentally challenged the alcoholism model of two separate and unlinked subpopulations of drinkers, the alcoholics and the social drinkers. Focusing on the consumption of the population as a whole, it also tended to point attention to measures aimed at the population level rather than at individual drinkers, including the availability and price of alcoholic beverages. It was thus a perspective which was doubly unwelcome to alcohol industry interests.

The distribution of consumption model had first been put forward by a French researcher, Sully Ledermann, in 1956 (Ledermann, 1956; Skog, 2006). In the 1950s, alcohol consumption levels in France had reached very high levels, and there tended to be a clear recognition among French medical experts that the high rates of alcohol-related disease in France reflected the high rate of

alcohol consumption – French professionals referred to the “alcoholization” of the society (Babor et al., 1994, p. 13; Room, 1984b). Ledermann proposed that the distribution of alcohol consumption among drinkers always conformed to a particular distribution -- a lognormal curve, with one of the two parameters of such a curve fixed. For this distribution to continue to fit when consumption levels changed meant that on average the consumption of heavy drinkers and light drinkers changed up and down together and proportionately.

Ledermann’s ideas were first picked up in North America by researchers at the Addiction Research Foundation in Toronto (de Lint & Schmidt, 1971), but were most fully adapted and developed over a period of more than three decades by a Norwegian sociologist, Ole-Jørgen Skog. Skog’s development of the theory was an important component of a foundation document of the “new public health” approach to alcohol, *Alcohol Control Policies in Public Health Perspective*, known as the “purple book” (Bruun et al., 1975).

In Skog’s hands, some indefensible parts of Ledermann’s theories were dropped (Skog, 1973; Skog, 1985). The empirical basis was widened with data from drinking surveys from a range of populations. In the “purple book”, Skog and his colleagues were able to show, based on cross-sectional distributions of reported amount of drinking in a population, that a measure of the dispersion of drinking in populations with very different average levels of drinking was much the same (though tending to be somewhat higher in populations with lower levels of drinking), indicating “a certain invariance in the drinking pattern” (Bruun et al., 1975:34). This implied that the drinking of heavy drinkers would tend to vary predictably with the overall population consumption level – contrary to the alcoholism model’s assertion that the level of drinking in a population was irrelevant to the drinking of “alcoholics”. In fact, change in the proportion of heavy consumers drinking above a certain level seemed empirically to be “approximately proportional to the square” of the change in mean consumption (p. 36). While little longitudinal data was available at the time, findings from two follow-up studies of Nordic populations were cited to support this argument (p. 38).

Trajectories of development of the distribution of consumption and the total consumption model

Technical arguments over the distribution

As Skog had noted, the approximately log-normal distribution of alcohol consumption among drinkers in a population should not be a surprise; “economists have already for a number of years applied the lognormal distribution of consumption with regards to a large number of products” (Skog, 1973). More broadly, it was pointed out that the distribution forms a good approximation of a wide variety of phenomena in nature (Aitchison & Brown, 1957) and human behaviour (Allport, 1934), tending to be the result “whenever a given stimulus produces a change in behavior which is proportional to the previous position on the variable” (Room, 1973).

Nevertheless, there was a succession of attacks on the validity of the “lognormal model” as a description of the distribution of drinking among drinkers. In earlier years, those critiquing the model often had the objective of undercutting the public health thrust of the argument, from the model, that rates of heavy drinking varied with the consumption levels among drinkers (e.g., Duffy &

Cohen, 1978; de Burgh, 1983). Later, as the rough empirical regularities the model described became accepted, there was considerable discussion of which of three fairly similar curves of the distribution of consumption – lognormal, a gamma distribution, or a Weibull distribution – best fitted the empirical distributions from population surveys (e.g., Guttorp & Song, 1977; Skog, 1979; Guttorp & Song, 1979). Analyses of this issue have generally concluded that there are variations between population surveys in which curve fits the data best, though all provide a fairly good fit. The most recent analysis found that “the Weibull distribution seems to best fit the various distributions”, but then found that the distribution’s statistical properties made it unfeasible for use in modelling alcohol exposure. In the same analysis, there was variation between populations in which of the gamma and log-normal distributions came closer to fitting varied between datasets (Rehm et al., 2010).

At a more wide-ranging level, Gmel and Rehm (2000; 2003) took on the question of the “empirical testability of Skog’s theory of collective drinking behaviour” both in statistical and in substantive terms. We shall return to the substantive level below. At the statistical level, Gmel and Rehm point out that both strong and weak versions of his main hypotheses can be found in Skog’s work, and offered criticisms primarily of the strong version. Skog’s responses (Skog, 2001; 2003) contested some statistical points, but tended to retreat to the weaker version.

Sociology and the focus on “total consumption” strategies to reduce alcohol problems

The group of authors of the purple book was dominated by sociologists. Only quite late in the preparation of the book, in discussing how it should be titled, was the collective decision taken that public health would be the flag the book would fly at its masthead: *Alcohol Control Policies in Public Health Perspective*. As Sulkunen and Warsell note, while the book is often seen by its critics “as an authoritarian approach to limit individual freedom”, in a Nordic context, instead it “stemmed from a much richer, liberal rather than authoritarian sociological background” (Sulkunen & Warsell, 2012). The focus on the distribution of alcohol consumption in the population as a whole reflected a disposition of the authors to focus on strategies to reduce rates of alcohol problems that did not focus on particular individuals, whether with education, treatment or punishment. This focus explicitly took account of the drawbacks of individual-directed approaches, as they were recognised and discussed in north American sociology of the time -- in terms of the dysfunctions and status inequalities of labelling:

most control measures tend to focus on the population at large, rather than on single individuals. In this they contrast with criminal law and treatment strategies.... Strategies which single out individuals – whether for correction, treatment, or rehabilitation – tend to involve the large and continuing costs of state-funded agencies and professional personnel. The labelling of individuals as a part of such strategies also carries social costs in that it tends to be applied to those with the least social resources to protect themselves. (Bruun et al., 1975, p. 67)

In the Nordic context, as Tigerstedt (1999) remarked – and for that matter, in a Canadian context (Room, 2012) – the “total consumption model” meant that controls on drinking were “detached from directly governing concrete individuals and moved toward the regulation of abstract risks defined on an aggregate level”.

On the other hand, in more recent decades, the total consumption model's push for controls on marketing and selling alcohol have lost ground to a combination of forces – not only the long shadow of the reaction against temperance in the mid-20th century, and the counter-pressure of vested interests of alcohol and allied industries, but also the neoliberal push for open markets and competition in recent decades (Sulkunen et al., 2000; Room, 2010).

The collectivity of drinking cultures and mechanisms and patterns of change

In the 1980s and later, Skog himself pushed in several directions, both conceptually and empirically, beyond the cross-sectional distribution of consumption in a population. The purple book had offered a sketch of how collective “changes in consumption may take place”, focusing on interpersonal influences: if one drinker starts offering a drink when his friends come over, they “may come to feel obliged to offer him a drink on his return visit” (Bruun et al., 1975: 39). In a series of papers, Skog developed conceptualizations and hypotheses about mechanisms underlying changes in consumption in a population in which the distribution of consumption stayed approximately constant. He focused particularly on what he called “contagion between persons” – that, given that drinking is predominantly a social activity, people influence each other's drinking directly in personal interactions: “studies strongly suggest that interaction causes similarity” in levels of drinking (Skog, 1980). These influences are passed along to further parties through interactions in social networks. With diagrams of hypothetical social networks and statistical reasoning, Skog argued that the structure of social networks could influence the extent to which the drinking patterns of different individuals are linked. “The hypothesis of covariation between per-capita consumption and prevalence of heavy use”, he insisted, “is therefore founded on *sociological* theory – not, as some seem to believe, on *statistical* theory” (Skog, 1980). In another paper, he considered how this network perspective on the linkage of individual patterns of drinking might interact in history with ideological movements such as temperance to produce “long waves” of alcohol consumption (Skog, 1986).

Skog's minimum argument was summarised in his paper on the “collectivity of drinking cultures” (Skog, 1985). First, “factors influencing a person's drinking behaviour tend to combine *multiplicatively*”. Second, “an individual's drinking habits are strongly influenced by the drinking habits of his friends, or more generally by the drinking habits in his personal social network”; evidence is also offered that “this argument can be extended to society at large”. From the two propositions, it follows that the distribution of consumption will be skewed, and that, as mean consumption increases in a population, so does the proportion of the population drinking above a given consumption level, through a “collective displacement of the whole population”.

As Skog had noted in 1980, “regrettably, our present knowledge of the structuring of social networks with respect to drinking is limited” – a statement which remained true until recently. And although the papers on the distribution of consumption and the total consumption model put forward arguments, tying together the individual and societal levels, on how consumption changes over time, they had drawn very little on empirical data on change in individuals' drinking over time. In a late paper with Rossow, Skog took on this dimension, making use of longitudinal data on individual drinking changes from one year to another from Norway, in a period when overall drinking changed little, and in Finland when there had been a dramatic increase in consumption as beer

became much more widely available. The paper set out to reconcile the apparent contradiction between the phenomenon of “regression to the mean”, where those giving an outlying answer on a variable at the first interview are more likely than others to have moved back towards the population mean when reinterviewed, and the prediction of the distribution of consumption model that change at the reinterview will tend to have changed proportionally to their answer on the first interview. In their analysis, Skog and Rossow (2006) were able to show that, when the regression effect is taken into account, “the Finnish alcohol reform in 1969 gave rise to an increase in consumption of the same order of magnitude in relative terms among consumers at different consumption levels” – that is, there was a substantially greater increase among those already drinking larger amounts.

Limits and anomalies in the distribution of consumption model

Over the decades since 1975, issues have been identified and anomalies have emerged in the total consumption model. We will enumerate a number of these here, discussing what may be needed to build on the model so as to take them into account and encompass them. While some of the issues were identified and discussed by Skog, some have emerged since his untimely death in 2006.

What about the interrelation of abstention and drinking?

Starting with Ledermann, the distribution of consumption model has quite explicitly been about the distribution among drinkers in a population, without taking account of abstention. In population surveys, definitions of the boundary between an abstainer and drinker have varied. A common definition of “current abstainer” is someone who has not had a drink of alcohol in the last year, but the time period has varied between studies, and some studies use a definition of “drinker” with a threshold of having drunk at least 12 drinks during the period (Dawson, 2003).

It has been common in analysing alcohol consumption to treat the issue of whether to drink at all as in a separate category from decisions by a drinker on how much to drink. But quite a substantial proportion of many populations drink infrequently, and often very little at a time. For instance, 13.6% of US adult respondents in 1984 (almost 1 in 5 of the current drinkers) reported drinking less than once a month and never as many as 5 drinks at a time (Room, 1991, p.45). There can also be some conceptual distance between whether one thinks of oneself as a drinker or an abstainer and whether one happens to have had a drink in the last year. Thus Lindgren (1973) found that in the Netherlands in 1969, where only 5% of the adult population identified themselves as “total abstainers”, 18% of the “total abstainers” had had a drink in the last year, while 7% of the majority of the sample (69%) who identified themselves as “occasional drinkers” had not had a drink in the last year. Commenting on such findings, Nelker (1973) suggested that differences in the cultural-political position of abstinence and drinking in the society at a given time would influence the relation between whether one occasionally had a drink and whether one considered oneself an abstainer. In terms of how the distribution of drinking changes in the whole population, there is some evidence that factors which influence drinkers to drink more will also influence some abstainers to become drinkers. Skog and Rossow’s paper includes some relevant data: after the 1969 Finnish alcohol policy changes, when alcohol consumption went up by about half, 33% of those

who had abstained in 1968 reported drinking in 1969, while only 13% of those who were drinkers in 1968 reported abstaining a year later (Skog & Rossow, 2006: Table 1). Skog's model of interpersonal influence, of "contagion between persons", would predict influence between abstaining and drinking friends or associates in contact with each other as population levels change.

On the other hand, it seems possible for cultural and geographic divisions between abstainers and drinkers living in the same society to provide insulation from change on the boundary between drinking and abstention, even while amount of drinking is changing among drinkers. The U.S., for instance, has retained a high rate of abstinence (about one-third of adults) in a historical period when rates of abstinence fell dramatically in other rich countries with a strong temperance tradition -- including in the 1960s and 1970s (Room, 1982, p. 573), when per-capita consumption in US rose by more than 20%. Nusbaumer (1981) found that abstinence had particularly held its own within the US in this era among members of abstinence-oriented religious denominations living in high-abstinence regions of the country -- that is, among those with multiple abstinence-inclined associations.

Thus if we aim to develop evidence-based models of how alcohol consumption changes in a population under the influence of external influences and cultural changes -- to move beyond the question of the distribution of alcohol consumption among drinkers to a sociologically-oriented analysis -- abstainers, and movement across the boundary between drinking and abstention, should be added to the frame of analysis.

Probing the limits of applicability: alcohol control mechanisms and forms of social control

Skog set some limits to the applicability of the analyses he put forward, in terms of the characteristics of societies and alcohol control models. A study by Norström (1987) had established that the distribution of consumption in Sweden changed quite radically when the system of individual rationing of alcohol purchases was abolished in 1955 -- with cirrhosis mortality increasing substantially in the following years. The previous Swedish system had not only imposed an upper limit on the amount each family could purchase per month, but also, on the basis of their troubles with drinking, had excluded about 10% of those who applied from any ration at all (Room, 2012). Citing Norström's study, Skog (1985) commented that the model he presented may only "be typical for what may be called a *consumers free market*. In social systems with strict formal control of individuals (rationing, for example), the situation may be somewhat different". In the current era, neoliberal policies at both international and national levels tend to keep the market quite free for consumers in general in high-income countries. But, as concerns about alcohol-related problems have grown, in some countries there has been a drift toward individual-level controls on drinking (Room, 2012), particularly for those whose behaviour after drinking has run up against criminal law (Nicosia et al., 2016). If these trends become more general, they could affect the distribution of consumption, as they probably have already in remote areas of Australia with respect to Aboriginal populations (e.g., Conigrave et al., 2007).

Skog (1985) opened up another potential set of limits of applicability by adding, "it may also be imagined that more rigid societies with a stricter informal social control may give rise to distribution patterns which deviate from those we have been able to observe up till now". Using data from surveys in 15 African countries, Rossow and Clausen (2013) showed that the distributions of consumption among drinkers were positively skewed, with the whole consumption displaced

upwards in heavier-drinking societies, and that the distribution held also in six countries with a strong Moslem population (ranging from 34% to 98% of the population). In other words, Skog's distribution of consumption model basically applied in 15 low- and middle income countries. In the authors' view, the findings for the African societies thus countered Skog's comments about "more rigid societies with a stricter informal social control". But Skog's comments were speculative, and there is room for substantial debate about which societies are more "rigid" and have "stricter informal social control".

In earlier work, Skog (1980) had specified factors in a society which might affect the "dispersion of the distribution" of alcohol consumption, including "(a) the heterogeneity of the society, i.e., the extent to which different substrata have different drinking habits, (b) the degree to which the individuals are influencing each other's drinking behaviour ... [lower dispersion with stronger influences], and (c) the connectedness of the society ... how rapidly innovations diffuse through the social network" -- lower dispersion with tighter connections. We will return to this list below; they can be seen as the beginning of a more complex theory of the collectivity of drinking cultures.

Diverse trends within a given society

Throughout the history of distribution of alcohol consumption discussions, the collectivity within which the distribution has been discussed has been almost exclusively the whole society or country. Yet a substantial number of cases can be found in which it is clear that different groups within a society have diverged in terms of their levels of drinking. Here are a few examples:

- Herd (1985) analysed cirrhosis mortality over time by recorded race and by birth cohorts to show that there had been substantial divergences in the drinking of the Black and White populations of the U.S. While before the 1950s Black cirrhosis death rates were roughly equal to or below White, the Black rates rose after 1955, with the rise specific to particular parts of the country (not in the South).
- Gustafsson (2010a) found that alcohol consumption rose in northern Sweden while it declined in southern Sweden – the opposite of what had been expected, since reductions in Danish spirits taxes and the end of border import controls meant that alcohol had become effectively cheaper in the south. In a second paper (Gustafsson, 2010b), in the course of analysing alcohol problems data, she pointed out that the changes in different directions in southern and northern Sweden did not support a single collectivity of drinking interpretation for Sweden as a whole. Neither did the fact that the changes were concentrated in particular subgroups of the population.
- A number of studies have shown divergent trends between men and women in levels of consumption. For instance, examining trends in Finland between 1987 and 2003, Herttua et al. (2007) found that alcohol-related mortality trend among women "was to some extent different from men"; there was "a larger increase in alcohol-related mortality among women than men" – implying a larger increase in consumption among women than among men.

- That attitudes to drinking can vary greatly from one generation to another has been well documented in qualitative terms historically (e.g., Warner, 1970). Now age-period-cohort analyses of population survey series (e.g., Pabst et al., 2010; Harkonen & Mäkelä, 2011) have brought empirical evidence of the existence of generational splits over alcohol consumption in a given societal population. The current widespread reduction in teenagers' drinking, for instance (de Looze et al., 2015), has attracted broad research interest in potential explanations of such changes.

At times in his work, as already cited, Skog acknowledged that there were variations in the degree of "connectedness" in a society, and even that developments and trends in substrata of a society's population might diverge:

The extent to which an exogenously-induced change in one substratum will eventually diffuse to other substrata as well will obviously depend on the degree of interconnectedness between substrata.... Mutually isolated substrata may change their drinking behaviour fairly independent of each other, since no diffusion is likely to occur. (Skog, 1980)

In particular, concerning gender, in response to Gmel and Rehm, Skog acknowledged (citing a report of his from 1985), that "informal social control (i.e., the extent to which people influence each other) may vary ... between substrata. For instance, there may be gender differences in this respect, and it has been demonstrated that there are systematic differences in the dispersion of the distribution among males and females" (Skog, 2001).

Building out the model: some dimensions for development

The issues with which Skog grappled in the distribution of consumption model remain significant, and the rough regularities over time and between societies which have been found in pursuing the model remain interesting and in some ways surprising. Skog's initiative to underpin the findings of regularities in the distribution with a model of interpersonal influences involved in drinking remains important and potentially fruitful. Skog's model opens up the question of how what happens at the interpersonal level at which most drinking occurs relates to trends and patterns in the population and the society. This is a worthy agenda to pursue, both to increase sociological knowledge and to inform policies on alcohol.

However, the scope of thinking needs to be expanded substantially in several directions and at several levels.

- Models of change in drinking in a population need to take patterns and trends in the abstinence/drinking boundary into account, along with the distribution of consumption among drinkers. In most circumstances, it would be reasonable to expect a relationship between influences and trends in amount of drinking among drinkers and influences and trends in whether or not to drink.
- Analysis of trends and patterns in the distribution of alcohol consumption need to take explicit notice of subdivisions within societies, and of differences across the boundaries of such subdivisions in the levels and distribution of consumption.

- For some subdivisions, the differences may derive from social and physical distance. For instance, Herd's findings on different trends in Black and White Americans almost certainly reflect, among other factors, that in the periods affecting her data there was little socialising across ethnoracial lines in the U.S., and thus few of the interpersonal influences around drinking at the heart of Skog's model. Conversely, there is evidence that drinking in Swedish society has been influenced by Swedes' experiences as tourists, particularly in southern Europe and such favoured spots as the Canary Islands (Heine, 2010; Cisneros Örnberg & Room, 2014).
- For other subdivisions, for instance between males and females, the differences reflect not distance, but rather such factors as gender roles and relationships, along with social position and biology. Skog's formulation in terms of "connectedness" needs to be unpacked and analysed.
- Notably absent from the discussions of the distribution of consumption is any reference to cultural dimensions. At the level of the whole society, there are substantial differences in the cultural position of drinking (and for that matter of not-drinking) (Room & Mäkelä, 2000). Also very important in drinking patterns and customs are cultural entities at the levels of subcultures – occupational, ethnic, avocational, etc. -- and looser social worlds, which frequently impose their own positive and limiting norms on drinking (Savic et al., in press). The interpersonal interactions in Skog's network diagrams are more often than not operating within the frame of such subcultures or social worlds.
- At the level of interpersonal interaction, there has been substantial development in network and other analyses in recent years, so analysis at this level need not remain at the level of what-if modelling at which Skog had to operate.
 - It needs to be recognised that the field of interpersonal interactions concerning alcohol is more complex than the undifferentiated links and the one-directional influences in Skog's network diagrams. Adults interact with others in a variety of social roles – e.g., family member, workmate, friend -- and in those roles are influenced by and influence others both to drink or drink more and to drink less or not at all. Each individual may thus be subject to a variety of normative influences both to increase and to decrease drinking – and a heavier drinker is likely to receive more nudges in both directions (Room et al., 2016). The extent and nature of influences in a given role is likely to change as the social environment becomes "wetter" or "drier" (Hilton, 1991).
 - US network studies in recent years have underlined the importance of friendship networks in the spread of drinking behaviour, not only in adolescence (e.g., Osgood et al., 2013), but also in terms of adult behaviour (Rosenquist et al., 2010; Cruz et al., 2012). Some such analyses now take account of online as well as face-to-face relationships (Huang et al., 2014).

There is a need for conceptual as well as empirical work on the relationships between interpersonal interactions and friendships and links at a cultural level such in subcultures and social worlds.

Conclusion

The distribution of consumption model was a specific artefact of the alcohol literature -- although there have been papers applying it to other habitual behaviours such as drug use and gambling -- and to my knowledge it has had little influence outside its specific field. On the other hand, while discussions of the distribution of consumption model have occasionally referred to distributions of other consumption behaviours, they have paid little attention to other literatures on consumer behaviour and interpersonal influences on such behaviour. It would be an interesting project, indeed, to try to bring work from such traditions together.

In the meantime, this paper offers a sketch of how the distribution of alcohol consumption literature might be developed. The main path forward, it is argued, is to accept that arguments about the distribution of alcohol consumption are largely settled in terms of the research literature -- that the distribution among consumers is highly skewed and roughly lognormal, and that in this it follows a common pattern among consumer products and behaviours. However, this consistent finding remains politically contentious, since its implications for policy are inconvenient for important economic interests and conceptual frames (Rose & Day, 1990).

Mapping patterns in the collectivity of drinking at the interpersonal level, and putting these into the frame of societal and cultural patterns, remains an important area for further work. We have argued that this work needs to move beyond the bilevel framing and the set limits on applicability implicit in Skog's model. What would emerge from this development would be multilevel and quite wide-ranging, and not particularly directed to the issue of the population distribution of consumption. Such a more fully sociological approach to analysing collective and interpersonal influence and actions with respect to an inherently social behaviour would not only push forward our knowledge of collective aspects of human behaviour nature, but also have implications for alcohol policies.

References

- Aitchison, J. & Brown, J.A.C. (1957) *The Lognormal Distribution: with Special Reference to Its Uses in Economics*. Cambridge: Cambridge University Press.
- Allport, F. (1934) The J-curve of hypothesis of conforming behaviour, *Journal of Social Psychology* 5(2):141-183.
- Babor, T., Campbell, R., Room, R. & Saunders, J., compilers (1994) *Lexicon of Alcohol and Drug Terms*. Geneva: World Health Organization.
http://www.who.int/substance_abuse/terminology/who_lexicon/en/
- Bruun, K., Edwards, G., Lumio, M., Mäkelä, K., Pan, L., Popham, R.E., Room, R., Schmidt, W., Skog, O.-J., Sulkunen, P. & Österberg, E. (1975) *Alcohol Control Policies in Public Health Perspective*. Helsinki: The Finnish Foundation for Alcohol Studies, Vol. 25.
- Cisneros Örnberg, J. & Room, R. (2014) Impacts of tourism on drinking and alcohol policy in low- and middle-income countries: a selective thematic review. *Contemporary Drug Problems* 41(1):145-169.

- Conigrave, K., Proude, E., & d'Abbs, P. (2007). Evaluation of the Groote Eylandt and Bickerton Island Alcohol Management System: a report produced for the Department of Justice, Northern Territory Government. Sydney: Royal Prince Alfred Hospital.
- Cruz, J.E., Emery, R.E. & Turkheimer, E. (2012) Peer network drinking predicts increased alcohol use from adolescence to early adulthood after controlling for genetic and shared environmental selection. *Development Psychology* 48(5):1390-1402.
- Dawson, D.A. (2003) Methodological issues in measuring alcohol use. *Alcohol Research & Health* 17(1):18-29. <http://pubs.niaaa.nih.gov/publications/arh27-1/18-29.htm>
- de Burgh, S.P.H. (1983) An appraisal of the Ledermann theory. *Australian Alcohol/Drug Review* 2(2):76-83.
- de Lint, J. & Schmidt, W. (1971) Consumption averages and alcoholism prevalence: a brief review of epidemiological investigations. *British Journal of Addiction to Alcohol & Other Drugs* 66(2):97-107.
- de Looze, M., Raaijmakers, Q., Ter Bogt, T., Bendtsen, P., Farhat, T., Ferreira, M., ... & Simons-Morton, B. (2015). Decreases in adolescent weekly alcohol use in Europe and North America: evidence from 28 countries from 2002 to 2010. *European Journal of Public Health* 25(suppl 2): 69-72.
- Duffy, J.C. & Cohen, G.R. (1978) Total alcohol consumption and excessive drinking. *British Journal of Addiction to Alcohol & Other Drugs* 73(3):259-264.
- Gmel, G. & Rehm, J. (2000) The empirical testability of Skog's theory of collective drinking behaviour. *Drug & Alcohol Review* 19:391-399.
- Gmel, G. & Rehm, J. (2003) Marginality revised – on the empirical basis and practical implications of Skog's theory of collective displacement: a reply to Skog's commentary. *Drug & Alcohol Review* 22:93-94.
- Gustafsson, N.-K. (2010a). Alcohol consumption in southern Sweden after major decreases in Danish spirits taxes and increases in Swedish travellers' quotas. *European Addiction Research* 16(3):152-161.
- Gustafsson, N.-K. (2010b). Changes in alcohol availability, price and alcohol-related problems and the collectivity of drinking cultures: what happened in southern and northern Sweden? *Alcohol and Alcoholism* 45(5): 456-467.
- Guttorp, P. & Song, H.H. (1977) A note on the distribution of alcohol consumption, *Drinking & Drug Practices Surveyor* 13:7-8.
- Guttorp, P. & Song, H.H. (1979) A rejoinder to Skog. *Drinking & Drug Practices Surveyor* 14:6, 29-30.
- Härkönen, J T., & Mäkelä, P. (2011). Age, period and cohort analysis of light and binge drinking in Finland, 1968–2008. *Alcohol and Alcoholism* 46(3): 349-356.
- Heine, S. (2010). Happy Hour i paradiset: Om alkohol och turism i Thailand, Kambodja och övriga världen [Happy Hour in paradise: On alcohol and tourism in Thailand, Cambodia and the rest of the world]. <http://www.schystresande.se/upl/files/86632.pdf>
- Herd, D. (1985) Migration, cultural transformation and the rise of Black cirrhosis mortality. *British Journal of Addiction* 80:397-410.
- Herd, D. (1992) Ideology, history and changing models of liver cirrhosis epidemiology. *British Journal of Addiction* 87:179-192.
- Herttua, K., Mäkelä, P. & Martikainen, P. (2007) Differential trends in alcohol-related mortality: a register-based follow-up study in Finland in 1987-2003. *Alcohol & Alcoholism* 42(5):456-464.

- Hilton, M. (1991) The presence of alcohol in four social situations: survey results from 1964 and 1984. In: Clark, W. & Hilton, M., eds., *Alcohol in America: Drinking Practices and Problems*, pp. 280-289. Albany, NY" State University of New York Press.
- Huang, G.C., Unger, J.B., Soto, D., Fujimoto, K., Pentz, M.A., Jordan-Marsh, M. & Valente, T.W. (2014) Peer influences: The impact of online and offline friendship networks on adolescent smoking and alcohol use. *Journal of Adolescent Health* 54(5):508-514.
- Jellinek E.M. (1952) Phases of alcohol addiction, *Quarterly Journal of Studies on Alcohol* 13:673-684.
- Ledermann, S. (1956) Alcool, alcoolisme, alcoolisation [Alcohol, alcoholism, alcoholisation]. Institut National d'Études Démographique, Travaux et Documents, Cahier N° 41. Paris: Presses Universitaires de France.
- Lindgren, Å. (1973) Some results from an international series of drinking surveys. *Drinking & Drug Practices Surveyor* 8:34-45.
- Nelker, G. (1973) Total abstinence – as an attitude and as a behavior – some further notes. *Drinking & Drug Practices Surveyor* 8:45-47.
- Nicosia, N., Kilmer, B., & Heaton, P. (2016). Can a criminal justice alcohol abstinence programme with swift, certain, and modest sanctions (24/7 Sobriety) reduce population mortality? A retrospective observational study. *The Lancet Psychiatry* 3(3):226-232.
- Norström, T. (1987) Abolition of the Swedish alcohol rationing system: effects on consumption distribution and cirrhosis mortality. *British Journal of Addiction* 82:633-641.
- Nusbaumer, M.R. (1981) Religious affiliation and abstinence: a fifteen-year change. *Journal of Studies on Alcohol* 42(1):127-131.
- Osgood, D.W., Ragan, D.T., Wallace, L., Gest, S.C., Feinberg, M.E. & Moody, J. (2013) Peers and the emergence of alcohol use: Influence and selection processes in adolescent friendship networks. *Journal of Research on Adolescence* 23(3)500-512.
- Pabst, A., Kraus, L., Piontek, D., & Mueller, S. (2010). Age, period, and cohort effects on time trends in alcohol consumption in the German adult population. *Sucht* 56(5):349-359.
- Rehm, J., Kehoe, T., Gmel, G., Stinson, F., Grant, B. & Gmel, G. (2010) Statistical modelling of volume of alcohol exposure for epidemiological studies of population health: the US example. *Population Health Metrics* 8:3 (12 pages).
- Roizen, R. (1991) *The American Discovery of Alcoholism, 1933-1939*. PhD dissertation, Sociology, University of California, Berkeley. <http://www.roizen.com/ron/disshome.htm>
- Room, R. (1973) Notes on the implications of the log-normal curve. *Drinking and Drug Practices Surveyor* 7:18-20.
- Room, R. (1982) Region and urbanization as factors in drinking practices and problems. In: Kissin, B. & Begleiter, H., eds., *The Pathogenesis of Alcoholism: Psychosocial Factors, The Biology of Alcoholism*, Vol. 6, pp. 555-604. New York: Plenum Press,
- Room, R. (1983) Sociological aspects of the disease concept of alcoholism. In: Smart, R. et al., eds., *Research Advances in Alcohol and Drug Problems*, Vol. 7, pp. 47-91. New York & London: Plenum.
- Room, R. (1984a) Alcohol control and public health. *Annual Review of Public Health* 5:293-317.
- Room, R. (1984b) The World Health Organization and alcohol control. *British Journal of Addiction* 79:85-92.
- Room, R. (1991) Measuring alcohol consumption in the U.S.: methods and rationales. In: Clark, W. & Hilton, M. eds., *Alcohol in America: Drinking Practices and Problems in a National Survey*, pp. 26-50. Albany: State University of New York Press, 1991.

- Room, R. (2010) The long reaction against the wowser: The prehistory of alcohol deregulation in Australia. *Health Sociology Review* 19(2):151-163.
- Room, R. (2012) Individualised control of drinkers: back to the future? *Contemporary Drug Problems* 39(2):311-343.
- Room, R. (2015) Alcohol. In: Detels, R., Gulliford, M., Karim, Q.A. & Tan, C.C., eds., *Oxford Textbook of Global Public Health*, 6th ed., vol. 3, pp. 1249-1261. Oxford, etc.: Oxford University Press.
- Room, R., Callinan, S. & Dietze, P. (2016) Influences on the drinking of heavier drinkers: interactional realities in seeking to “change drinking cultures”, *Drug and Alcohol Review* 35(1):13-21.
- Room, R. & Mäkelä, K. (2000) Typologies of the cultural position of drinking, *Journal of Studies on Alcohol* 61:475-483.
- Room, R., Schmidt, L., Rehm, J. & Mäkelä, P. (2008) International regulation of alcohol. *British Medical Journal* 337 (Nov. 6):a2364.
- Rose, G. & Day, S. (1990) The population mean predicts the number of deviant individuals. *British Medical Journal* 301:1031-1034.
- Rosenquist, J.N., Murabito, J., Fowler, J.H. & Christakis, N.A. (2010) The spread of alcohol consumption behavior in a large social network. *Annals of Behavioral Medicine* 152(7):426-435.
- Rossow, I., & Clausen, T. (2013). The collectivity of drinking cultures: is the theory applicable to African settings? *Addiction* 108(9):1612-1617.
- Savic, M., Room, R., Mugavin, J., Pennay, A. & Livingston, M. (in press) Defining “drinking culture”: a critical review of its meaning and connotation in social research on alcohol problems, *Drugs: Education, Prevention and Policy*, forthcoming.
- Skog, O.-J. (1973) Less alcohol – fewer alcoholics? *Drinking and Drug Practices Surveyor* 7:7-14, 20.
- Skog, O.-J. (1979) Gamma vs. lognormal distributions – a reply to Guttorp and Song. *Drinking & Drug Practices Surveyor* 14:3-6.
- Skog, O.-J. (1980) Social interaction and the distribution of alcohol consumption. *Journal of Drug Issues* 10(1):71-92.
- Skog, O.-J. (1985) The collectivity of drinking cultures: A theory of the distribution of alcohol consumption. *British Journal of Addiction* 80:83-99.
- Skog, O.-J. (1986) The long waves of alcohol consumption: a social network perspective on cultural change. *Social Networks* 8(1):1-32.
- Skog, O.-J. (2001) Commentary on Gmel and Rehm’s interpretation of the theory of collectivity of drinking culture. *Drug & Alcohol Review* 20:325-331.
- Skog, O.-J. (2003) Collectivity revisited – a reply to Gmel and Rehm. *Drug & Alcohol Review* 22:472-473.
- Skog, O.-J. (2006) The historical roots of Ledermann’s theory of the distribution of alcohol consumption. *Contemporary Drug Problems* 33:143-174.
- Skog, O.-J. & Rossow, I. (2006) Flux and stability: individual fluctuations, regression to towards the mean and collective changes in alcohol consumption, *Addiction* 101:959-970.
- Sulkunen, P., Sutton, C., Tigerstedt, C. & Warpenius, K., eds. (2000) *Broken Spirits. Power and Ideas in Nordic Alcohol Control*. Helsinki: Nordic Alcohol and Drug Council, Publication No. 39.
- Sutton, C. (1998): *Swedish Alcohol Discourse: Constructions of a Social Problem*. PhD, Sociology, Uppsala University. Uppsala University Library: Studia Sociologica Upsaliensia 45.
- Warner, H.S. (1970) Alcohol trends in college life: Historical perspectives. In Maddox, G., ed., *The Domesticated Drug: Drinking Among Collegians*, pp. 45-80. New Haven: College & University

Press. (Paper originally published in 1938.)