ALCOHOL-RELATED PROBLEMS AND PUBLIC HEALTH.

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CONTENTS.

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List of Tables.

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DECLARATION

The author designed the APQ and all the studies reported in this thesis with the exception of the 1984 U.S. National Survey, which was conducted by the Alcohol Research Group of the Medical Research Institute of San Fransisco under the direction of Dr. Robin Room, from whom permission to re-analyse the data was obtained. The analysis of the 1984 U.S. National Survey data reported here had not previously been conducted. The study of specialist versus general practitioner treatment of problem drinkers was designed and carried out by the author in association with Ms. Cheryl Brown, Prof. Griffith Edwards, Dr. Mike Mullins and Ms. Betsy Thom; the German APQ study was designed by the author, with translation, data collection and coding carried out by Dr. Ulrich John, and back-translation by Mrs. Glautier and Ms. Gabrielle Steiger; the APQ test-retest reliability study was designed by the author in association with Mr. Bryn Williams who, with Ms. Sharon Hoffman, collected and coded the data; the college student study was designed in association with Dr. Robert West who, with Ms. Kate Eames, collected and coded the data.

The author carried out all data definition; preparation of computer system files; data analysis; the literature search; the preparation of figures and tables. The thesis was written and word processed by the author alone.

SUMMARY.

The aim of this thesis was to examine the validity of three different theoretical models in explaining the nature of alcohol-related problems in both clinical and general populations. The two models which have traditionally occupied centre stage in the public health debate concerning the most appropriate means to reduce the burden of alcohol-related problems on society, are described here as the 'cluster' and 'disaggregation' models. The former has often, although not exclusively, been described in terms of a more medically-based disease concept, whereas the latter represents more a sociologically-based concept favoured by the epidemiologist. The cluster model advises a public health policy of specialized treatment targetted at the minority of very heavy drinkers, whereas the disaggregation model suggests alcohol control policies such as taxation aimed at reducing alcohol consumption in the whole drinking population.

The 'mediational' model, occupies an intermediate position, sharing certain features of the two earlier models. It is proposed that problems and dependence represent conceptually separate dimensions. However, they are also predicted to be functionally related: the altered drive state occasioned by dependence is hypothesized to be a key mediating factor in the relationship between alcohol consumption and alcohol-related problems. The existing evidence to support the mediational model is inconclusive, in part through the absence of a suitable instrument to measure alcohol-related problems.

The development of a questionnaire to measure alcohol-related problems is described: the Alcohol Problems Questionnaire (APQ). A series of surveys was then conducted to test the following two main hypotheses:
1. That dependence is a mediating factor in the consumption-problems relationship.
2. That alcohol-related problems are more subject to the influence of social, demographic, economic, and cultural factors than is dependence.

The initial survey was conducted in a clinical sample of 103 problem drinkers in treatment in 3 London hospitals. Responses to the APQ were compared with those to

the Severity of Alcohol Dependence Questionnaire (SADQ). The results of a path analysis provided support for the two main hypotheses described above. These findings were then replicated in two further clinical surveys, one in an English population and one in a German population (in the latter case, using translated questionnaires).

These surveys, combined with two further studies, examined variously, the test-retest reliability of the APQ, and the validity of both the APQ and the mediational model. It was concluded that the APQ is a reliable questionnaire, with additional evidence of construct validity, concurrent validity, and discriminant validity.

The validity of the mediational model was then examined in a re-analysis of a major U.S. general population survey. Using the same path analytic method, further evidence was found to support the mediational model, with evidence to suggest that the mediating influence of dependence was more marked amongst heavier drinkers.

Finally, two further analyses were conducted to examine the influence of cultural factors in the consumption-problems relationship. Through comparisons of British and German clinical populations, and drinkers resident in 'wet' and 'dry' regions of the U.S., evidence was found to support the view that drinkers resident in more restrictive cultures with respect to drinking behaviour reported more problems at a given level of consumption and dependence. Cultural factors were not found to influence level of consumption or dependence, however.

The implications of these findings for theory, classification and diagnosis, public health policies, and further research are then examined. It is concluded that the mediational model provides a useful framework for future research. Further, the key mediational role which dependence was found to have on the consumption-problems relationship in a large sector of the drinking population prompts a re-evaluation of unitary public health policies targetted at either the small minority of very heavy drinkers or the whole drinking population.

CHAPTER 1.

INTRODUCTION.

THE STRUCTURE OF THIS CHAPTER.

The chapter is divided into five main sections. In the first section the competing models which traditionally have occupied centre stage in the public health debate concerning the most appropriate means to reduce the burden of alcohol-related problems on society, are described. Theorists have tended to be divided, although by no means exclusively, between a more medically-based disease concept and a more sociologically-based epidemiological concept of drinking behaviour and its related consequences. A distinction between these concepts along disciplinary lines, however, represents an oversimplification. In the second section, the key distinguishing features of these two models will therefore be described, the principal difference being on the question of whether different kinds of problem related to drinking tend to cluster together as indication of an underlying causal disorder.

The bi-axial concept is introduced in the third section. The main distinction between this and earlier concepts is in the recognition of dependence as a dimension which is conceptually separate from other kinds of alcohol-related problem. These conceptual differences between dependence and problems, as well as their potentially crucial functional relationship are explored.

The fourth section proceeds by examining existing empirical evidence in support of the three models and identifies the key research issues which form the basis of this thesis. The final section integrates the conclusions of the foregoing discussion and leads to the formulation of hypotheses which will be tested in the studies described in subsequent chapters.

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THE TWO WORLDS OF ALCOHOL PROBLEMS: A MEDICAL, MORAL, AND POLITICAL DILEMMA.

Room (1977) has drawn attention to a dichotomy in the alcohol literature which has led to heated debate over several centuries, and continues to pose a pressing dilemma for public health policy. The type of alcohol-related problems found in a treatment setting has been described as different from that found in general population surveys. The maximum prevalence of alcohol-related problems in general population surveys, for example, is in the early 20s age group, whereas alcohol treatment clinic attenders tend to be aged between 35 and 60 years (Fillmore & Midanik, 1984). Problems tend to be transient in the general population, with many moving in and out of problematic status (Cahalan & Room, 1974; Fillmore & Midanik, 1984). Longitudinal studies of clinical populations, on the other hand, describe a far greater chronicity or even progression of problems in the long term (Edwards, Duckitt, Oppenheimer et al., 1983; McCabe, 1986). Room (1977) described this divided picture as the 'two worlds of alcohol problems'.

Rather than being merely esoteric, this dichotomy has had profound implications for societal, and particularly, public health attitudes and policies towards alcohol problems. The clinician's beliefs concerning the nature of alcohol problems have been considerably different from those of the survey researcher. The view from the clinic has been that the characteristic clustering of a particular pattern of drinking behaviour and certain specific associated problems, which emerge at a particular age and follow a progressive course, are indicative of an underlying addiction process (Jellinek, 1952). The sufferer is captive to the natural history of the disorder and has an impaired capacity to exercise control over alcohol intake. Such a model of drinking problems identifies what are now classified as dependence phenomena (e.g. withdrawal symptoms, craving, impaired control over alcohol intake) as being symptoms of the underlying addictive disorder, as are heavy alcohol intake itself, and social and psychological disabilities: a 'cluster model'. Such a view has attracted treatment strategies aimed at only the small minority of the population regarded as being affected by the disorder. This has provided considerable impetus to the

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development of the existing treatment system for alcoholics in the Western World since the Second World War, as well as profoundly influencing international disease classificatory systems. Such a model has also been popular with the alcohol industry, contradicting as it does, the view that alcohol is an inherently dangerous substance, since only a small, abnormal minority of the population are affected.

In contrast, the view from the community, as seen by the epidemiologist, has been that alcohol consumption, and hence the problems consequent upon it, is distributed throughout the population. One can therefore readily predict the number of heavy consumers, and hence, the number experiencing alcohol-related problems on the basis of per capita consumption of alcohol in a given population (Popham, Schmidt & de Lint , 1976). Dependence phenomena simply represent further problems caused by heavy drinking, but do not bear a causal relationship to other problems, and do not influence drinking behaviour itself (Room, 1983): a 'disaggregation model'. Strategies to control the extent of alcohol-related harm, within this model, should involve the whole population with a view to reducing per capita consumption, rather than targetting the minority of very heavy drinkers (Kreitman, 1986). These have included at various times the promotion of "sensible drinking" guidelines, increased alcohol taxation, restrictions on the sale of alcohol (Kendell, 1987), and even outright prohibition. Such policies have differed in the extent to which alcohol has been viewed as an inherently dangerous substance: prohibition representing the extreme position.

This latter view of alcohol was popular with the Temperance Movement and remains extremely unpopular with the alcohol industry for obvious reasons. While those who advocate 'sensible drinking' and stricter alcohol control policies which fall short of outright prohibition have seen the heavy drinker as the victim of cynical exploitation by the alcohol industry, such a position has engendered a somewhat more moralistic attitude towards the drinker in contrast to a disease model: if an individual's control over alcohol intake is unimpaired, why does he not cut down his drinking? Further, to a champion of this position the purveyor of a disease concept is seen as misguidedly excusing excess.

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Proponents of these different philosophies continue to advocate opposing policies, some through an underlying belief in the veracity of theory, others through a desire to obtain scientific hegemony, still others are motivated by priorities other than public health. The power of public opinion in swaying political decision making can be easily understood: as Chancellors of the Exchequer are only too aware, increasing taxation or restricting the availablity of alcohol are unpopular policies. Further, the alcohol industry has clear profit motives and will readily point to the danger of increasing unemployment and reduced productivity accompanying increased alcohol taxation. Similarly, the alcoholism treatment 'industry', particularly in the U.S., but increasingly also in the U.K., has profit motives and a vested interest in promoting the concept of alcoholism as a disease requiring intensive, specialized treatment (Drummond & Edwards, 1990; Curson, 1991).

While this debate persists, alcohol continues to exact a considerable burden on society. One recent estimate suggests that up to 200,000 Americans die from causes directly attributable to alcohol annually, more than 30,000 due to hepatic cirrhosis (Harwood et al., 1984). The financial costs to society are enormous. McDonnell and Maynard (1985) have estimated that alcohol-related morbidity and mortality cost in excess of 1.6 billion pounds per annum in the U.K.: the equivalent cost of 30,000 new homes or 160 new hospitals. The social costs in terms of human suffering are incalculable, but the families of approximately one in ten of the population will be affected by problems related to drinking, often the already most disadavantaged in society.

The aim of this thesis is to examine the veracity of the competing theories in explaining alcohol problems in the real world, and to find a rapprochement, some middle ground, between the different conceptual positions. Such an analysis, however, can only seek to clarify theory and point to appropriate public health strategies to deal with drinking problems. The decision as to whether public health or the profits of the alcohol industry, or the taxpayer's desire for the cheapest possible pint of beer, represent a higher priority for policy makers will remain a problem for society and its elected representatives in government.

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CONCEPTUAL DISTINCTIONS BETWEEN A CLUSTER AND A DISAGGREGATION MODEL OF ALCOHOL PROBLEMS.

The 'cluster' and 'disaggregation' models have been identified as an historically important conceptual distinction. Before examining the evidence to support these models it is important to define the terms 'cluster' and 'disaggregation' and to examine the important differences between them.

Definitions of the 'cluster' and 'disaggregation' models.

1. <u>Cluster model</u>. The terms 'cluster' or 'constellation' have frequently been used, principally by clinicans, to describe the co-occurrence of phenomena believed to be symptoms of an underlying addiction disorder or disease entity (Jellinek, 1960; Vaillant, 1983; Meyer, 1988). The underlying disorder is believed to give rise to the symptoms of excessive drinking, dependence phenomena (e.g. tolerance and withdrawal symptoms), as well as physical, psychological and social problems (Figure 1.1a). Such a 'conjunctive' definition (Room, 1977) requires the presence of all the symptoms in order to impute that the underlying disorder is present. If only one symptom is present, for example, heavy drinking, then the individual is not 'a true alcohol addict' (Bowman & Jellinek, 1942).

The term 'cluster' is preferred here in that while such a formulation has often been made in terms of disease, this has not invariably been the case. The opprobrium directed towards the 'Disease Concept' has tended to split theorists along the lines of membership of the medical profession or otherwise, obscuring the more important facets of a cluster model. This has often occurred through failure to define what one means by 'a disease'. The cluster model then, does not necessarily imply the existence of an underlying disease, but instead can be defined as:

> A clustering, or coalescence of phenomena which share a common underlying cause; such an underlying cause has a direct relationship with

each of the phenomena; all the phenomena require to be present in order to impute the existence of the underlying disorder; the cluster represents a unitary phenomenon.

In Figure 1.1a the underlying cause has been described as 'addiction', but other causal entities have been proposed (see below).

2. Disaggregation model. Sociological theorists have tended to view the various problems associated with heavy drinking as being disaggregated from one another (e.g. Cahalan & Room, 1974; Room, 1983; Fillmore, 1988; Berridge, 1990). In other words, while different kinds of problems (e.g. social problems, and dependence phenomena such as tolerance and withdrawal) may share a common cause, heavy drinking, they are not causally related to each other or to an underlying disorder (Figure 1.1b). Such a view stems from surveys of general populations in which many drinkers have been found who experience a variety of social, psychological and physical problems related to heavy drinking without also experiencing dependence phenomena (Cahalan & Room, 1974). Indeed, the existence of one type of social problem does not readily predict the existence of other problems of this type in the general population (Room, 1977).

The disaggregation model can then, be defined as follows:

> Heavy drinking may lead to a variety of problematic consequences, including dependence phenomena, which may occur independently, and bear no causal relationship to each other.

This represents a 'disjunctive' definition (Room, 1977), in that the criterion of 'a problem' does not require that all phenomena need be present.

a) Cluster model

'addiction' →
- consumption
- problems
- dependence

b) Disaggregation model

consumption →
- dependence
- problems

c) Mediational model

consumption → dependence → problems
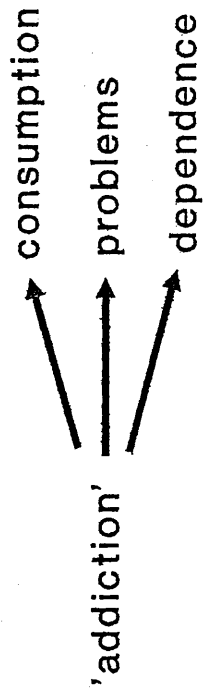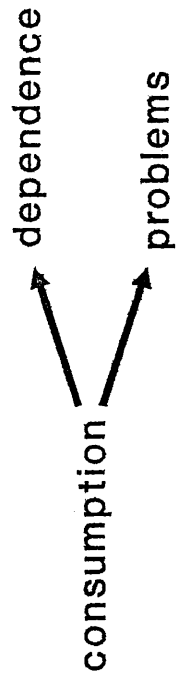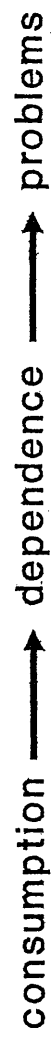
Figure 1.1. Models of alcohol-related problems.

<u>Underlying assumptions of the cluster and diaggregation models.</u>

There are three crucial ways in which these two theories differ: on the question of whether control over alcohol intake is impaired; on the underlying causes of problems; and on whether problems related to drinking are continuously distributed throughout the drinking population. Table 1.1 summarizes the ways in which these theories differ. This table also includes the 'mediational model' which will be discussed later.

<u>Impairment of control.</u>

The most important distinction between these two models lies in the question of the extent to which the individual can exercise control over alcohol intake. From 18th Century descriptions of a cluster model of drinking problems (often couched in terms of disease), proponents argued that the drunkard or inebriate was unable to exercise will or control over alcohol consumption, and that his was the key to understanding and treating the problem. The inebriate was seen as captive to the natural history of the disorder. Lettsom (1787), for example, observed that to the sufferer alcohol:

> "....becomes as necessary as food...neither threats nor persuasions are powerful enough to overcome it [the desire for alcohol], and that the miserable sufferer is so infatuated, as in spite of locks and keys, to bribe by high rewards the dependent nurse, privately to procure the fatal draught." (p.157)

This clearly emphasizes the power which it was believed alcohol had acquired over the drunkard. Similarly, Rush believed that the drinker, while initially able to exercise control, gradually found drinking a necessity. In 1810 he wrote:

> "When strongly urged, by one of his friends, to leave off drinking [the affected individual] said, 'Were a keg of rum in one corner of a room, and were a cannon constantly discharging balls between me and it, I could not refrain from passing before that cannon, in order to get at the rum." (p.266)

Table 1.1. Conceptual similarities and differences between models
of alcohol-related problems.

	Cluster model	Disaggregation model	Mediational model
Impaired control	yes	no	yes (in degrees)
Continuity	all-or-nothing	continuous	continuous
Dimensionality	unidimensional	multidimensional	dependence and problems separate dimensions
Causes of problems	habit (early) disease	heavy drinking	consumption mediated by habit

Numerous examples of similar formulations can be found in 18th and 19th Century accounts. Latter-day disease theorists such as Jellinek (1960) also emphasize this loss of control over intake, although placing less store by an interpretation of habit formation which was common in earlier accounts (Edwards, in press). Many 18th and 19th Century

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commentators did not, however, share such a view. Todd (1882), for example, stated:

> "I consider it certain that the great multitude of drunkards could stop drinking today and for ever, if they would; but they don't want to.....I observe then there is no apparent difference between drunkenness in its first and drunkenness in its last stages. In both cases there is an appetite and a will to gratify it. The man drinks simply because he likes to drink, or likes to be drunk" (p.7-9).

Similarly, Edwards (1754) did not hold with the view of impaired control over alcohol intake:

> "It cannot truly be said.....that a drunkard, let his appetite be never so strong, cannot keep the cup from his mouth."(p218).

To this latter group there was no mystery in drunkenness, it was simply a case of sinful excess, and the ills which accompanied it were an understandable consequence of the excess. Such views, albeit in somewhat less moralistic tones, continue to be expressed by opponents of a cluster model. While acknowledging that a return to normal drinking may be more difficult amongst the more severely dependent, Heather & Robertson (1985) suggest that:

> "The contention that persons with previous drinking problems who have recovered the ability to drink normally were not 'real' or 'true' alcoholics in the first place has been shown to be false. The evidence indicates that there is no upper limit to severity of physical dependence which absolutely precludes the possibility of recovered control." (p.90)

Another vociferous opponent of a cluster model, Fingarette (1988), concludes that morning drinking is no more a symptom of a disease than is "frequently discussing business over breakfast ..... a 'symptom' of an ambitious commitment to business." Thus, proponents of a cluster model view impaired control, and other features of alcohol dependence (Edwards & Gross, 1976) as being simply epiphenomenal consequences of heavy drinking, disaggregated from other social, physical or psychological disabilities. As the anonymous Connecticut minister (cited by Levine, 1978) contended:

"the whole question pivots, thus, on the power or powerlessness in the confirmed drunkard to resist the propensity to drink." (p.3).

The causes of problems.

The question of whether drunkenness (inebriety, or alcoholism) is or is not a disease continues to represent a key source of division between the cluster and the disaggregation models. Early, although by no means the first, examples of disease formulations include a 'disease of the mind' (Trotter, 1804), a 'derangement of the will' (Rush, 1791), 'dipsomania' (Bruhl-Cramer, 1819), and 'hereditary insanity' (Harley, 1884). Several later disease theorists emphasized psychological causes, blaming variously, 'emotional immaturity' (Strecker, 1941), 'psychic allergy' (Carroll, 1941), 'emotional illness' (McCullough, 1952), anxiety (Pfeffer, 1956). Trotter (1804), in putting down the efforts of 'the priesthood' and 'the moralist' in dealing with drunkenness, put forward a remarkably sophisticated causal formulation for the putative disease:

> "....the physical influence of custom, confirmed into habit, interwoven with the actions of our sentient system, and reacting on our mental part, have been entirely forgotten. The perfect knowledge of those remote causes which first induced the propensity to vinous liquors, whether they sprung from situation in life, or depended on any peculiar temprament of body, is necessary for conducting the cure."(p3-4)

Thus, Trotter can be seen as putting forward a formulation in keeping more with recent psychological theories which emphasize the formation of a habit (Edwards & Gross, 1976; Heather & Robertson, 1985; Orford, 1985; Marlatt, 1985) which by nature is likely to be graded in intensity, compared to later disease formulations which were seen as all-or-nothing phenomena (Jellinek, 1960).

It is not the aim of this review exhaustively to annotate the various causal models of disease which have been proposed, but rather to emphasize the belief which prevails to the present amongst cluster theorists that pathological causes, as yet undiscovered, need to be identified in order to successfully conduct a cure. A large amount of research resources continue to be allocated to identifying the genetic causes of alcoholism, for example, with a view to establishing preventative measures, or to develop physical

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treatments.

There are some who feel that the search for causes of the disease should be abandoned since no disease exists (Fingarette, 1988). In concluding that alcoholism is more a political than a medical problem Kendell (1979) writes:

> "The conclusion seems inescapable. Until we stop regarding alcoholism as a disease....we shall never tackle the problem effectively. The medical profession and the caring professions in general are just as incapable of dealing effectively with the harm and suffering caused by alcoholism as the medical services of the Armed Forces are incapable of dealing effectively with the harm and suffering caused by war."(p. 370).

While it would appear, superficially, that the disaggregationist position regards a search for causes as futile, this is far from the case. Instead, a different set of causal hypotheses are put forward. Gorman (1989) has pointed out that, Heather & Robertson (1985), in rejecting a disease concept in favour of 'problem drinking' as 'the new approach',

> ".....merely substitute one all embracing reductionist theory --a biological one (based on the assertion that 'alcoholism' is a disease entity)-- with an opposing all-embracing reductionist theory --a psychological one (based on the assertion that 'problem drinking' is a learned behaviour)." (p.844)

Similarly, supporters of a disaggregation model of drinking problems, who propose tighter controls on alcohol availability, put forward an alternative causal model based on statistical associations in general popualtions. Popham et al. (1976), for example, write that:

> "Regional and temporal variations in mean consumption are believed to be caused mainly by differences in the economic accessibility of beverage alcohol and in the level of acceptance of drinking." (p. 611)

Thus it is not the case that the disaggregation model rejects the formulation of causal models per se, but rather that it is at odds with 'disease' or medical formulations of drunkenness, favouring instead, social, psychological or economic factors as putative causes. If one can put aside the precise medical terminology and the implication of attempting to achieve professional hegemony (an accusation which may be levelled at

proponents on both sides), there is greater room for finding common ground.

Continuity and discontinuity.

Implicit in the cluster model of drinking problems is the belief that the affected individual is qualitatively as well as quantitatively different from the rest of the drinking population, not only in terms of level of alcohol consumption, but also in relation to the extent of associated problems. Popham et al. (1976) have described this as the 'Bimodal Model' of alcohol consumption: describing the distribution of consumption in the general population. Further, they point out that this model proposes that:

> "factors that may cause a change in the consumption level of normal drinkers will have little or no effect on that of pathological drinkers."
> (p.610).

Conversely, the 'Single Distribution Model' argues that the true distribution of consumption and problems in the general population will be continuous, unimodal, and positively skewed, approximating to a log-normal curve (Ledermann, 1956). As Popham et al. (1976) suggest:

> "The variance [in level of consumption] is constant and only the mean differs from one group to another. Under these circumstances, the relative frequency of high level consumers (e.g. those consuming at or above the level at which most alcoholics drink) depends upon the mean per-drinker consumption in a population, and factors that alter the latter may be expected to alter the former." (p.611)

So there are two premises upon which the distinction between the two distribution theories depends: first on the question of continuity, and second on the ability of the drinker to move along the continuum in one direction or another over time, in response to various environmental manipulations. It is this distinction which will later be shown to be of considerable importance in finding a rapprochement between the opposing camps.

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Summary.

Several distinctions have been made between a cluster and a disaggregation model of alcohol problems. Impaired control over alcohol consumption has been important throughout the history of cluster models, and denied by proponents of disaggregation models. Underlying causes of cluster models have most often been conceptualized in medical terms, whereas disaggregationists have tended to draw on moral, social, psychological and economic theories to formulate causal hypotheses.

It has been noted, however, that the early cluster theorists (e.g. Rush, Trotter), while emphasizing the importance of impaired control, viewed drunkenness as a habit in a very similar way to later psychological theorists. The question of whether drunkenness (or inebriety, or alcoholism) is best understood in terms of a disease has been something of a diversion. Thus, putting aside the question of disease, the causal explanations put forward by proponents of the two models have not been so very different. In particular, the importance of impaired control as an obstacle to moderating alcohol consumption appears to have been rejected, as we shall see later, more on the grounds that there is a lack of empirical support for discontinuity in the drinking population, than the existence of compelling evidence to suggest that it is simply a medical chimera. The possibility that an individual at the upper end of the consumption continuum can moderate his drinking is crucial to the disaggregationist position.

THE MEDIATIONAL MODEL AS AN INTEGRATIVE CONCEPT.

A combination of disenchantment with the prevailing disease concept, the growth of psychology and social science, and emerging evidence from epidemiological research led to the development of a new formulation of drinking problems in the 1970s: the Biaxial Concept. Influential in this conceptual shift was a report prepared by a World Health Organisation Group of Investigators, published in 1977 (Edwards, Gross, Keller et al., 1977) and a provisional description of the Alcohol Dependence Syndrome published the

previous year (Edwards & Gross, 1976).

The Biaxial Concept differed from the models described earlier in five important respects (Table 1.1; the Biaxial Concept is labelled here the 'mediational model' for reasons described below).

1. <u>Dimensionality.</u> In keeping with the disaggregation model, dependence was recognized as a conceptually separate dimension from other alcohol-related disabilities (or problems). Figure 1.2 is a schematic representation of this two dimensional (or Biaxial) model. In the upper right quadrant are those who experience both problems and dependence, typical of a clinical population, or indeed the type of person who would be considered problematic within a cluster model. In the upper left quadrant are a group described by the experience of problems in the absence of a significant degree of alcohol dependence. This would be typical of young, relatively inexperienced drinkers who are overrepresented in alcohol-related road traffic accidents, and are perhaps also the majority of problem drinkers identified by general population surveys. The lower right quadrant indicates a group experiencing dependence without associated problems. This occurrence is likely to be rare in the case of alcohol dependence, but examples of relatively non-problematic dependence might include the use of nicotine chewing gum as an aid to smoking cessation or the therapeutic use of diamorphine for pain relief under appropriate medical supervision.

2. <u>Continuity.</u> In acknowledgement of the emergent epidemiological evidence, it was suggested that dependence phenomena (including withdrawal symptoms, and impaired control) could exist along a continuum of severity rather than representing all-or-nothing phenomena. In other words, one could experience different degrees of impaired control. This represented a significant break with the cluster tradition while still retaining one of its central theoretical tenets.

dependence
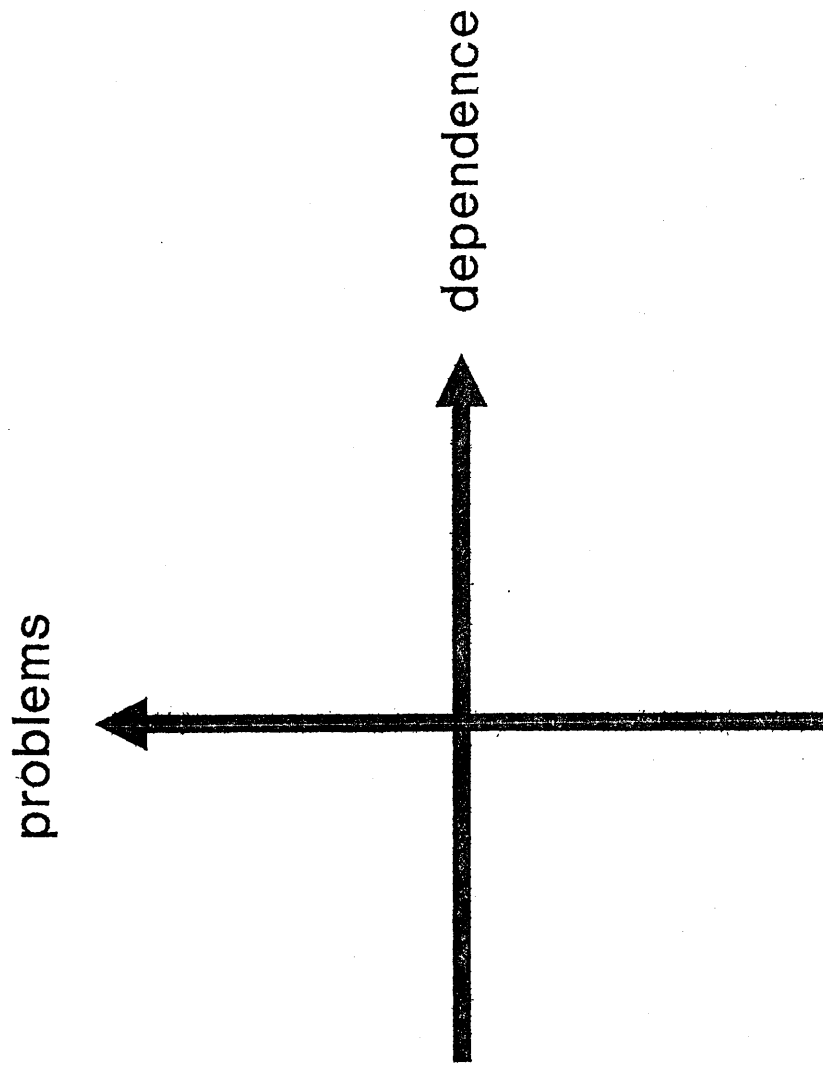
problems

Figure 1.2. Diagram of the Biaxial Concept.

3. Clustering of dependence phenomena. While dependence and problems were seen as conceptually separate within this 'mediational model', elements of the Alcohol Dependence Syndrome would tend to cluster together. The Group, however, were cautious not to imply that this was simply a restatement of the cluster concept of 'alcoholism', describing their view of the position thus:

> "The term syndrome [as in the Alcohol Dependence Syndrome] has the advantage of emphasizing the openness of the position that is being taken: it is implicit only that a number of phenomena tend to cluster with sufficient frequency to constitute a recognizable occurrence. The assertion is not made that all those elements will all be present with the same magnitude, nor indeed that all elements need invariably be present. No assumption is made at this stage as to the causal nexus (the pathology)." (p.9).

4. The mediating effect of dependence. While dependence and problems were seen to represent separate dimensions, Edwards et al. (1977) did not regard these phenomena as existing completely independently of each other. There would be inter-relationships between them, as described above, and indeed also between dependence and social and cultural factors. Heavier drinking was expected to be associated with a higher degree of dependence and increasingly severe problems. However, the altered behavioural state occasioned by dependence, was expected to have a key mediational effect on the development of problems (Figure 1.1c). The group succinctly described the position thus:

> "An important behavioural alteration may often be a diminished variability in the individual's drinking behaviour. He drinks every day in rather the same manner, whether it be a week-day or during the week-end, and one week's drinking looks much like another's. The daily pattern he establishes is typically one that ensures the maintenance of a relatively high blood alcohol level throughout the waking period and the avoidance of withdrawal. In a culture where drinking is easily accepted, this goal may be achieved without offending cultural proscriptions, but where the basic cultural pattern is of more spaced drinking (typically perhaps at the end of the day), the individual who is scheduling his drinking so as to maintain his desired blood alcohol level may face a difficult daily logistic problem, may easily offend against cultural norms, and may have to drink according to a less set and predictable pattern." (p12-13).

Thus, the development of dependence would bring about an alteration in the pattern and style of drinking in such a way as to increase the likelihood of occurrence of other types

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of problem.

Central to the the mediational model, then, is the theoretical distinction between dependence and other kinds of problem related to heavy drinking. In what ways might problems and dependence differ theoretically?

<u>Theoretical distinctions between problems and dependence.</u>

Within the disaggregation model dependence is seen as only a further problem associated with heavy drinking. The mediational model, on the other hand, views dependence as representing a special kind of problem, one which has important mediational properties with respect to consumption and to other kinds of problem. Dependence can be viewed as involving an altered psychobiological state and is by definition, intrapersonal. Most problems, on the other hand, can be seen as interpersonal, arising from an interaction between the individual's behaviour associated with drinking and societal reactions towards it (Jessor & Jessor, 1977). There are some exceptions to this general principle, occurring mainly in the realm of physical and mental pathology (e.g. hepatic cirrhosis, brain damage, depression, anxiety).

Problems and dependence also differ, theoretically, in relation to their time course. Problems frequently occur as discrete events related to drinking (e.g. a drunk driving conviction, an accident, a depressive episode), but can also continue over many years, at times increasing or decreasing in intensity, as in the case of a marital problem. Problems may co-occur or take place unconnectedly. They may be causally related, as in the case of a financial problem due to drinking leading to a marital problem, or quite independent. Further, causal paths between problems and consumption may, at different times, be reversed, or indeed, interactive. Inevitably, as suggested earlier, such causal relations may be difficult to disentangle.

Dependence on the other hand represents an evolving process of theoretically related

phenomena. Unlike a drunk driving conviction which may occur at any point in a drinking career, the process of physiological adaptation to alcohol begins from the point of first ingestion. The emergence of withdrawal symptoms may lead to the development of behaviours aimed at their relief. Each element of the dependence syndrome influences or is influenced by the other. Most of the elements are expected to occur together (although not invariably). Such a prediction could not be made of other types of problem.

There are a number of reasons, therefore, why dependence and problems should be considered as conceptually distinct phenomena. But what is special about the nature of dependence that it should influence drinking behaviour and the development of problems as proposed by the mediational model?

Dependence as habit.

It has been suggested that the concept of habit was important in earlier cluster theories (Edwards, in press). Trotter (1804), for example, gives mention of "the evil genius of the habit itself" and provides a lucid account of the 'priming effect' of alcohol in the inebriate:

> "As soon as the limited portion of liquor is swallowed, an agreeable glow is experienced; and by it so grateful a feeling conveyed to the mind, which in an instant connects the chain of habit, that is our duty to break. This glow and feeling are associated in the patient's mind with all those pleasurable sensations he has been accustomed to receive from his former bumper. He therefore reasons with himself that he finds much relief; and as he is aware that the effect of the present dose will only be of short duration, he must take another to prolong his reverie, and ward off some intruding care. With a second glass he finds more pleasing objects presented to his imagination and then he is urged to try a third." (pp. 177-178).

Similarly, Woodward (1838) describes the subjective effects of what would be termed within a modern conception of dependence as 'relief drinking'. While conceiving of this process as having a physical origin, it bears a similarity to a more recent psychological formulation of 'excessive appetite' (Orford, 1985):

> "The appetite is wholly physical.....which trancends all ordinary motives

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of abstinence. The suffering is immense, and the desire of immediate relief so entirely uncontrollable, that it is quite questionable whether the moral power of many of its victims is sufficient to withstand its imperative demands." (p.2).

In both of these accounts the subjective experience of compulsion to drink is believed to be an important motivation for drinking as is the experience of relief. Later cluster theories viewed this element of compulsion, or craving, as being the basis of addiction (e.g. Jellinek, 1960). Mello (1972) has argued, however, that craving represents a tautologous concept since it is often defined by subsequent drinking behaviour. Nevertheless, the vivid accounts of this compulsive desire to drink as provided by Trotter and Woodward bear witness to the abnormal attraction which has developed for alcohol in the affected individual.

Theories of classical and operant conditioning have particular advantages in explaining the formation of habit in relation to alcohol and other psychoactive drugs, and were important in the development of the concept of the Alcohol Dependence Syndrome. Stolerman and Goldberg (1986) have traced the history of such behavioural approaches to dependence. Early animal experiments showed that "preferences" could develop for environmental stimuli which had previously been associated with morphine injections (Spragg, 1940). Wikler (1948) put forward theories which suggested the potential importance of conditioning in the withdrawal syndrome and drug-seeking behaviour. Several experiments have subsequently demonstrated the reinforcing effects of alcohol in both animals and humans. In particular, the reinforcing effect of alcohol through its ability to relieve aversive withdrawal symptoms has been viewed as potentially important in the development of dependence (see Edwards (1990) for a recent review).

A view of dependence as a learned phenomenon gives credence to the assertion that it should exist in degrees of severity rather than being all-or-nothing. Thus the individual's capacity to exercise control over their intake of alcohol will not necessarily amount to a complete inability, as suggested by earlier cluster theories.

Psychological formulations of dependence, then, have much in common with earlier theories of habit. While much still needs to be learned about the precise mechanisms involved in the control of drinking behaviour, such theories provide a rationale for impaired control over alcohol intake.

Dependence as a mediating factor.

The view of the reinforcing effects of alcohol described above provide a rationale for effect of dependence in leading the drinker into offending against cultural norms, resulting in the kind of social opprobrium which, as we shall see, forms the basis of many, if not most, problems related to drinking. Drinking in the morning to relieve withdrawal symptoms before going to work may be of greater immediate concern to the dependent drinker than the possibility of being sacked. Thus dependence and hence the pattern and scheduling of drinking, rather than the quantity of alcohol consumed, per se, is likely to determine the extent of, particularly, social problems.

Other types of problem may also be influenced by dependence in a similar way. The emergence of dyspepsia on the morning following a drinking episode may be an indication of the development of a peptic ulcer. To the dependent drinker, however, the drive to relieve withdrawal symptoms may be more pressing and urgent than concerns about offending against his own health status. Similarly, returning to drinking after a near fatal illness due to hepatic cirrhosis and heamorrhage from oesophageal varices can only be understood in human terms in a case where the individual's desire to drink outweighs his concern over impending mortality.

In this sense, dependence can be seen theoretically as an important mediating factor in the consumption-problems relationship. Thus at a given level of alcohol intake the more dependent drinker is likely to experience more problems than his less dependent counterpart because his drinking is being scheduled in such a way that the relief of withdrawal symptoms takes precedence over other social and health considerations.

Culture, dependence, and problems.

Also stemming from this formulation is the prediction that social and cultural factors will be likely to mediate the extent of problems at a given level of consumption and dependence. Thus an individual who lives in a society where morning drinking, for example, is regarded as abnormal will be more likely to experience problems through the greater degree of social opprobrium towards this activity, a point which will be taken up in Chapter 7. Jellinek (1960) made a similar prediction, although based on a cluster model of alcohol problems. Of his famous typologies of alcoholism, two are particularly relevant to the question of the influence of culture on the development of alcohol-related problems: delta and gamma alcoholism. Based on cultural stereotypes of cultural patterns of drinking behaviour and survey material obtained from members of Alcoholics Anonymous, he identified the predominant drinker in France to be the "inveterate drinker" or "delta alcoholic", who:

> "....does not go through the distressing social and psychological experiences of the [Anglo-Saxon] gamma alcoholic and manifests only a few behaviour changes of the latter." (pp.38-39).

In terms of the two dimensional scheme described above, the gamma alcoholic could be seen as experiencing both dependence and problems, whereas the delta alcoholic experiences dependence without overt social and psychological problems. Jellinek, however, suggested that the delta alcoholic suffers from, in contrast to the gamma alcoholic, "inability to abstain" rather than "loss of control". While he recognized a difference between Continental and Anglo-Saxon cultures in terms of their relative permissiveness towards alcohol, he regarded the differences in problem experience to be due to the existence of different alcoholic species rather than, as the mediational model suggests, differences in acceptance of certain drinking patterns. Instead he proposes a "vunerability-acceptance theory" of alcoholism:

> "In societies which have a low degree of acceptance of large daily amounts of alcohol, mainly those will be exposed to the risk of addiction who on account of high psychological vulnerability have an inducement to go against social standards. But in societies which have an extremely high degree of acceptance of a large daily alcohol consumption, the presence of

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any small vulnerability, whether psychological or physical, will suffice for exposure to the risk of addiction." (pp.28-29)

In other words, Jellinek did not see the degree of social opprobrium as being, in a sense, 'the problem', but rather that in a less permissive culture only the more deviant or problematic drinkers become addicted, and hence, display more problems. As will be demonstrated later, the mediational model offers an opportunity to test such a theory by separately measuring problems and dependence in different cultural settings. The prediction of such a mediational model is that dependence can be expected to be less influenced by cultural factors than are problems.

Dependence and problems as interactive variables.

So far it has been suggested that dependence may act as a mediational factor in the development of problems. Edwards et al. (1977), however, also predicted an interactive relationship between dependence, problems, and consumption. A mediational effect of dependence suggests that the effect of consumption on problems will be to some extent conditional on the existance (and the degree of) dependence.

The group also suggested that dependence could have a positive feedback, or interactive, relationship with consumption. This can readily be explained in terms of tolerance. Increasing consumption leads to increased dependence (including tolerance) requiring a further increase in consumption to produce the same subjective and physiological effects. Similarly, as dependence becomes more marked, so withdrawal symptoms will become more severe, requiring more alcohol to relieve them. In a similar way, the experience of adverse social, psychological, and physical problems, as well as possibly underlying drinking behaviour, may exacerbate drinking, and hence lead to the progression of dependence: another positive feedback loop. For example, as Edwards et al. (1977) suggest:

"Depression may lead to excessive drinking, which may exacerbate depression; excessive drinking may impose social isolation, which may lead to more drinking; heavy alcohol intake may cause painful gout, which may induce more alcohol intake." (p11).

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WHICH MODEL IS BEST SUPPORTED BY THE AVAILABLE EVIDENCE?

Several conceptual differences between the various models have so far been identified. Which is supported by existing evidence? Rather than looking at all potential differences, I will focus on the three which have the strongest bearing on the main conceptual distinctions between the models. As suggested earlier, the question of whether alcoholism is or is not a disease, has no bearing on the choice of model, and in any case does not represent a particularly meaningful question.

Dimensionality.

As suggested earlier, the cluster model can be seen to differ from the mediational model with respect to the question of dimensionality. Alcoholism is suggested to be a unitary phenomenon, with heavy consumption, dependence and other problems sharing a common aetiology, and occurring together. Similarly the disaggregation model predicts that higher levels of consumption should be associated with both more problems and dependence phenomena, although different causes have been proposed. The mediational model, on the other hand, predicts that problems, dependence and consumption can theoretically occur independently and in different degrees. A difficulty immediately encountered is in the measurement of these phenomena, which will be taken up in the next chapter. Secondly, studies which have so far examined this question have been conducted exclusively in clinical populations. Nevertheless, one would expect that measures which contain the 'classic' symptoms of alcoholism, as described by cluster theories, should indicate statistical homogeneity or a single dimension reflecting an 'alcoholic diathesis' in both clinical and general populations.

Here also, however, a difficulty exists in identifying which symptoms define alcoholism. As Trotter (1804) noted:

> "In assigning the character [of inebriety] formerly, I was well aware of the difficulty of fixing on any symptom, or even concourse of symptoms, that are invariably present." (p.8).

Room (1977) has drawn a distinction between 'conjunctive' and 'disjunctive' definitions of alcoholism. Cluster theorists have tended to prescribe conjunctive definitions of alcoholism. A conjunctive definition requires the presence of all of a list of symptoms in order to make a diagnosis of alcoholism. Bowman & Jellinek (1942) for example went to great lengths in describing what symptoms do, or do not, constitute 'true' alcoholism. Later, Jellinek (1960) assigned conjunctive definitions to his species of alcoholism, and proceeded to classify certain species as not representing 'true' alcoholism. Much of this can be seen to emanate from the accounts of members of Alcoholics Anonymous (Jellinek, 1952) rather than strong theoretical reasons for including or excluding symptoms. By applying a conjunctive definition of alcoholism in a general population survey, however, Mulford (1968) found that:

> "to employ indicators for all the descriptions of the species given by
> Jellinek soon eliminates virtually all cases." (p.10).

A disjunctive definition, on the other hand, requires the presence of greater than a criterion number of 'typical' symptoms in order to make a diagnosis. Such a method has typically been employed by survey researchers (e.g. Selzer, 1971; Cahalan & Room, 1974) and in official diagnostic and classificatory systems (e.g. National Council on Alcoholism, 1972). Room argues that this approach has developed out of practical necessity, rather than from a firm belief that such a system reflects the 'true' nature of alcoholism (although clearly the disaggregationist view does not require different problems to be related).

Several studies have examined the dimensionality of alcoholism. Most have been relatively overinclusive in terms of the measures employed (including measures of consumption, problems, dependence, and other phenomena such as reasons for, and attitudes towards, drinking), and have been strongly influenced by cluster model descriptions of alcoholism. Most have found that clinical populations are heterogeneous and that, using exploratory factor analysis, the symptoms are multidimensional. Further, the dimensions found tend to differ from one study to another. In an analysis of responses

to the Alcohol Use Inventory, Wanberg & Horn (1983) found 15 different factors corresponding to different constructs of alcoholism; Pokorny, Miller & Cleveland (1971) found one large and 10 smaller factors; Park & Whitehead (1973) found 4 factors. Zung (1978) found the Michigan Alcoholism Screening Test (Selzer, 1971), which was designed to measure various proposed elements of alcoholism, to be multidimensional (although in a re-analysis Zung (1980) subsequently revised this view).

Three studies have noted the relative independence of consumption and social problems (Sadava, 1985; Skinner, 1981; White, 1987). In two of these studies (Sadava, 1985; Skinner, 1981), symptoms corresponding to the Alcohol Dependence Syndrome (Edwards & Gross, 1976) were found to belong to the same dimension as measures of quantity and frequency of alcohol consumption. Further evidence comes from the study of alcoholism treatment outcome. In reviewing the pertinent literature, Babor, Dolinsky, Rounsaville et al. (1988) concluded that there was support for both a unitary and a multidimensional view of alcoholism.

The evidence for alcohol dependence constituting a unitary dimension is somewhat more conclusive. Several studies, employing a variety of different questionnaires reflecting elements of the dependence syndrome (Edwards & Gross, 1976) have revealed a single dimension in principal components analysis (Stockwell, Hodgson, Edwards et al., 1979; Meehan, Webb & Unwin, 1985; Skinner, 1981; 1990; Hesselbrock, Babor, Hesselbrock et al., 1983; Raistrick, Dunbar & Robinson, 1983; Polich, Armor & Braiker, 1980). Only one study which specifically attempted to address this issue has revealed more than one dimension reflecting different elements of the alcohol dependence syndrome. Chick (1980) found one large factor reflecting 'Withdrawal/Need/Salience' and a smaller second factor reflecting 'Impaired Control'.

The overall conclusion to be taken from this evidence is that clinical populations have been generally found to be statistically heterogeneous with respect to classically described symptoms of alcoholism, and that there is little support for the assertion that a

characteristic pattern of symptoms defining a distinct phenomenon of alcoholism can be found. It is therefore not possible to identify a satisfactory conjunctive definition of alcoholism. The evidence to support the existence of a unidimensional syndrome of alcohol dependence is, however, strong. The lack of an adequate instrument to measure problems, uncontaminated by items reflecting other conceptually different phenomena (such as dependence) has not so far been available. This has prevented the study of interrelationships between problems, dependence and consumption to be studied. This question is addressed in the next chapter.

Continuity.

The question of whether there is continuity or discontinuity in the drinking population is hampered by a number of practical difficulties. First, in general population studies there are far fewer heavy drinkers consuming quantities of alcohol typical of a clinical population, than lighter drinkers. This has meant that it would be extremely difficult to discern discontinuity in the distribution of alcohol consumption. A related difficulty is that of response bias. Popham & Schmidt (1981) have drawn attention to the differential extent of underreporting of alcohol consumption in heavier and lighter drinkers. In their study of actual and self-reported purchases of alcohol in Ontario, they found that there were considerably fewer self-reported heavy consumers than expected, by a factor of 3.61:1. They concluded that error in self reporting was a non-linear phenomenon, thus introducing significant difficulties in interpretation of survey data. Similar difficulties may attend the measurement of self-reported alcohol-related problems.

Second, there is a difficulty in establishing whether there is discontinuity in the distribution of alcohol-related problems and dependence phenomena in the general population. Questionnaire measures reflecting a disjunctive view of alcohol problems have most often been used in general population surveys, defining the number of 'problem drinkers' by producing an overall problem score which is the aggregate of a series of problem items. The natural characteristic of such a questionnaire method is to produce a smooth, continuous distribution, making it difficult to discern a disjunction at any point

on the distribution curve, irrespective of whether a disjunction truly existed or not. Further, since problems tend to be transient events, the time-scale covered by the questionnaire will crucially determine the estimated level of problems which a drinker may report at any given time. This difficulty tends to mitigate against finding discontinuity in problems.

Third, the type of social disorganization which is known to exist in clinical populations of problem drinkers could significantly compromise the validity of general population surveys of drinking behaviour. The most rigourous surveys have achieved around a 70% contact rate. It is highly likely that the very heaviest drinkers, through their higher degree of social disorganization, and the disproportionate amount of time spent in the pursuit of alcohol, will be harder to locate and interview in surveys than their lighter drinking counterparts. This is likely, therefore, to result in further underrepresentation of 'alcoholic' drinkers in such surveys.

Partly because of these difficulties, epidemiologists have tended to rely on official population consumption, morbidity, and mortality statistics in order to make inferences about the continuity of the distribution of drinking in the general population. Such measures are also subject to several sources of error (Popham et al., 1976). It is therefore remarkable that such high correlations have been found between per capita consumption and a range of indices of problems (notably, mortality from hepatic cirrhosis). Such findings hold true in the same population at different times in relation to changes in per capita consumption, and between populations which differ in terms of per capita consumption. The conclusion reached by numerous studies of this type has been that the number of people in a given population drinking in an 'alcoholic' manner is determined by changes in per capita consumption, thus implying that drinkers can move in and out of 'alcoholic' drinking behaviour. One obvious criticism of this conclusion is that mortality from hepatic cirrhosis does not necessarily reflect a history of 'alcoholic' drinking as might be defined by a cluster model of 'alcoholism' (or indeed the presence of dependence), but rather a pattern and quantity of consumption necessary to produce a

specific pathological lesion. Indeed there is some evidence to suggest that the sufferers of cirrhosis are on average less dependent than a typical clinical population, and that this may reflect a vulnerability to develop this particular pathology (see Chapter 7). The same problem is likely to attend other official measures such as public drunkenness arrests or admissions to psychiatric hospital with a diagnosis of alcoholism.

More pertinent to this question is data derived from the observation of clinical populations. Some behavioural information relevant to the issue of impaired control which will be examined in the next section displays graded degrees of abnormality. Similarly, it is common experience that phenomena such as withdrawal symptoms and social and physical disability occur in different degrees of severity; many problem drinkers have marital problems, but not all have experienced divorce; many suffer from sweating and tremor during withdrawal, but few experience epileptiform seizures or visual hallucinations; gastric irritation related to drinking can vary from gastritis to peptic ulceration. Cluster theorists such as Jellinek (1952) have countered the interpretation of graded severity by suggesting that such observations reflect different phases of the addiction process. It is further suggested that those individuals who do not progress towards more severe disability were not 'true' alcoholics in the first place. Such an assertion is, of course, non-falsifiable, and tautologous.

Overall, it seems reasonable to conclude that within both a clinical and a general population, at any given time, there exist individuals who display different degrees of dependence and problems, and that it is impossible to suggest with any degree of certainty, a cut off point which defines a discrete entity of alcoholism. As Vaillant (1983) has suggested, normal drinking merges imperceptibly into pathological drinking just as normal blood pressure merges into hypertension. The distinction between these phenomena lies entirely in the hands of the observer.

Impaired control.

In contrast to a disaggregationist view, the cluster and mediational models both emphasize the importance of impaired control over alcohol intake. Of the three conceptual differences discussed here, this is the most crucial in practical and theoretical terms. What evidence exists to support the belief that some drinkers display evidence of such impaired control?

a) Clinical Studies.

A large body of research has been conducted to examine this question in clinical populations, and it is beyond the scope of this thesis to provide a detailed review of the evidence. The most pertinent findings will, however, be reviewed.

The 'controlled drinking' question. This is an area of research surrounded by heated controversy, beginning with the publication by Davies (1962) of a follow-up study of alcoholics in which it was reported that 7 out of 93 had returned to normal drinking. At that time and even subsequently, this suggestion was met with considerable skepticism. Indeed, this skepticism was later found to be justified. Edwards (1985) followed-up these seven patients 20 years later and reviewed the clinical case records. He found that five out of the seven had in fact experienced significant drinking-related problems both during and subsequent to Davies's follow-up. One of the remaining two had never been significantly alcohol dependent.

Nevertheless, Davies's paper heralded an era of considerable research interest into 'controlled drinking' in former 'alcohol addicts' (Heather & Robertson, 1983). Much of the controversy surrounding the apparently conflicting findings in this area can be attributed to the inadequacy of concepts and the research measures derived from them. Indeed, there remains considerable disagreement over what constitutes a 'controlled' or 'normal' drinking outcome. In early studies, subjects were generally included on the basis of Jellinek's typology of gamma alcoholism (e.g. Sobell & Sobell, 1976; Armor, Polich & Stambul, 1978). Later studies which included a graded measure of the severity of

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dependence (e.g. Vaillant & Milofsky, 1982; Edwards et al., 1983) have found that 'alcoholics' do not behave as an homogeneous group with respect to controlled (or non-problem) drinking during follow-up: controlled drinking, as defined by stable non-problematic drinking, is an uncommon occurrence in the more severely dependent. In Edwards et al's (1983) 10-12 year follow-up study of 99 married men, for example, it was found that eight were engaging in 'social drinking', only one of whom had previously been severely alcohol dependent defined by his score on the Severity of Alcohol Dependence Questionnaire. Indeed, only one out of the 99 reported 'continuous light social drinking' throughout the follow-up period (Taylor, Brown, Duckitt et al., 1985).

'Priming dose' experiments. Another area of research relevant to the impaired control question is that of experimental exposure to alcohol in clinical subjects. Several studies have found an increase in desire for alcohol, and changes in physiological state, in alcoholics given a 'priming dose' of alcohol (Engle & Williams, 1972, Ludwig, Wikler & Stark, 1974; Hodgson, Rankin & Stockwell, 1979; Rankin, Hodgson & Stockwell, 1979; Stockwell, Hodgson, Rankin et al., 1982; Kaplan, Meyer & Stoebel, 1983; Kaplan, Meyer & Virgilio, 1984; Laberg, 1986; Laberg & Ellertsen, 1987). Further, the consumption of a priming dose has been found to be associated with an increase in work for further alcohol in an operant paradigm (Ludwig et al., 1974) and a more rapid speed of consuming further available alcohol (Hodgson et al., 1979). These responses can be interpreted in terms of impaired control over alcohol intake and are more prominent in the severely dependent. It should be noted, however, that there have been failures as well as successes in demonstrating the above effects (Drummond, Cooper & Glautier, 1990). There is also evidence to suggest that the drinkers' beliefs, rather than the actual alcohol content of drinks, was an important determinant (Marlatt, Demming & Reid, 1973; Ludwig et al., 1974, Stockwell et al., 1982; Laberg, 1986).

Reinstatement. One final area of clinical research which has an important bearing on this question is that of 'reinstatement' of dependence symptoms following a period of

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abstinence (Edwards & Gross, 1976). The speed of reinstatement has been found to be related to the subject's degree of dependence during the most recent period of heavy drinking preceding a period of abstinence. Topham (1983) found that the rapidity with which withdrawal symptoms recurred in a group of 19 treated alcoholics who had initially begun to drink was related to their baseline score on the Severity of Alcohol Dependence Questionnaire (SADQ)(Stockwell et al., 1979). In addition, the 'reinstatement' scale of the SADQ, which asks the extent to which various symptoms of dependence recur within a few days of relapse, is highly correlated with the overall SADQ score, excluding the reinstatement items (Stockwell et al., 1979).

Taken together, these findings suggest that in clinical populations important differences have been found to exist between those with severe dependence and moderate dependence with respect to impairment of control over alcohol intake. This is not to deny that dependent drinkers can modify their drinking towards a less problematic pattern, but rather that such a course of action becomes difficult to achieve and sustain at higher levels of dependence. Whether the more dependent have impaired control because of a belief that such an outcome is inevitable, as in the Alcoholics Anonymous tenet of 'one drink, one drunk', or rather because of some biological or behavioural abnormality, however, remains an open question (Marlatt, 1985). Whatever underlying cause might exist, even ardent proponents of controlled drinking as a legitimate treatment goal have conceded that such an outcome is difficult for the severely dependent to achieve. As Heather & Robertson (1985), in reviewing the evidence concluded:

> "There is evidence that normal drinking [in former alcoholics] becomes
> increasingly rare as severity of dependence increases, but no proof that it
> ever becomes impossible in principle." (p.90).

Put another way, one can reasonably conclude that if a severely dependent drinker can in principle return to a moderate pattern of drinking this is unlikely to occur without considerable and sustained effort on the drinker's part. Based on the observation of the graded nature of dependence one can also reasonably expect different degrees of impairment of control in the general population.

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b) General population studies.

There has been considerably less research conducted in relation to impairment of control in general population samples in comparison to clinical populations, partly due to the different theoretical orientation of the epidemiologist, described above. The available evidence is conflicting.

Price elasticity. The most compelling evidence in favour of impairment of control in the general population comes from economic analysis of drinking populations. The concept of price elasticity of commodities has proved particularly useful in this respect. Since the cost of alcohol is highly inversely correlated with per capita consumption one might reasonably expect changes in real prices (taking into account actual price and disposable income) to be accompanied by proportional changes in alcohol consumption: an increase in cost by one unit should result in a decrease in consumption by one unit and vice versa. Price elasticity is the proportion by which consumption follows changes in cost. Thus a price elasticity of alcohol of 0.5 indicates that an increase in cost of one unit would only be accompanied by a fall in consumption of only 0.5 units. Important to the question of dependence and in particular control over intake, however, is the possibility of finding an asymmetric response to changes in price or income. Thus as Godfrey (1989a) points out:

> ".....consumers may have a tendency to acquire a habit more easily at times of low prices or high income and they may be reluctant to abandon them when prices rise and incomes fall. So, for example, considering price changes only, the response to a price rise would be smaller than to a price fall of the same amount." (p.1131).

Such asymmetric changes in consumption have indeed been found in relation to both alcohol (Godfrey, 1989b) and tobacco (Young, 1983), although contradictory evidence also exists.

<u>The distribution of change in the drinking population.</u> This prompts the question as to which sector of the population is relatively unresponsive to such increases in the cost of alcohol. Both the cluster and the mediational models would predict that the more dependent drinkers would be relatively unresponsive to such environmental influences. It is clearly difficult to test such a hypothesis under controlled conditions, but one naturalistic study which has a bearing on this question has been reported.

Kendell, de Roumanie & Ritson (1983) studied the effects of an increase in the real price of alcohol between 1978/79 and 1981/82, on the drinking habits of a sample of 463 'regular drinkers' in the Lothian Region. Sixty-nine percent of the initial sample were successfully reinterviewed. During the period between the interviews the cost of alcoholic beverages rose by 61%. Complicating interpretation of the consumption data, however, were parallel increases in the Retail Price Index (RPI), earnings, and unemployment. While the price of alcohol increased more than the RPI during this period, there were important shifts in disposable income within the population: those in work being better off, and the increasing number who became unemployed, worse off. Overall, consumption during the week prior to the survey decreased for the whole sample, the largest reduction taking place in the heaviest drinking group at initial interview, and in lower social class, unemployed males, particularly those who had become unemployed during the study period. The greatest reductions in 'adverse effects' scores, measuring alcohol-related problems, and three dependence symptoms, also ocurred in the heaviest drinkers. There were modest correlations between income and consumption across the various income categories (0.10-0.17). Notably, a reduction in mean consumption was found in subjects who assented to one or more of the items reflecting symptoms of dependence (n=42) (although interestingly this group did not reflect the heaviest drinkers in the sample at either time point).

As the authors acknowledge, this differential change in consumption between heavier and lighter drinkers can largely be accounted for by a 'regression to the mean' effect. This is compounded by the narrow time-frame of the interview: a longer time frame may have

better described drinking patterns. Also, a quantity-frequency measure of consumption, used more commonly in such surveys than a simple weekly quantity measure, is a better predictor of problematic drinking (Knupfer, 1984). Further, because of confounding changes in socioeconomic composition of the sample, a multiple regression analysis would have been more helpful in establishing the predictors of reduced consumption. Finally, it is known from other general population surveys that younger, male drinkers of lower social class not only consume more alcohol, and have more probems related to drinking than older drinkers (Cahalan & Room, 1974 ; Hilton, 1987b). They also show the greatest remission in problematic drinking over time (Fillmore & Midanik, 1982), irrespective of economic factors. Finally, for reasons suggested earlier, the design of general population studies tends to mitigate against finding a sizeable group typical of clinic attenders, particularly where a significant proportion of the sample is lost to follow-up, as in this study.

Thus, while this study lends some support to the hypothesis that heavier drinkers can reduce their drinking in response to increased cost of alcohol, there are several important methodological difficulties in forming a firm conclusion that this is indeed the case. More importantly, the question of whether dependent drinkers can moderate their drinking can not be ascertained on the basis of this study. A score of more than one on a three item dependence scale could not be regarded as an indication of the presence of the dependence syndrome, and the group of 42 subjects identified by this survey as being 'dependent' cannot be regarded as representative of dependent drinkers in the population.

Dependence as a mediating factor. Turning now to the question of whether dependence mediates the influence of consumption on the development of problems, as predicted by the mediational model, neither general nor clinical population studies have so far addressed this question. Several cross-sectional general population surveys in the United States have collected measures of consumption, dependence, and problems. Because epidemiologists have so far held to a disaggregation model of problems, the important potential mediating effect of dependence has not been examined in relation to the

consumption problems relationship. Hilton (1987), for example, has separately studied the predictors of problems and dependence independently in multiple regression analyses, using data from the 1984 U.S. National Survey of drinking practices. He found that the strongest predictor of both problems and dependence was consumption, with some other smaller predictive relationships found with sociodemographic factors. Grant & Harford (1990) reached similar conclusions concerning the effect of consumption on dependence in a re-analysis of the same data set, but using DSM-III-R criteria (American Psychiatric Association, 1987) for alcohol dependence to divide the sample into 'dependent' and 'non-dependent' subgroups. Thus the all important question of whether dependence represents an intervening variable in the consumption-dependence relationship has not been examined.

In sum, the evidence to support the concept of impaired control in general population studies is weaker than that from clinical studies. Because of methodological difficulties in conducting apposite research in general population samples, however, particularly with respect to the problem of identifying an adequate number of dependent drinkers, it is hard to form firm conclusions concerning the importance of impaired control on the basis of existing evidence. Further, the important question of whether the data supports a disaggregation or a mediational model has not so far been addressed.

CONCLUSIONS AND FORMULATION OF HYPOTHESES.

Three theoretical models of alcohol-related problems have been described and the available evidence supportive of each model has been presented. The cluster and disaggregation models can be traced back several centuries, and it has been noted that the dispute between these two opposing positions continues to provide a source of division in the current public health debate concerning the most appropriate method to deal with alcohol problems in society. The main factors held to distinguish between these models are the underlying causes, dimensionality, continuity, and impaired control over alcohol

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intake. It has been suggested that the issue of whether alcoholism is or is not a disease, while representing an historically important distinction, is not relevant to the current debate.

The mediational model is of more recent origin and occupies an intermediate position between the two more established models. The evidence presented supports the view that problems related to drinking are distributed throughout the drinking population, and are statistically multidimensional, going against the doctrine of latter-day cluster theorists such as Jellinek, and supportive of the other two models. The mediational model shares with earlier cluster theories the view that impaired control is central to an understanding of why certain individuals continue to consume alcohol in spite of severe adverse consequences. It is on this key issue that the mediational and disaggregation models are divided. It has been proposed that the basis of this conceptual disagreement is partly one of moralism, and partly related to the different aims and objectives of those who seek to influence policy. Principally, however, the different models have arisen out of the separate study of clinical and general populations resulting in a philosophical division between the clinician and the epidemiologist.

The series of research studies described in this thesis aims to find some common ground between these opposing positions by exploring commonalities in the behaviour of different populations. In particular, the studies examine whether the disaggregation or the mediational model best describes observed behaviour in both clinical and general population samples. Previous research conducted in these two types of population have tended to employ different research methods and instruments, and have had a different theoretical orientation.

The main hypothesis which the studies reported here share is that <u>dependence mediates the consumption-problems relationship</u>. In other words, the extent of alcohol-related problems which an individual experiences will be dependent not only on the quantity and frequency of alcohol consumption, but also crucially on the individual's degree of

dependence. Such a finding would be supportive of the mediational model.

The second hypothesis is that <u>since problems and dependence are theoretically different</u> <u>kinds of phenomena, they should behave differently in at least the following two</u> <u>important respects</u>:

1. <u>Different elements of the dependence syndrome should tend to co-occur,</u> <u>whereas there is no inherent reason why having one problem should predict</u> <u>the presence of other problems.</u>

2. <u>Since within the mediational model dependence represents a</u> <u>psychophysiological response to alcohol consumption, it should be less</u> <u>subject to social and cultural influences than other types of alcohol-related</u> <u>problem, and should be more closely related to the quantity of alcohol</u> <u>consumed.</u>

This latter hypothesis should pertain irrespective of whether a simple unidirectional causal relationship exists between consumption and dependence or whether there is a more complex interactive relationship. Most other problems (and in particular social problems) are more likely to be related to the social and cultural setting in which drinking occurs (Jessor & Jessor, 1977; Sadava, 1985). Further, drinking patterns have previously been found to be related to demographic factors such as age and gender (Mäkelä & Simpura, 1985; Hilton, 1987b). This is probably related to changing peer group influences at different stages of psychosocial development (Scaturo, 1987). Similarly, the way in which drinking behaviour is perceived by significant others (e.g. family, friends) and social agencies (e.g. police, doctors, employers), as being 'normal' or 'deviant', may to some extent be determined by factors such as the age, sex, marital and social status of the drinker. Thus, for example, a particular pattern of heavy drinking may be perceived as more deviant in a young woman with small children, than in an older, divorced, unemployed man, although these two individuals might share the same level of

dependence. Hence, differences in the extent of social disapproval experienced may be apparent in different social and cultural groups, controlling for drinking pattern and degree of dependence.

If commonalities do indeed exist between clinical and general populations in terms of the relationships between these different theoretical dimensions of drinking behaviour one can move towards a common theoretical framework for further research. In addition, if dependence has an important mediational role in the development of problems, rather than being merely epiphenomenal, the type of policies which may have an impact at one end of the dependence spectrum may be less appropriate at the other. Problems engendered by severe dependence may be less responsive to increased alcohol taxation, although such a measure may be effective amongst the majority of minimally dependent heavy drinkers. Thus, if these hypotheses are supported by the data, the mediational model has potentially important implications for public health policy.

CHAPTER 2.

THE MEASUREMENT OF ALCOHOL-RELATED PROBLEMS.

INTRODUCTION.

In the previous chapter three rival models of alcohol-related problems were identified: the cluster, disaggregation, and mediational models. The lack of aggreement in the field as to the model which most closely describes naturally occurring phenomena has led to the development of different instruments designed to measure drinking problems. This has led to markedly different findings concerning the nature and frequency of occurrence of drinking problems between different studies, dependent on the questionnaire and the strictness of the criteria employed (Hilton, 1989).

The development of the Bi-axial Concept (Edwards et al., 1977) and the mediational model which stems from it, prompted the need for methods to measure dependence as distinct from other problems related to drinking. Since the original description of the Alcohol Dependence Syndrome (Edwards & Gross, 1976) several questionnaires have been developed to measure elements of the dependence dimension, which were cited in the previous chapter. The reliability of these questionnaires has, in general, been high and broadly similar findings regarding the unidimensional structure of dependence have been reported across a variety of clinical populations.

In contrast, the measurement of the problems dimension has received considerably less attention. This may in part be linked to difficulties in establishing an adequate operational definition of problems, due to a lack of consensus in relation to the nature of alcohol-related problems, and also due to practical difficulties in the measurement of these phenomena. Room (1977) has provided an excellent review of such difficulites.

The aim of this chapter is to extend, and update this review in the light of subsequent developments. It will be suggested that until now an adequate instrument to measure alcohol-related problems, free from contamination with other conceptual content but providing adequate coverage of the potential problems experienced, has not been available. The development of a new questionnaire to measure alcohol-related problems

will be described, and the findings of an initial study will be presented. Before doing so, however, it is important briefly to review the potential practical utility of such an instrument.

The practical importance of the measurement of alcohol-related problems.

In the previous chapter, several crucial hypotheses were identified which have a bearing on our understanding of the nature of problems related to heavy drinking. It was argued that a better understanding of the nature of interrelationships between problems, dependence, and consumption, has important implications for public health policy. If dependence is, indeed, an important mediating factor in the consumption-problems relationship rather than being simply an epiphenomenon, this would prompt a re-evaluation of policies which rely solely on either population-level or individual-level solutions to alcohol problems in society. Such implications are discussed in more detail in Chapter 7. Clearly, however, a valid and reliable instrument to measure alcohol-related problems is required to test such hypotheses.

Second, such an instrument could have important practical utility in the diagnosis and clinical assessment of problem drinkers. Instruments based on an imperfect model of drinking problems will lead to errors in diagnosis. This in turn could result in the failure to provide appropriate help to those in need who remain undetected by exclusive instruments based on narrow criteria. Still others may be subjected to unnecessary interference through overinclusive screening methods. Such an error in case identification could pose difficulties particularly where treatment resources are limited. Once identified, the specific needs of the individual problem drinker must be taken into account in providing the most appropriate form of help. Several studies cited in the previous chapter pointed to the heterogeneous nature of problem drinkers presenting for treatment. Instruments which accurately reflect different dimensions of problematic drinking could be employed in studies which aim to identify the most appropriate treatment for the individual drinker. Some leads in treatment-patient matching have been identified since

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it has become possible to measure alcohol dependence (Edwards, 1986).

A further potential advantage in being able to measure the problems dimension is in providing more precise typologies of abnormal drinking behaviour. This has considerable implications for, particularly, genetic research in which adequate specification of phenotypes is essential to the interpretation of human laboratory data (Mullan, 1989). Thus far geneticists have tended to regard alcoholism as a unitary phenomenon or in terms of a limited range of typologies (e.g. Cloninger, Bowman & Sigvardsson, 1981). The development of methods to measure multiple dimensions of abnormal drinking could open up new areas of research enquiry in this regard.

Finally, there is the area of international classification of mental disorders. The dependence syndrome has been adopted into both DSM-III-R (American Psychiatric Association, 1987) and ICD-10 (World Health Organization, 1988) as a separate category of mental disorder. The ability to measure alcohol- related problems as well as dependence would not only allow the relationships between these dimensions to be explored, but would also allow for more sophisticated operational definitions of problems to be established. At present there is uncertainty as to whether problems should be regarded as direct consequences of dependence or as a separate diagnostic dimension. This issue is also examined in more detail in Chapter 7.

The definition of alcohol-related problems.

Several difficulties in terms of finding agreement on an operational definition of problems related to drinking were identified in Chapter 1. These included disagreement as to what constitutes 'a problem'. At times definitions have been narrow, particularly in the case of cluster theories (e.g. Jellinek, 1960). Others have adopted a much broader view of drinking problems. Knupfer (1967), for example, suggested that:

"A problem --any problem-- connected fairly closely with drinking

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constitutes a drinking problem."

Similarly, Clark (1966) regarded "excessive intake, concern about own drinking, and loss of control" as all reflecting drinking problems as well as, of course, "disturbance of social and economic functioning." Chafetz (1967) regarded anyone who drank to intoxication four or more times per year as a problem drinker.

A further difficulty, noted by Room (1977) is that of establishing a causal relationship between drinking and problems. In certain cases this may not present major difficulties, such as with a conviction for drunk driving, although even here a successful legal defence has been made on the basis of contamination of a blood sample with an alcohol-impregnated swab. In the case of a marital problem or a depressive illness, however, there are considerable difficulties in establishing time precedence of the phenomena. To do so might require lengthy interviewing with both the affected individual and independent informants. Even then one's conclusions will remain to a large extent dependent on the causal attributions of both the respondent and the interviewer. Further, such a method would be impossible to administer in a large-scale survey. In noting this difficulty, Edwards et al. (1977) suggest that:

> "There is often no satisfactory way in which the matter [causality] can be dealt with. The assumptions on which such a determination might be based would usually be so dubious that, wherever possible, a search for causes should be avoided." (p.7).

The operational definition which Edwards et al. propose is also broad:

> "An alcohol-related disability is deemed to exist when there is an impairment in the physical, mental or social functioning of an individual, of such a nature that it may be reasonably inferred that alcohol is part of the causal nexus of that disability." (p.17).

Importantly, the definition also explicitly excludes elements of the dependence syndrome and patterns of drinking behaviour. It is illogical to define problematic drinking in terms of a specific quantity or frequency of consumption since no particular pattern invariably results in problems. The question of whether problems invariably result from a particular

degree of dependence is also a matter for empirical study and, as such, should not be included in definitions of problems (or <u>vice versa</u>). Further, attitudes towards drinking and beliefs concerning the effects of alcohol, common in earlier instruments designed to measure alcohol problems were excluded from Edwards et al.'s (1977) definition.

In sum, there is no ideal way in which alcohol-related problems can be defined. In practice, one must rely on the survey respondent's belief concerning the existence of a problem and its alcohol-relatedness. It is possible that different respondents will hold different views as to the existence of a problem in the same individual, and that this will in part depend on the respondent's attributions, and their awareness of the problem (a doctor may be in a better position to identify hepatic impairment than a subject's spouse for example). A questionnaire to measure alcohol-related problems therefore requires questions to be phrased in such a way that the respondent will be in a position to know the answer, and to understand that a relationship with alcohol is implied. The definitions of problems and dependence offered by Edwards et al. (1977) represent a significant advance on earlier definitions and has been adopted for the purpose of the research described in this thesis.

<u>Other threats to the validity of problem measurement.</u>

<u>The validity of self-reported measures.</u> The validity of alcoholics' self-reports of drinking behaviour and related problems has been questioned (Popham & Schmidt, 1981; Watson, Tilleskjor, Hoodecheck-Schow et al., 1984). Room (1977) has pointed to the possibility of both a "denial factor" which may lead to underestimation of drinking behaviour, possibly through unwillingness to disclose information perceived of as antisocial, and an "admission factor" in which the drinker may believe overestimation of problems may more readily secure entry into treatment. Indeed, problematic events are often given as reasons for coming for treatment (Weisner, 1990). Such factors may inevitably merge into respondents' attributional bias. Most studies which have explored the validity of self-reported drinking behaviour and related problems have, however, found that clinical

subjects tend to offer underestimates, although the extent of this error shows considerable variability from study to study.

Sobell, Sobell & Samuels (1974) found a significant correlation between alcoholics' self reported number of arrests and court records. In another study Sobell & Sobell (1975) found that their subjects overestimated the extent of hospitalisation and criminal behaviour. The most common method of validity assessment has been through comparing the reports of alcoholics and collateral informants (usually their families). Such studies have generally found good agreement between independent sources (Fine, Steer & Scoles, 1978; Sobell & Sobell, 1978; Maisto, Sobell & Sobell, 1979; Hesselbrock et al., 1983). Watson et al. (1984), on the other hand, found only moderate correlations between alcoholics' and collaterals' reports of drinking behaviour. It should be noted, however, that since drinking in clinical populations is often secretive, it is also difficult to assess the validity of collateral reports. Nevertheless, self-reported drinking behaviour tends to be consistent with blood investigations (Fine, Steer & Scoles, 1978; Chick, Kreitman & Plant, 1981).

Overall, with some exceptions an adequate level of consistency has been found between self-report and independent information, although in the case of alcohol consumption the quality of the independent measures is questionable. More importantly for the research studies presented in this thesis, one is not concerned with the absolute level of consumption, dependence or problems reported by individuals (as would be the case in prevalence estimation) but rather the relationships between these variables. While there may be a tendency to underreport such phenomena in both clinical and general populations, there is no reason to assume that differential underreporting will take place. If subjects are reluctant to admit to having, for example, marital problems through a desire to respond to questions in a socially desirable manner, then it is likely that they will also underestimate taking morning drinks, tremor and heavy consumption.

Composite measures of problems. It has most often been the case that survey researchers have added together the scores of separate questionnaire problem items to produce aggregate problem scores. This has been carried out in spite of a belief that problems are not necessarily related phenomena within a disaggregationist framework. To what extent is such a procedure justified? In the case of dependence, the existence of a single factor which explains most of the variance in dependence questionnaire items, as has most often been found to be the case, suggests that all the items reflect a unitary underlying dimension. This is in keeping with the original description of the Alcohol Dependence Syndrome (Edwards & Gross, 1976): while the diagnosis of alcohol dependence does not depend on the presence of all elements of the syndrome, the occurrence of tremor, for example, suggests the likely co-existence of other phenomena such as sweating, craving, tolerance and reinstatement.

In the case of problems, however, having one problem does not necessarily predict the occurrence of other problems. The disaggregationist perspective is that problems are not necessarily functionally related and hence, do not necessarily co-exist. This view of problems is also true of the mediational model, and suggests that principal components analysis of problems questionnaire items reflecting different kinds of problem would not necessarily reveal a central 'problematic' dimension. Instead, within this perspective, it is likely that only functionally related items will tend to co-occur. For example items reflecting criminality may be intercorrelated, as might items reflecting disturbance in a marital relationship. However, these two problem domains, reflecting different kinds of disturbance in social functioning, may theoretically be quite unrelated to each other. A principal components analysis of such a questionnaire might therefore be characterized by multiple small factors, reflecting the functionally separate (disaggregated) problem domains.

In contrast, problem behaviour theory (Jessor & Jessor, 1977) postulates a vulnerability to alcohol-related problems arising from certain predisposing psychosocial characteristics. Further, dependent drinkers are likely to experience disturbance of functioning in several

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problem domains. Within this theoretical framework it is possible that there exist 'problematic' individuals who have a tendency to develop multiple problems related to drinking. Different problems, therefore, might tend to coalesce into a central problematic dimension by virtue of sharing common causes.

It is unclear, therefore, whether different problems are likely to be functionally related or unrelated in contrast to the aggregated view of dependence phenomena. Whether a problems questionnaire is characterized by a single or multiple dimensions is therefore a matter for empirical study. In either case, the justification for aggregation of problem items into an overall problems score is that the number and range of problems experienced by an individual over a given period reflects the overall degree of disturbance related to drinking, irrespective of whether the problems are functionally related or not. If problems tend to be disaggregated, however, it is important that a problems questionnaire reflects as wide a range of potentially affected problem domains as possible.

A further issue in the aggregation of problem items concerns the relative severity of problems. Certain items may reflect greater disturbance than others (e.g. marital strain compared to marital breakdown). Some aggregate problem scales assign weighting to certain items on a rule-of-thumb basis for this reason (e.g. Hilton, 1987a), although it is not clear that this is a valid approach.

Some items will be inapplicable to certain subjects (e.g. marital problems in the unmarried or work problems in the unemployed) which will lead to an underestimation of overall problems in some individuals when aggregate scales are used. This has led to the development of questionnaires relecting a narrow range of problems, or providing alternative questions for different subgroups.

Time frame. Certain problems may be relatively transient and infrequent. Macdonald & Pederson (1988), for example, found that the probability of being arrested for drunk driving was approximately once every 1168 impaired driving events or an average of once

every 9-10 years. Thus, it is necessary to use a time frame for questionnaires which is sufficiently long to capture an acceptable range of problems, but of sufficient recency to be both accurately recalled (Chick, 1980; Davidson, 1987), and to relate closely to other measures such as dependence which may also be subject to fluctuation over time.

Taken together, these difficulties can be expected to lead to underestimation of problems in questionnaire surveys. Aggregate problem scores are, however, acceptable for the purpose of comparisons with other measures such as dependence and consumption for the reasons stated above. Since there is no ideal way in which weighting can be applied to items on an a priori basis, such weighting should be avoided until the psychometric properties of the questionnaire are known. Nevertheless, while both the subjects and the methods used, tend to underestimate problems, there is no reason to assume that this will interfere with the validity of comparisons between measures of drinking behaviour through differential underreporting.

Existing measures of alcohol-related problems.

Existing instruments which have been designed to measure alcohol- related problems can be divided into two broad categories reflecting the purposes for which they were designed. The first category is that of instruments designed for clinical purposes, either in terms of screening for cases in need of treatment or for the assessment of severity of disability, and includes both self- and interviewer-reported questionnaires. The second includes questionnaire instruments designed for general population surveys. The relative advantages and disadvantages of these instruments will be discussed with special reference to the foregoing discussion. In particular, the extent to which the various questionnaires enquire about an adequate range of problems (or disabilities), as defined by Edwards et al. (1977), as distinct from other phenomena associated with heavy alcohol consumption (e.g. dependence, attitudes towards drinking) will be identified.

Clinical Instruments.

Existing instruments in this category have mostly been designed to identify 'alcoholics' as distinct from 'non-alcoholics' usually in general hospital or primary care populations, and are generally based on a cluster model. Thus with few exceptions these instruments combine items relating to both problems and dependence.

The Michigan Alcoholism Screening Test (MAST)(Selzer, 1971; Pokorny et al., 1971) which remains a commonly used screening instrument contains items covering these conceptually different phenomena. The four-item CAGE instrument (Mayfield, McLeod & Hall, 1974) which is also commonly used in screening includes items relating to both problems and dependence. In each of these questionnaires a "case" is defined by achieving greater than a criterion aggregate score. The main advantage of these instruments is their ease of use and their generally high degree of sensitivity and specificity in detecting alcoholism when compared with an interview with an experienced clinician (Selzer, 1971; Mayfield et al., 1974).

A more recent screening instrument, the AUDIT questionnaire (Saunders & Aasland, 1987) devotes 4 out of a total of 10 items to quantity and frequency of alcohol consumption. The remaining 6 items refer to both problems and dependence.

Several questionnaires have been designed to assess the severity of problems related to drinking in clinical populations, and as measures of change in problem status over time, usually following a course of treatment. Orford's (1974) Trouble scale, a 10 item questionnaire, was used to assess outcome in a controlled trial of treatment and advice in a group of alcoholics (Orford & Edwards, 1977). This instrument also contained both problems and dependence items (5 items reflecting each dimension). The MAST has also been used for this purpose. The Alcohol Use Inventory (Wanberg, Horn & Foster, 1977) is a more comprehensive questionnaire which measures a wide range of phenomena including problems, dependence, attitudes, social adjustment and personality.

The main limitation of all the questionnaires so far described is in the mixing of conceptually separate phenomena, making the specific identification of problems difficult. Further, because the focus has been broad, the number of problem items in any given questionnaire has been few.

The only clinical instrument specifically designed to measure problems in a clinical population is the Scale of Alcohol-related Problems (Chick, Ritson, Connaughton et al., 1988). This instrument contains 9 items relating to physical and mental problems and 14 items relating to alcohol-related social problem areas. A further subscale of 12 items relating to a range of problem areas was asked of informants alone and was based on the Trouble scale (Orford & Edwards, 1977) described above. Several of the items in the 23-item self-reported section of the questionnaire, however, were inapplicable to significant subgroups of subjects who were single or unemployed.

General population survey instruments.
Several instruments have been designed to measure alcohol-related problems in general population samples. Edwards, Hawker, Hensman et al. (1973), for example, used a 25-item 'problem drinker' scale containing 15 items conforming to the definition of problems, 6 items relating to dependence, one item about consumption, and 3 miscellaneous items relating to help seeking and attitudes towards drinking. In the study by Kendell et al. (1983) described in Chapter 1 a 14 item questionnaire was used to measure both problems (11 items) and dependence (3 items). Again, however, neither questionnaire includes a wide range of affected problem domains.

The most comprehensive and specific measure of problems used in either clinical or general populations is that of Cahalan & Room's (1974) Tangible Consequences questionnaire. This questionnaire has been repeatedly used in general population studies in the U.S. (Cahalan & Room, 1974; Cahalan, 1970; Clark & Midanik, 1982; Hilton, 1987a). It consists of 33 items covering a range of problem domains, although is heavily weighted towards social problems. Further, while entirely suitable for general population

samples where severe drinking problems are relatively uncommon, it does not cover many of the more severe problems encountered in clinical populations. In addition some of the problems included in the questionnaire are inapplicable in subgroups of subjects (e.g. 5 items refer to marital problems, and 4 to work problems; 4 items refer to problems with parents). While this may not pose major difficulties in general population samples, a much higher proportion of clinical subjects will have disrupted social relationships before presenting for treatment, and will thus be unable to answer several questions producing underestimates of problem status.

Summary.

In reviewing the available instuments only one, the Scale of Alcohol-related Problems, provided a measure of problems as distinct from other dimensions, suitable for use in clinical populations. Details of this instrument had not been published at the time of conducting the initial Alcohol Problems Questionnaire study described below. Further, although the self-reported section of the questionnaire contained 23 items, inapplicability of certain items reduced the total number to which all subjects could respond to a narrow list. The only comprehensive problems instrument available for general populations was both weighted towards social problems, and problems which were generally less severe than in clinical populations.

THE DEVELOPMENT OF THE ALCOHOL PROBLEMS QUESTIONNAIRE.

The study which follows stemmed from the need to develop a comprehensive measure of the problems dimension for use in clinical populations. As already described, a suitable instrument to measure dependence had already been developed (Stockwell et al., 1979). However, its relationship to the problems dimension was unknown.

In the course of developing the questionnaire, a preliminary analysis of the data was carried out to examine the relationships between problems, dependence, consumption, and demographic variables. Two hypotheses stated in Chapter 1 were tested, namely 1) that dependence is a mediating factor in the consumption- problems relationship, and 2) that problems and consumption would be more susceptible to the influence of sociodemographic factors than would dependence.

A further hypothesis related to the question of the dimensionality of problems and dependence. It seemed likely that in comparison to the unidimensional nature of dependence, problems would tend to be disaggregated. On the other hand, problem behaviour theory predicts that different problems will be related to common problematic dimension through their proposed shared aetiology. The hypothesis that problems would tend to be disaggregated was initially examined in a principal components analysis. Further, if different problem domains had different causes, such a finding would tend to run contrary to problem behaviour theory and support a disaggregational view of problems.

The initial aim of this study, however, was to develop a suitable problems measure. This research has previously been reported (Drummond, 1990; Drummond, in press,a). The reliability and validity of the Alcohol Problems Questionnaire (APQ) is described in Chapter 3.

Method.

Measures.

The Alcohol Problems Questionnaire. 46 items reflecting alcohol-related problems (as defined by Edwards et al., 1977) were derived using two methods. First, the Troubles scale (Orford, 1974), the Problem Drinker scale (Edwards et al., 1973), and the Alcohol Use Inventory (Wanberg et al., 1977) were examined and items which were definitely viewed as representing elements of the Alcohol Dependence Syndrome (Edwards & Gross, 1976) were discarded. Other items not reflecting problems (e.g. attitudes, beliefs, personality) or only tenuously conforming to Edwards et al.'s (1977) definition (e.g. 'a doctor advised me to cut down', or 'worried about intake') were also discarded. Some overlap between the questionnaires was found and a list of 35 items remained. Second, the list was shown to a group of 5 psychiatrists specializing in the treatment of patients with drinking problems and 5 patients who had presented for treatment at the Maudsley Hospital Alcohol Clinic. They were each asked to identify which questions in their experience reflected problems related to drinking: in the case of the patients this included both problems which they had experienced and problems which they thought other problem drinkers had experienced. Finally, they were asked to add any problems which did not appear on the list, but which they regarded as important.

All 35 items were endorsed by at least one informant. Of the additional problems offered by the subjects, those which reflected dependence were excluded. When these additional items were added to the initial list, there were 46 items in total. The items reflected 8 problem domains (the number of items in each domain is given in parentheses): friends (4); marital (9); children (6); police (3); work (8); finances (4); physical (7); psychological (5). A total of 23 items in 5 problem domains are applicable to all subjects (friends, police, finances, physical, psychological). Two items were dropped following the initial study because of infrequency of reporting (see below), the final version used in the subsequent replication study is given in Appendix I. All questions refer to the previous 6 months and are answered either 'yes' or 'no'.

The SADQ. This questionnaire has previously been described (Stockwell et al., 1979). It consists of a 20 item questionnaire which measures 5 elements of the alcohol dependence syndrome: physical withdrawal; affective withdrawal; craving and relief drinking; typical daily alcohol consumption (a measure of tolerance) and reinstatement of symptoms following a period of abstinence. Subjects are asked to recall a recent period of heavy drinking and to nominate a particular month to remind them of this. Each question invites a response in terms of frequency of occurrence: 'never or almost never', 'sometimes', 'often', or 'nearly always'. These responses carry scores of 0, 1, 2, or 3, respectively. The consumption subscale consists of 4 items covering the quantity and frequency of consumption in a 'typical day' during the period of heavy drinking, and are summed to produce a maximum possible score of 12. The maximum possible score on the SADQ is thus, 60. A separate SADQ total score was also computed (maximum possible score, 48), excluding the consumption items, to allow a comparison to be made between consumption, dependence, and problems. The SADQ is given in Appendix II.

Sociodemographic characteristics. A brief questionnaire was used to record sociodemographic information (see Appendix III). Socioeconomic status was classified on the basis of the Registrar General's Classification of Occupations (Office of Population Censuses and Surveys, 1980).

Subjects.

One hundred and four consecutive patients presenting to the alcohol treatment units of three London hospitals (the Maudsley, Stone House and Priory Hospitals) were invited to participate in the study. None of those approached refused to give their consent to participate. All subjects had presented to hospital for help with a drinking problem. The sample included both inpatients and outpatients. Subjects were excluded if they showed evidence of organic impairment. One subject was later excluded because the questionnaires were incorrectly completed.

Procedure.

Subjects were approached at first contact with the clinic or as soon as possible thereafter if admitted, intoxicated, or experiencing withdrawal symptoms. For inpatients data were collected following completion of withdrawal. To ensure subjects' full cooperation and maximum validity of responses, complete confidentiality was ensured and an interviewer was present to answer questions if necessary. Subjects were, however, invited to complete the questionnaires quickly and without too much introspection. Completion of the APQ took approximately 10 minutes. The SADQ and demographic questionnaire took a further 10 minutes to complete.

Analytic strategy.

Analysis of the data was conducted in five phases. First, the frequency of reporting APQ items was examined to assess item redundancy. Items infrequently reported were eliminated from subsequent analyses. Second, the structure of the questionnaire was examined using correlational and exploratory principal components analyses. The purpose of this phase was to examine whether the APQ items related to a single or to multiple dimensions. As suggested earlier, it was unclear whether problem items would be disaggregated or related to a central problematic dimension. Because of the sample size and the inapplicability of certain subscales in subgroups of subjects, the principal components analysis was conducted with only the items common to all subjects (APQ common items). However, correlations between the 8 APQ subscales were examined to assess the extent to which the MARITAL, CHILDREN, and WORK subscales related to other subscales. The correlations between each subscale and the APQ common score (the aggregate of the APQ common items) was examined, in each case excluding the relavant subscale.

The factor structure of the SADQ was also examined to confirm previous findings (Stockwell et al., 1979). Correlations between SADQ subscales were computed, as were

correlations between SADQ and APQ subscales.

Third, Pearson correlations and partial correlations between the APQ common score (APQC score), the SADQ total score excluding consumption items (SADQ score), and the SADQ consumption subscale score (consumption score) were examined. Although less informative than subsequent multiple regression analyses, this exploratory analysis was used to establish the paths between the key variables of interest. A logical assumption was made that consumption must have preceded both problems and dependence and that the observed pattern represented a state of equilibrium between the variables. Thus, if significant partial correlations existed between consumption and both problems and dependence, but not between problems and dependence (conforming to the disaggregation model (Figure 1.1b)) dependence would have been excluded from subsequent regressions of problems and vice versa. If, however, the data supported a mediational model (Figure 1.1c)(significant partial correlations between consumption and dependence, and dependence and problems, but not between consumption and problems) then dependence would have been included in problems regressions.

The fourth phase of the analysis employed multiple regression analysis to examine first, the predictors of individual APQ subscales and second, to construct a path analysis of the predictors of problems (APQC score), including demographic variables, and consumption and dependence, as indicated by the previous analysis. In each case, an SPSS-X 'enter' procedure was used in the first instance. Backward elimination and forward insertion procedures were also conducted as a further check for the existence of any additional paths in less strict regression models.

Finally, the predictors of individual problem subscales were examined in a series of multiple regression analyses, with consumption, dependence and sociodemographic indices as independent variables. A further explanation of the use of path analysis is provided in Appendix IV.

Results.

Sample characteristics.

The male female ratio of the sample was 4:1 (male, n=83; female, n=20). The mean age of the combined sample was 41.5 years (s.d.=10.2), with no significant difference in mean age between males and females (male=41.8; female=40.0 years). Half of the sample were married or co-habiting, 24% had never been married, and an equal number were separated or divorced (12% in each category). Two percent were widowed. Sixty-one percent of the sample were engaged in full time employment, and 20% were unemployed.

Fifty-five percent of the sample were classified as belonging to social class I and II (I, n=13; II, n=24). The remainder of the sample had the following distribution: social class III, n=19 (29%); IV, n=5 (8%); V, n=5 (8%). While atypical of clinical populations of problem drinkers in the United Kingdom in terms of social class distribution, patients from a private hospital (Priory Hospital) were deliberately included in order that the experience of problems could be studied in widely differing social groups. Sixty-four percent of the total sample had one or more children.

Frequency of reporting alcohol-related problems.

The instruments proved straightforward to administer and none of the items proved difficult to comprehend. All items were assented to by at least 3 subjects. The most commonly endorsed item in the APQ common scale was approximately nine times more frequently reported than the least endorsed item (Table 2.1). Three items were endorsed

Table 2.1. Frequency of reported alcohol-related problems[1] (%).

Common (n=103)		Marital (n=52)		Work (n=63)	
Drinking alone	79	Spouse complains	55	Lost day's work }39	
Self neglect	71	Shouting	47	Lost efficiency }	
Lost enjoyment	70	Prevents drinking	46	Lost interest	30
Friends criticize	69	Threaten to leave	38	Lost time	27
Diarrhoea	64	Spouse ignores	34	Warnings	21
Vomiting }	59	Put to bed	25	Complaints	18
Paraesthesiae }		Refuses sex	22	Suspension	10
Worried meeting }	56	Spouse injured	11	Accidents	4
Drinking friends }		Spouse separated	9		
Depression }	55				
Abdominal pain }		Children			
Suicidal thoughts }	49	(n=54)*			
Lost interest }					
Weight loss	47	Children criticize	36		
Debt	46	Children avoid	27		
Money excuses	39	Rows with children	22		
Police trouble	37	Prevent drinking	20		
Money lies	28	Hit children	6		
Accidents	26	Refuse money	5		
Fail to wash	25				
Pawn belongings	23				
Drunk driving	19				
Prison	9				

* Data missing in 11 cases
[1] Items abbreviated. See Appendix 1 for a full listing of items.

by only 6% or less of the sample (two items from the CHILDREN and one from the WORK subscale). These items were dropped from subsequent analyses. In the case of accidents at work this may represent the true prevalence of this problem, particularly in view of the fact that more than half of the sample were in non-manual occupations. However, the item reflecting hitting one's children, while endorsed during piloting as a known behaviour amongst problem drinkers, was probably in this study influenced by social acceptibility.

The frequency of reporting the remaining problems was strikingly high, particularly in the case of physical and psychological problems. The high prevalence of depression and suicidal thoughts in problem drinkers has been noted in other studies (Jaffe & Ciraulo, 1986) as has the common occurrence of marital problems (Orford & Edwards, 1977).

The structure of the APQ.

An exploratory principal components analysis of the APQ common items revealed one main factor accounting for 19.9% of the variance. The next largest factor accounted for 8.4% of the variance. A scree plot (Figure 2.1) shows that while the data exhibit some central tendency, the first 7 factors together account for 60.8% of the variance, with no clear disjunction in the scree plot to suggest an appropriate cut-off point. This suggests

Table 2.2. Correlations between APQ subscales[1] and the APQC score[2].

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) APHYS	1.00								
(2) AAFF	0.29 **	1.00							
(3) MONEY	0.41 ****	0.23 *	1.00						
(4) POLICE	0.22 *	0.29 **	0.25 **	1.00					
(5) FRIENDS	0.33 ***	0.43 ****	0.08	0.21 *	1.00				
(6) MARITAL	0.38 **	0.23 *	0.32 **	0.23 *	0.23 *	1.00			
(7) CHILDREN	-0.13	-0.11	0.06	0.03	-0.12	0.28 *	1.00		
(8) WORK	0.37 **	0.27 *	0.50 ****	0.11	0.23 *	0.29 *	0.06	1.00	
(9) APQC Score[1]	0.50 ****	0.39 ***	0.45 ****	0.39 ***	0.36 ****	0.49 ***	-0.03	0.47 ***	1.00

[1]Subscale titles abbreviated. See text for a full description of subscales.

[2]Excluding the relevant 'common' subscales where appropriate. See text for definition of APQ subscales.

The MARITAL, CHILDREN and WORK subscale correlations are based on smaller sample sizes than in the case of 'common' subscales. See text for details.

**** p<0.0001
*** p<0.001
** p<0.01
* p<0.05
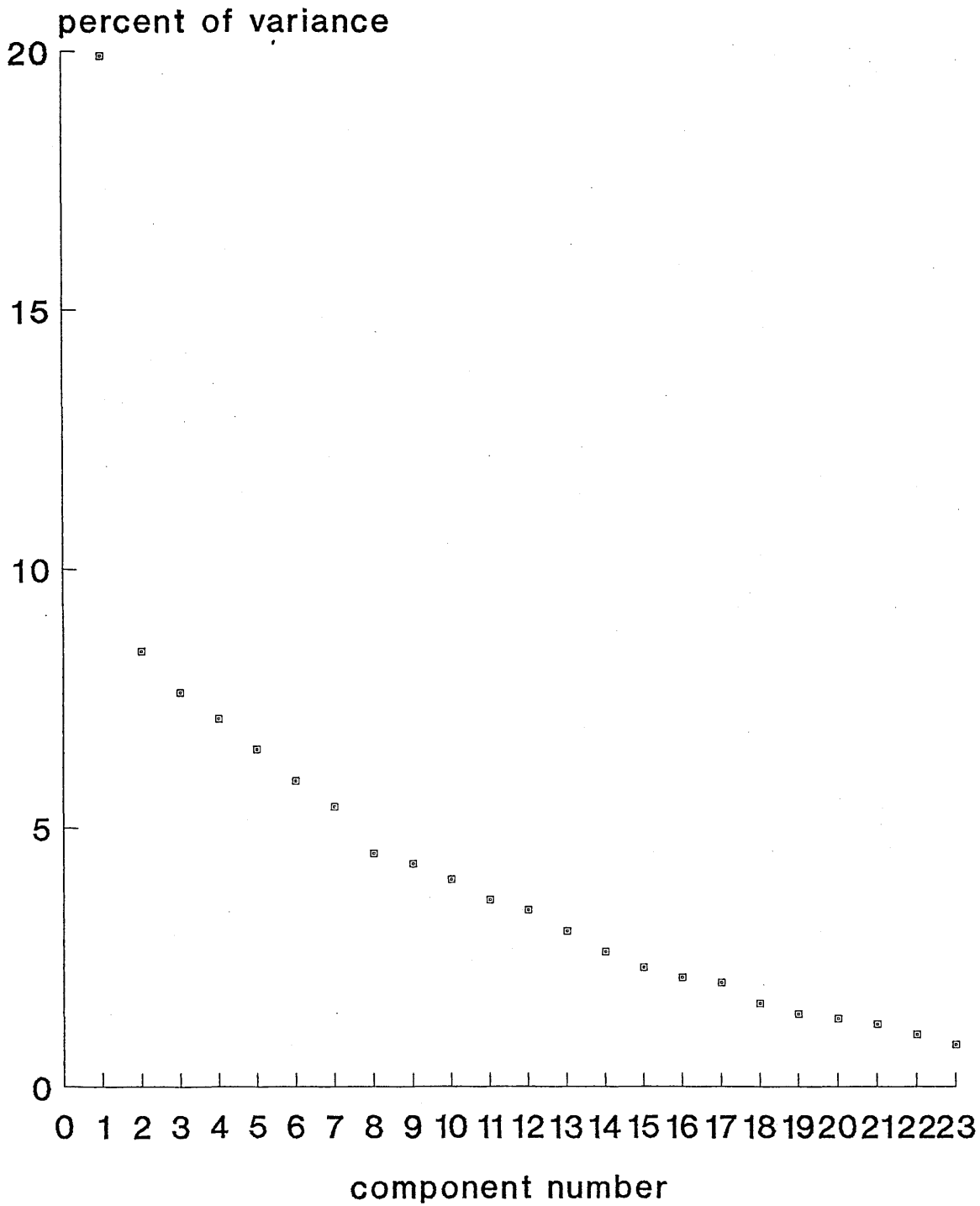
Figure 2.1. Scree plot of the principal components analysis of the APQ

percent of variance

component number
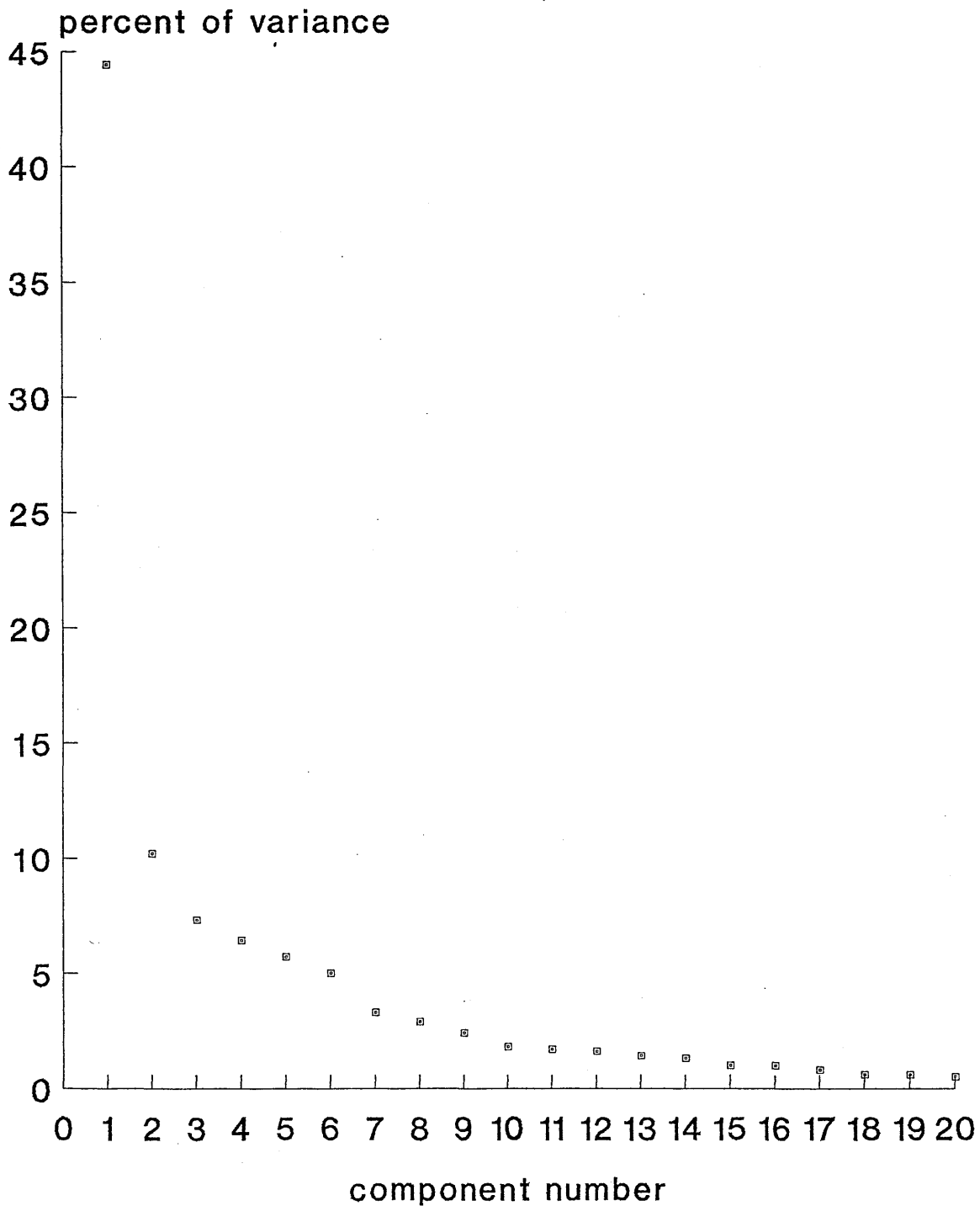
Figure 2.2. Scree plot of principal components analysis of the SADQ.

that the problems represented in the APQ are disaggregated.

Pearson correlations between APQ subscales, and between these subscales and the APQC score are shown in Table 2.2. The subscale scores were were calculated by aggregation of all the items covered by each subscale representing the 8 problem domains: physical (APHYS), affective (AAFF), financial (MONEY), police (POLICE), friends (FRIENDS), marital (MARITAL), children (CHILDREN), and work (WORK). Hereafter these subscale scores will be referred to by the labels given in parentheses.

Highly significant correlations were found between each of the APQ common subscales and the APQC score (excluding in each case the relevant subscale). The MARITAL and WORK subscales were also highly significantly correlated with the APQC score. The only scale which was not consistent with this trend was that of CHILDREN.

Intercorrelations between all APQ common subscales were high except in the case of FRIENDS and MONEY. The CHILDREN subscale was only significantly correlated with MARITAL, but even here the correlation was small. Otherwise, the MARITAL and WORK subscales were significantly correlated with the APQ common subscales with the exception of POLICE and WORK. Thus, with the exception of the CHILDREN subscale, these results reflect the view that while some problem domains are related to others, reflecting a central problematic tendency, they tend to be disaggregated.

The structure of the SADQ.

In contrast to the APQ, a principal components analysis of the SADQ items revealed results which confirmed the findings of Stockwell et al. (1979). A single large factor accounted for 44.4% of the variance, and a scree plot confirmed the insignificance of other factors (Figure 2.2). All SADQ items loaded strongly on this factor (Table 2.3).

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Only the item reflecting consumption of more than 2 bottles of spirits per day or the equivalent had a loading of less than 0.50, reflecting the relative infrequency of occurrence of this level of consumption, and hence the lower variance accounted for by the item.

Intercorrelations between SADQ subscales, and those between individual subscales and the SADQ score (excluding in each case the relevant subscale) were all highly significant, and consistent with Stockwell et al.'s (1979) findings (Table 2.4).

Table 2.3. Factor loadings of SADQ items on Factor 1.

Item*	Loading
I woke up feeling sweaty.	0.733
My hands shook first thing in the morning.	0.786
My whole body shook violently first thing in the morning.	0.761
I woke up absolutely drenched in sweat.	0.724
I dreaded waking up in the morning.	0.599
I was frightened of meeting people first thing in the morning.	0.611
I felt on the edge of despair when I awoke.	0.567
I felt very frightened when I awoke.	0.624
I liked to have a morning drink.	0.777
I always gulped my first few morning drinks down as quickly as possible.	0.735
I drank in the morning to get rid of the shakes.	0.811
I had a very strong craving for drink when I awoke.	0.739
I drank more than 1/4 bottle of spirits a day.	0.547
I drank more than 1/2 bottle of spirits a day.	0.648
I drank more than 1 bottle of spirits a day.	0.670
I drank more than 2 bottles of spirits a day.	0.445
Reinstatement: I would start to sweat.	0.561
Reinstatement: I would start to shake.	0.653
Reinstatement: My body would shake.	0.660
Reinstatement: I would be craving for a drink.	0.545

*Items abbreviated in places. The full questionnaire is given in Appendix II.

	PHYS	AFF	NEED	POSTAB	ALCTOT
PHYS	1.00				
AFF	0.50	1.00			
NEED	0.71	0.42	1.00		
POSTAB	0.60	0.36	0.59	1.00	
ALCTOT	0.64	0.50	0.57	0.49	1.00
SADQ total score[1]	0.55	0.56	0.49	0.46	0.53

Subscale abbreviations
PHYS   -Physical withdrawal
AFF   -Affective withdrawal
NEED   -Craving and salience
POSTAB -Reinstatement
ALCTOT -Consumption (tolerance)

[1]Excluding in each case the relevant SADQ subscale.
See text for definition of subscales.

All correlations are significant the level of $p < 0.0001$

The relationships between problems, dependence and consumption.

The Pearson and partial correlations between the APQC, SADQ (excluding the consumption subscale), and consumption scores are shown in Figure 2.4. It will be seen that all Pearson correlations between the variables are highly significant. Partial correlations were computed for each pair of variables controlling for the third variable. The effect of controlling for dependence was to reduce the consumption-problems relationship to insignificance. The consumption-dependence and dependence- problems correlations were however virtually unaffected by this procedure, suggesting that dependence is an intervening variable in the consumption-problems relationship in line with the mediational model.

Pearson correlations

DEPENDENCE

0.63***   0.77***

PROBLEMS   0.53***   CONSUMPTION

Partial correlations

DEPENDENCE

0.45***   0.53***

PROBLEMS   0.15*   CONSUMPTION

*** p<0.0001
*   n.s.

Figure 2.3. Correlations and partial correlations between consumption, dependence, and problems in 103 problem drinkers.

Predictors of problems, dependence, and consumption.

A series of multiple regression analyses were conducted to construct a path analysis of the predictors of problems. In the initial analysis, dependence, consumption and sociodemographic variables were entered into the regression equation with problems (APQC score) as the 'dependent' variable. The age distribution of the sample indicated that it would be appropriate to employ the age in years in the regression analysis. Sex and socioeconomic class were coded as binary variables (male=0; female=1; class I & II=1; III, IV & V=0). The result of this analysis is given in Table 2.5. It will be seen that dependence is the strongest predictor of problems, with age and social class as smaller, but significant predictors in the direction of younger age and lower social class being independently associated with more problems.

In the second analysis consumption and sociodemograpic variables were entered into the regression analysis with dependence as the 'dependent' variable. Table 2.6 shows that consumption was the only significant predictor of dependence, with sociodemographic variables not approaching significance.

The sociodemographic predictors of consumption were then examined. Table 2.7 shows that age and sex significantly predicted consumption in the direction of younger males reporting more problems. The path diagram constructed on the basis of these analyses is displayed in Figure 2.4.

Finally, all of the above analyses were repeated using forward insertion and backward elimination procedures. The results of these procedures were consistent with that obtained by the forced entry procedure.

Table 2.5. Results of multiple regression analysis of problems (forced entry procedure).

Variable	Beta	T	Significance
Dependence	0.509	4.227	0.0001
Age	-0.232	-2.225	0.029
Social class	-0.211	-1.910	0.035
Married	-0.014	-0.143	0.886
Sex	0.074	0.778	0.440
Consumption	0.088	0.684	0.496

Table 2.6. Results of multiple regression analysis of dependence (forced entry procedure).

Variable	Beta	T	Significance
Consumption	0.716	7.947	0.0001
Age	0.056	0.586	0.560
Social class	-0.050	-0.592	0.556
Married	0.028	0.308	0.759
Sex	0.086	0.984	0.328

Table 2.7. Results of multiple regression analysis of consumption (forced entry procedure).

Variable	Beta	T	Significance
Age	-0.265	-2.378	0.020
Social class	0.085	0.838	0.404
Married	-0.120	-1.116	0.267
Sex	-0.281	-2.824	0.006
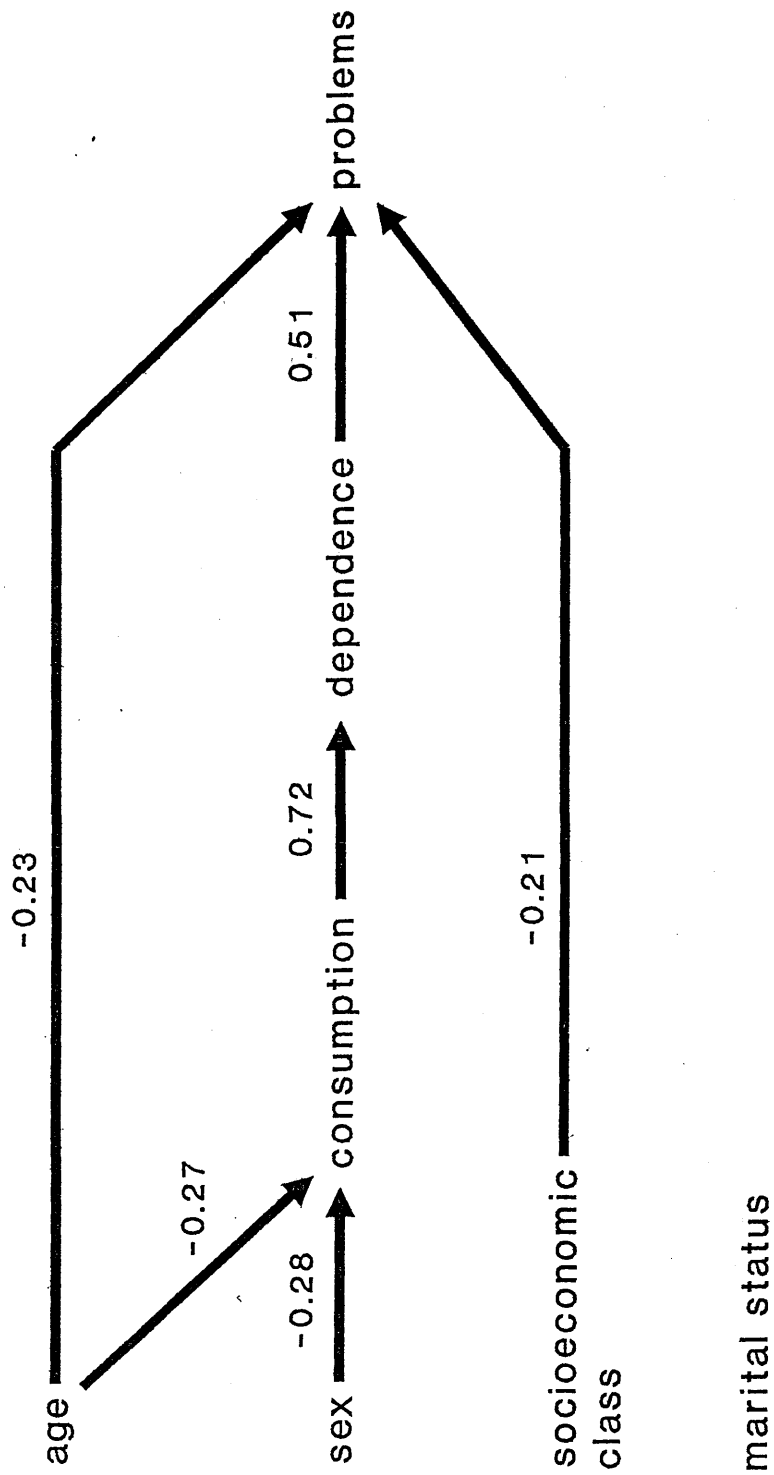
Figure 2.4. Path diagram of problems, dependence, consumption, and sociodemographic variables.

Predictors of different problem domains

In order to explore whether different problem domains were predicted by different factors a series of regression analyses was performed with each problem subscale in turn as the dependent variable. Differential effects were indeed found. Problems with friends were only predicted by the level of consumption (Beta=0.33; $p<0.002$) and physical problems were only predicted by dependence (Beta=0.50. $p<0.0001$). Psychological problems, however, were predicted by dependence (Beta=0.50, $p<0.0001$) and sex (Beta=0.26, $p<0.009$), in the direction of females being more susceptible to such problems. Financial problems were positively related to dependence (Beta=0.54, $p<0.0001$) and lower social class (Beta=-0.54, $p<0.01$). Sex and social class alone predicted police problems, although in the former case this was only marginally significant (Beta=0.20, $p<0.05$) and in the latter case, approaching significance (Beta=-0.21, $p<0.07$). This suggests that males of lower social class tend to have more police problems. Dependence was the only predictor of marital (Beta=0.35, $p<0.01$) and work (Beta=0.58, $p<0.0001$) problems. No significant predictors were found for problems with children.

CONCLUSIONS.

While it would be wrong to form firm conclusions on the basis of this preliminary study, and a more extensive discussion of the results will be conducted in Chapter 7, it is worthwhile at this stage briefly to reflect on the findings. The main aim of the study was fulfilled, namely the development of a new questionnaire designed to measure alcohol-related problems, with few redundant items. Further, the questionnaire proved straightforward to administer, and contained questions which were intellegible to the subjects, consistent with their experience.

What is the significance of the main findings concerning the relationships between dependence, consumption, and problems? The relative independence of consumption and problems has previously been noted in exploratory principal components analyses of data

derived from clinical populations (Sadava, 1985; Skinner, 1988). This is the first study, however, in which dependence has been identified as an intervening variable in the consumption-problems relationship, a finding which is in keeping with the mediational model. This observation has not previously been made because a suitable instrument to measure problems in a clinical population has not been available until now, and partly because the existence of such a relationship has not previously been sought. Existing data, such as that described in Chapter 5, has so far only been analysed in keeping with a disaggregation model, as described in Chapter 1.

The second important finding demonstrates the value of path analysis in examining complex interrelationships between variables. Problems and consumption are predicted by several sociodemographic factors, whereas the only predictor of dependence in this study is consumption. These findings are in keeping with the second hypothesis, namely that dependence is more closely related to level of consumption than other environmental influences. Problems, and consumption itself, may be subject to the influence of sociodemographic variables. The extent to which causal relationships between these phenomena can be inferred from the correlational data presented in this and other studies described in later chapters will be the subject of a more detailed discussion in Chapter 7.

While some problem domains are interrelated, problems tend to be disaggregated. There is wide variation in the frequency of reporting different problems, and multiple factors were found in principal components analysis, rather than a clear single factor. Further, there is evidence from this study which is both supportive of, and tending to go against, the predictions of problem behaviour theory. While different sociodemographic factors predict different types of problem, the strongest and most commonly observed predictor of individual problem domains is dependence: overall (for 5 problem domains) dependence was the most significant, and in some cases the only, predictor. Without specifically naming dependence, however, Jessor & Jessor (1977) predicted that factors other than psychosocial characteristics, including possibly genetic or metabolic factors might lead to increased vulnerability to develop alcohol-related problems. These results

tend to support this hypothesis.

The reliability and validity of the APQ is also crucial to the conclusions which may be drawn from the results. These issues are the subject of the next chapter.

CHAPTER 3.

VALIDITY AND RELIABILITY OF THE ALCOHOL PROBLEMS QUESTIONNAIRE.

INTRODUCTION.

The aims of the studies reported in this chapter were three-fold. First, to establish whether the results described in the previous chapter pertaining to the mediating influence of dependence on the problems-consumption relationship could be replicated in a different clinical sample of problem drinkers. The second aim was to assess the validity of APQ as a measure of alcohol-related problems and the third, to establish the reliability of the APQ. Without these essential studies, the generalizability of results of the initial study was uncertain.

Validity.

The issue of validity was discussed in the previous chapter in connection with the extent to which self-reported drinking behaviour and related problems could be substantiated by independent information. It was concluded that to a large extent one must rely on the attributions of the survey respondent in this regard, but there is no inherent reason why differential underreporting (or indeed overreporting) of problems, dependence, or consumption should occur. Thus, the conclusions of the study described in the previous chapter should not be compromised through this source. All of the APQ items were endorsed by one or more problem drinkers in treatment and by clincians as being typical of problems related to drinking, and thus can be accepted as having face validity. The validity of the questionnaire, however, does not rest at this point.

The conformation of the APQ as a measure of alcohol-related problems in relation to the stated hypotheses adds weight to its validity. If problems and dependence simply represented similar 'disturbances due to heavy drinking' as suggested by the disaggregation model, their differential relationship with consumption would have been unlikely to have occured. The replication of this finding in different populations would further support the generalizability not only of the mediational model, but of the APQ itself.

Anastasi (1982) distinguishes between three main types of validity: content validity, criterion validity, and construct validity. Content validity refers to the extent to which inferences based on a questionnaire measuring a hypothetical consruct can validly be drawn. In other words, to what extent do high scorers on the APQ in reality have more problems than low scorers. In order to have high content validity, the questionnaire must have a wide coverage of the construct, and the inferences which can be drawn must hold true under a range of circumstances (Streiner & Norman, 1989). The APQ was designed in such a way as to include as wide a range of problems as possible, and will be examined here under a range of different circumstances.

Criterion validity is further subdivided into two types: concurrent validity and predictive validity. In order to test concurrent validity, the questionnaire must be compared with an existing measure of known validity. In the case of problems the difficulty arises that part of the reason for its development is the lack of a suitable existing instrument (as discussed in Chapter 2). In the studies described in this chapter, however, the APQ was compared with other measures which arguably tap into a narrower range of alcohol-related problems. The predictive validity of the APQ has not been tested here. (Such a study to assess the predictive validity of the APQ would involve testing the hypothesis that the future behaviour of those low and high scores would differ; for example, help seeking behaviour might be more likely in those with higher APQ scores.)

Construct validity refers to the extent to which the questionnaire, and the construct which it purports to measure, conforms to hypothetical predictions (Cronbach & Meehl, 1955). In either case, repeated demonstrations of the validity of both the construct and the measure are required, under a range of different circumstances. In this thesis the problems construct as measured by two instruments in different countries, and (in the case of the APQ) in translated form, is examined in terms of its relationship to other variables within the mediational model. Construct validity also includes both convergent and discriminant validity. Convergent validity is assessed by comparing the new measure to existing measures of the same construct. In this chapter, changes in APQ score in problems

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drinkers following treatment are compared with other outcome measures. Correlations between the new and existing measures of outcome would provide evidence of convergent validity.

Finally, the discriminant validity of a questionnaire is the extent to which the new measure does not correlate with other measures of constructs which are believed to be unrelated. In this chapter, a group of college students who completed the APQ were also asked questions referring to the drinking behaviour of others. Responses to such questions should be unrelated to the drinking behaviour of the respondent.

Reliability.

The reliability of a questionnaire refers to the extent to which the same score is consistently obtained by the same individuals when tested on different occasions (Anastasi, 1982). A reliable questionnaire is one in which the error variance in test scores is small. The reliability of a questionnaire can be expressed in two ways. First, the extent to which scores obtained on different testing occasions are correlated provides a measure of reliability. There is the possibility, however, that a correlation, when viewed in isolation, will provide only a limited view of reliability. If scores have a tendency to decline across testing occasions in concert, they might remain significantly correlated while in absolute terms having little correspondence. The method employed here, therefore, includes both an assessment of correlations between initial test and retest scores, and a method of comparing absolute scores between testing occasions.

VALIDITY STUDIES.

Study 1: A study of specialist versus general practitoner treatment of problem drinkers.

Method.

40 problem drinkers referred consecutively by their general practitioner to the Maudsley Hospital Alcohol Clinic were assessed and then randomized to either continuing clinic care or were returned to their general practitioner who was contacted and supported by the specialist. This study has previously been reported (Drummond, Thom, Brown et al., 1990). During initial assessment, subjects were interviewed to establish their alcohol consumption over the preceding 6 months, and completed several self- completion questionnaires including the APQ, SADQ and the 28-item General Health Questionnaire (GHQ) (Goldberg, 1972) which is a widely used measure of psychiatric symptomatology. In addition, subjects were asked to mark on a 10cm analogue scale how severe they believed their problem with drinking to be. The extremes of the scale were marked with 'no problem' at one end, and 'extremely severe problem' at the other end.

Subjects were reassessed at six months following initial assessment or as near as possible to that time. At this point the APQ and GHQ were readministered. Initial scores on the different questionnaires were compared, as were changes in scores on these measures over the follow-up period.

Results.

At intake, the APQC score was significantly correlated with the SADQ total score ($r=0.65$, $p<0.0001$), as had previously been found, but also with the GHQ score ($r=0.75$, $p<0.0001$) and the subjects' global rating of problem severity ($r=0.57$, $p<0.0001$). While there were no significant differences between the two treatment groups on any of the outcome measures at follow-up, both groups had improved significantly on all measures (MANOVA, within-subjects change scores: APQC score, $F=38.5$, $p<0.0001$; GHQ score, $F=8.4$, $p<0.01$; alcohol consumption score, $F=61.5$,

p<0.0001). Further, improvements in the APQC score were correlated with improvements in both the GHQ (r=0.40, p<0.05) and alcohol consumption score (r=0.50, p<0.01).

Conclusions.

In this study the APQ showed evidence of both concurrent validity, through its correspondence to other problem measures, and construct validity, with changes in APQC score occuring to a large extent in parallel with other outcome measures.

Study 2: A survey of drinking problems in a sample of college students.

Method.

A sample of 270 students (125, males; 145, females) in an English college, part of the University of London, were solicited to participate in a questionnaire study through advertisements in the college's student magazine and posters (West, Drummond & Eames, 1990). In order to maximize the response rate a raffle ticket for entry into a prize draw was offered for each completed questionnaire, and absolute confidentiality was assured through the use of anonymous questionnaires. The response rate was 68%.

The questionnaire included the shortened Michigan Alcoholism Screening Test (MAST)(Selzer, 1971), the GHQ (Goldberg, 1972) and a version of the APQ, modified to be applicable to the student population. For example questions in the work subscale made reference to missing lectures, reduced efficiency in studying, and problems with the college authorities (rather than employers). The questionnaire also included items concerning alcohol consumption and aggressive or antisocial behaviour.

Table 3.1. Correlations between APQC score and other alcohol-related problem measures in the college student sample.

	MAST score	GHQ score	Damage to property	Fights	Injuries	Regret behaviour
APQC score	0.51	0.56	0.38	0.30	0.44	0.41

All correlations significant at p<0.0001.

Results.

The results are presented in Table 3.1. The APQC score (based on the same 23 items as in the original version) was significantly correlated with both the MAST score (r=0.51, p<0.0001)(using the standard weightings and aggregate scoring method), and the GHQ score (r=0.56, p<0.0001). The APQC score was also significantly correlated with other problems related to drinking including 'getting into fights following alcohol' (r=0.30, p<0.0001), 'sustaining injury following drinking' (r=0.44, p<0.0001), 'regretted behaviour following drinking' (r=0.41, p<0.0001), and 'drink causing any kind of problems' (r=0.33, p<0.0001). Two further questions referred to the behaviour of others following alcohol. These questions were not expected to be correlated with the respondents APQC score, since observation of others could take place without the respondent engaging in drinking. It was possible, however, that heavier drinking respondents, who had higher APQC scores would be likely to spend their spare time in the company of others who were drinking. The results showed that 'being assaulted by a member of college who had been drinking' was not significantly correlated with APQC

score (r=0.08, n.s.), nor was 'seeing a member of college damaging property following drinking' (r=0.09, n.s.).

Conclusions.

This study provided further evidence of the construct validity of the APQ, showing highly significant correlations with other problem measures. There was also some evidence of discriminant validity, the APQ being correlated with other measures of problems experienced by the respondent but not with problems experienced by others.

Study 3: Replication study.

The aims of this study were to assess the extent to which the findings of the study described in Chapter 2 could be replicated in a different clinical population, and to assess the test-retest reliability of the APQ. The test-retest element of the study is reported below. The results reported here refer to a test of the principal hypothesis of the study in Chapter 2, namely that dependence would be a mediating variable in the consumption-problems relationship. If the evidence supported this hypothesis, it would provide further support for the construct validity of the APQ and the mediational model.

Method.

Seventy-five problem drinkers referred to specialist treatment clinics and rehabilitation hostels in the London and Manchester areas, and to Cloud's House residential rehabilitation centre in Wiltshire were recruited in an identical way to that described in Chapter 2. Two subjects were later excluded because of incorrectly completed questionnaires. None of those approached refused to participate. As before subjects were recruited either at first contact with a clinic or if admitted, as soon as possible thereafter. All subjects completed the APQ and the SADQ as well as several additional questionnaires which were unconnected with this study. The problems, dependence, and consumption scores were calculated in an identical way to the previous study. The size of the overall batch of questionnaires was likely to have considerably reduced the

possibility of subjects recalling their initial responses in the subsequent retest described below.

Results.

The male-female ratio was 4:1, and the sample as a whole had a mean age of 41.6 years. The mean APQC score for the sample was higher than that found in the previous study (15.13, s.d.=4.81 compared with 11.16, s.d.=4.50), as was the SADQ score (34.27, s.d.=15.05 compared with 25.20, s.d.=14.80).

As in the previous study, however, problems, dependence and consumption were all highly significantly intercorrelated (see Figure 3.1). The effect of controlling for dependence was to reduce the consumption-problems relationship to insignificance. As before, controlling for consumption had little effect on the dependence-problems relationship, as was the case with controlling for problems and the consumption-dependence relationship.

Conclusions.

While the sample size reported here was smaller than that of the study reported in Chapter 2, the Pearson correlations between the variables were no less significant. Further, the study provides further support for the construct validity of the mediational model.

Pearson correlations

DEPENDENCE

0.55***   0.60***

PROBLEMS   0.42***   CONSUMPTION

Partial correlations

DEPENDENCE

0.46***   0.52***

PROBLEMS   0.15*   CONSUMPTION

*** p<0.0001
*   n.s.

Figure 3.1. Correlatons and partial correlations between consumption, dependence, and problems in the replication study.

Method.

A test-retest reliability study was conducted with the subjects recruited in the study described above. The APQ was readministered to the subjects as closely as possible to two weeks after the initial questionnaire administration. The conditions under which the questionnaire was readministered was as far as possible, identical to the initial administration. Efforts were made to ensure that subjects completed the retest questionnaire with reference to the same six month time period as applied to the initial questionnaire.

The reliability of the APQ was assessed statistically in three ways. First, the correlation between the APQC score at the two time points was computed. The same procedure was conducted with each APQ subscale. While correlations between the two tests might be high, there was the possibility that this might conceal increases or decreases in the APQC score in concert, as discussed above. Therefore, secondly, difference scores were computed by subtracting the initial score from the retest score. The extent to which the resulting value differed from zero was then tested using an analysis of variance. Finally, the alpha reliability coefficient was computed for the two scores using the SPSS/PC+ V3.0 'reliability' procedure. A high Chronbach's Alpha reliability value is an indication of a reliable questionnaire (Nunally, 1978).

Results.

The correlation between the initial and retest APQC scores was highly significant ($r=0.87$, $p<0.0001$). Further, the difference between these two scores did not differ significantly from zero ($F=0.52$, $p=0.47$). These results suggest that the APQC score was extremely stable over the two week test period. The Cronbach's Alpha reliability coefficient was high (0.93), suggesting a high degree of internal consistency.

The majority of subscale scores reflected the stability of the APQC score, with the

exception of the CHILDREN subscale which had a Cronbach's Alpha reliability coefficient of 0.41 (although this was based on a sample of only 20 subjects). The results of the analyses for all the APQ subscales are shown in Table 3.2. Apart from the CHILDREN and FRIENDS subscales, all had Alpha coefficients of greater than 0.80.

Table 3.2. Test-retest reliability of the APQ: correlations, analyses of variance and alpha reliabilities of the APQC score and APQ subscale scores.

	APQC	PHYS	AAFF	POLICE	MONEY	FRIENDS	MARITAL	CHILDREN	WORK
n	73	73	73	73	73	73	18	20	22
r	0.87	0.79	0.72	0.90	0.88	0.59	0.66	0.26	0.78
p	***	***	***	***	***	***	**	n.s.	***
F	0.52	0.33	0.05	1.44	0.00	0.40	0.88	0.66	8.29
p	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**

r=Pearson correlation coefficient

F=F test

*** p<0.0001

** p<0.001

n.s. p>0.05

Conclusions.

The APQ proved to be a reliable measure on the basis of all measures of reliability used here. The APQC scores were highly stable over time. Although there was no inherent reason why different problems reflected by the different APQ items should co-occur, the internal consistency of the questionnaire as expressed in the form of the Alpha reliability, was high.

Individual APQ subscales were also, in general, reliable, although the CHILDREN subscale was an important exception to this.

OVERALL CONCLUSIONS ON THE VALIDITY AND RELIABILITY OF THE APQ.

All the evidence presented here suggests that the APQ is a valid and reliable measure of alcohol-related problems. It should be noted that a 'gold standard' problems measure did not already exist with which to compare the APQ, but it was significantly correlated with diverse measures of alcohol-related problems in a variety of different subject samples. The results also support the validity of the mediational model. Further examples which provide additional support for this model will be presented in Chapters 4 and 5.

When considered separately, the majority of the APQ subscales showed a high degree of reliability. The CHILDREN subscale was a notable exception to this. It will be recalled that in Chapter 2, this subscale tended to go against the general trend by having low correlations with other subscales. It is probable that the CHILDREN subscale is affected by a bias in reporting, either because the questions are inapplicable to parents of particularly young children, or through social desirability of responses.

While there was no inherent reason why different problems measured by the APQ should co-occur, the results support the view that the common subscale has a high degree of internal consistency. This suggests that the diverse items included in the questionnaire reflect the same 'problematic' construct. This finding contrasts with the relative

disaggregation of problems found in the principal components analysis described in Chapter 2. It will be recalled that while there was some central tendency reflected in a first factor of moderate size, there was also wide variation in the frequency of reporting different items. Thus while having one problem does not to a large extent predict the occurrence of other problems, problems appear to be related to a central construct of being 'problematic'. This is in keeping with Jessor & Jessor's (1977) concept of "problem proneness", a point which will be further expanded in Chapter 7.

CHAPTER 4.

REPLICATION STUDY IN A GERMAN CLINICAL POPULATION.

INTRODUCTION.

In the previous two chapters, evidence has been presented which is in keeping with a mediational model and which is supportive of the view that dependence is less subject to the influence of social factors than are problems and consumption. The aim of the study presented in this chapter is to further test these hypotheses in a different cultural setting. Similarity in the findings of research conducted in different cultures can add weight to the validity and generalizability of concepts.

The study described here tested hypotheses identical to those in the initial study described in Chapter 2. Translated versions of the questionnaires employed in the Chapter 2 study were administered to a German clinical population.

Further use will be made of this data set in Chapter 6 in connection with the relationship between culture and alcohol-related problems.

METHOD.

Measures.

The SADQ and the APQ were translated into German as was the questionnaire to record sociodemographic information, used in the study described in Chapter 2 (referred to hereafter as 'the London study'). All questionnaires were then back-translated into English by two translators not involved with the study and who had not previously seen the questionnaires. A high level of agreement was found between the original questionnaires and the back-translated versions. Scoring of the questionnaires was identical to that previously described. The German versions of the APQ and SADQ are to be found in Appendices V and VI, respectively.

For the sake of comparability with the London study socioeconomic status was ascertained using the Registrar General's Classification of Occupations (1980). German sociologists

employ a similar, although less elaborate, method which has the same number of classificatory groups (U. John, personal communication).

Subjects.

Subjects were recruited in the same way as in the London study, except that all were inpatients in a specialist alcoholism treatment unit in the state hospital Landeskrankenhaus Heiligenhafen. The nearest city is that of Lübeck with a population of 200,000, located some one hour's drive from the hospital. The total catchment population of the hospital was 551,000 and included other large conurbations. In the U.K. normally only patients with more severe problems are admitted to hospital. In this case, as will be seen later, admission was the preferred mode of treatment, the more so because of the practical difficulties of attending as an outpatient in this relatively isolated location.

One hundred and forty subjects were invited to participate in the study, 8 of whom did not give their consent, leaving 132 subjects who completed the questionnaires (this group will be referred to hereafter as 'the Lübeck sample'). A further 16 subjects admitted during the study period were excluded because of physical illness or intellectual impairment.

Procedure.

Subjects were recruited as soon as possible following completion of withdrawal. The procedure was otherwise identical to that of the London study. The translated questionnaires took a similar length of time to complete.

Analytic strategy.

The analytic strategy was identical to the London study. A principal components analysis of the translated questionnaires was initially conducted to examine their internal structure. Then, correlations and partial correlations between problems, dependence, and consumption were computed to establish the relationships between the main variables of interest. A series of multiple regression analyses were then conducted to construct a path

analysis of the predictors of problems in an identical way to that described in Chapter 1.

RESULTS.

Sample characteristics.

The mean age of subjects in the Lübeck sample was 43.9 years (s.d.=9.9). 76.5% were male, and 24.2% of the whole sample were married, with the majority, 39.3% and 27.3%, either never married or divorced, respectively. A small minority (9.4%) were classified as being in professional or managerial occupations.

Internal consistency of the APQ.

A principal components analysis was performed to assess the degree of internal consistency of the APQ in the Lübeck sample. As in Chapter 1, because of the sample size and inapplicability of certain subscales, only the APQ common items were examined in this analysis. As in the London study, there was some central tendency in the data. The first factor accounted for 20.2% of the total variance. The scree plot showed a similar slope to that of the London study.

Intercorrelations between APQ subscales, and between subscales and the APQC score (excluding relevant subscales) showed a similar pattern to that in the London sample (Table 4.1). The MARITAL problems subscale had lower correlations with AAFF, POLICE and FRIENDS, whereas correlations between CHILDREN and other subscales were generally higher. Notably, however, correlations between individual subscales and the APQC score were all higher than in the London sample. Taken together, however, these findings suggested that the translated questionnaire has similar characteristics to its English language counterpart in an English sample.

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Table 4.1. Correlations between APQ subscales and the APQC score[1] in the Lübeck sample.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) APHYS	1.00							
(2) AAFF	0.44 ***	1.00						
(3) MONEY	0.37 ***	0.26 **	1.00					
(4) POLICE	0.20 *	0.17 *	0.27 **	1.00				
(5) FRIENDS	0.22 **	0.26 **	0.21 **	0.15 *	1.00			
(6) MARITAL	0.28 **	0.16	0.18	-0.06	0.35 **	1.00		
(7) CHILDREN	0.26 *	0.31 **	0.07	-0.06	0.33 **	0.46 **	1.00	
(8) WORK	0.33 **	0.43 ***	0.31 **	0.12	0.41 **	0.46 **	0.65 ***	1.00
APQC Score[1]	0.48 ***	0.81 ***	0.83 ***	0.83 ***	0.84 ***	0.30 **	0.30 *	0.48 ***

[1] Excluding the relevant 'common' subscales where appropriate.
See text (Chapter 2) for definition of APQ subscales. Subscale titles abbreviated as in Chapter 2.

The MARITAL, CHILDREN and WORK subscale correlations are based on smaller sample sizes than in the case of 'common' subscales. See text for details.

*** $p<0.001$
** $p<0.01$
* $p<0.05$

Internal consistency of the SADQ.

The principal components analysis of the SADQ also revealed one factor in this instance accounting for 39.8% of the variance, similar to the London sample (Chapter 2). The next largest factor accounted for only 10.2% of the variance, and a scree plot showed only one factor of any significance. Factor loadings on this first factor were also generaly high and consistent with the London results.

All SADQ subscales were highly significantly intercorrelated with each other and with the SADQ score (excluding in each case the relevant subscale)(Table 4.2).

Table 4.2. Correlations between SADQ subscales and the SADQ total score in the Lübeck sample[1].

	PHYS	AFF	NEED	POSTAB	ALCTOT
PHYS	1.00				
AFF	0.47	1.00			
NEED	0.65	0.52	1.00		
POSTAB	0.64	0.35	0.49	1.00	
ALCTOT	0.30	0.38	0.54	0.29	1.00
SADQ score[1]	0.69	0.55	0.74	0.56	0.48

[1] Excluding the relevant SADQ subscale where appropriate. See text (Chapter 2) for definitions of SADQ subscales. All correlations significant at the level of $p < 0.0001$.

Relationships between problems, dependence, and consumption.

As in previous studies, the Pearson correlations and partial correlations were examined to establish the relationships between the main variables of interest. The variables were computed in an identical way to those in Chapter 2. Figure 4.1 displays the results of these analyses. As in the London study, all 3 variables were highly significantly correlated with each other. The effect of controlling for dependence, however, was to reduce the consumption-problems correlation to insignificance. Meanwhile the consumption-dependence and dependence-problems partial correlations remained high controlling, in each case, for the third variable.

Path analysis.

Problems, dependence, and consumption were entered into a series of multiple regression analyses using the same method as reported in Chapter 2. The results of these analyses are displayed in Tables 4.3, 4.4, and 4.5. A path diagram of the inter-relationships

between the variables was then constructed (Figure 4.2). The results in the German sample are broadly similar to the London study path analysis. Age and dependence significantly predicted problems, but in this case socioeconomic class did not. This may in part be related to the relatively narrower social class distribution in the Lübeck sample compared to the London sample. Importantly, however, consumption did not significantly predict problems, and was the only predictor of dependence. In contrast to the London study, only marital status predicted consumption, in the direction of being single predicting heavier consumption. This could represent an effect rather than a cause of heavy drinking in that the 'single' category includes both separated and divorced subjects.

Table 4.3. Results of multiple regression analysis of problems in the Lübeck sample (forced entry procedure).

Variable	Beta	T	Significance
Dependence	0.511	5.964	0.0001
Age	-0.176	-2.335	0.021
Social class	-0.020	-0.273	0.786
Married	0.098	1.272	0.206
Sex	-0.025	-0.323	0.748
Consumption	0.064	0.728	0.468

Table 4.4. Results of multiple regression analysis of dependence in the Lübeck sample (forced entry procedure).

Variable	Beta	T	Significance
Consumption	0.523	6.476	0.0001
Age	-0.038	-0.474	0.636
Social class	-0.023	-0.292	0.771
Married	0.001	0.016	0.988
Sex	0.109	1.323	0.189

Table 4.5. Results of multiple regression analysis of consumption in the Lübeck sample (forced entry procedure).

Variable	Beta	T	Significance
Age	0.046	0.514	0.608
Social class	-0.074	-0.840	0.402
Married	0.171	1.873	0.050
Sex	-0.135	-1.472	0.144

Pearson correlations

DEPENDENCE

0.56***   0.48***

PROBLEMS   0.35***   CONSUMPTION

Partial correlations

DEPENDENCE

0.48***   0.37***

PROBLEMS   0.11*   CONSUMPTION

*** p<0.0001
*   n.s.

Figure 4.1. Correlations and partial correlations between problems, dependence, and consumption in the Lübeck sample.

age

married — 0.17 → consumption — 0.52 → dependence — 0.51 → problems

−0.18

sex

socioeconomic class
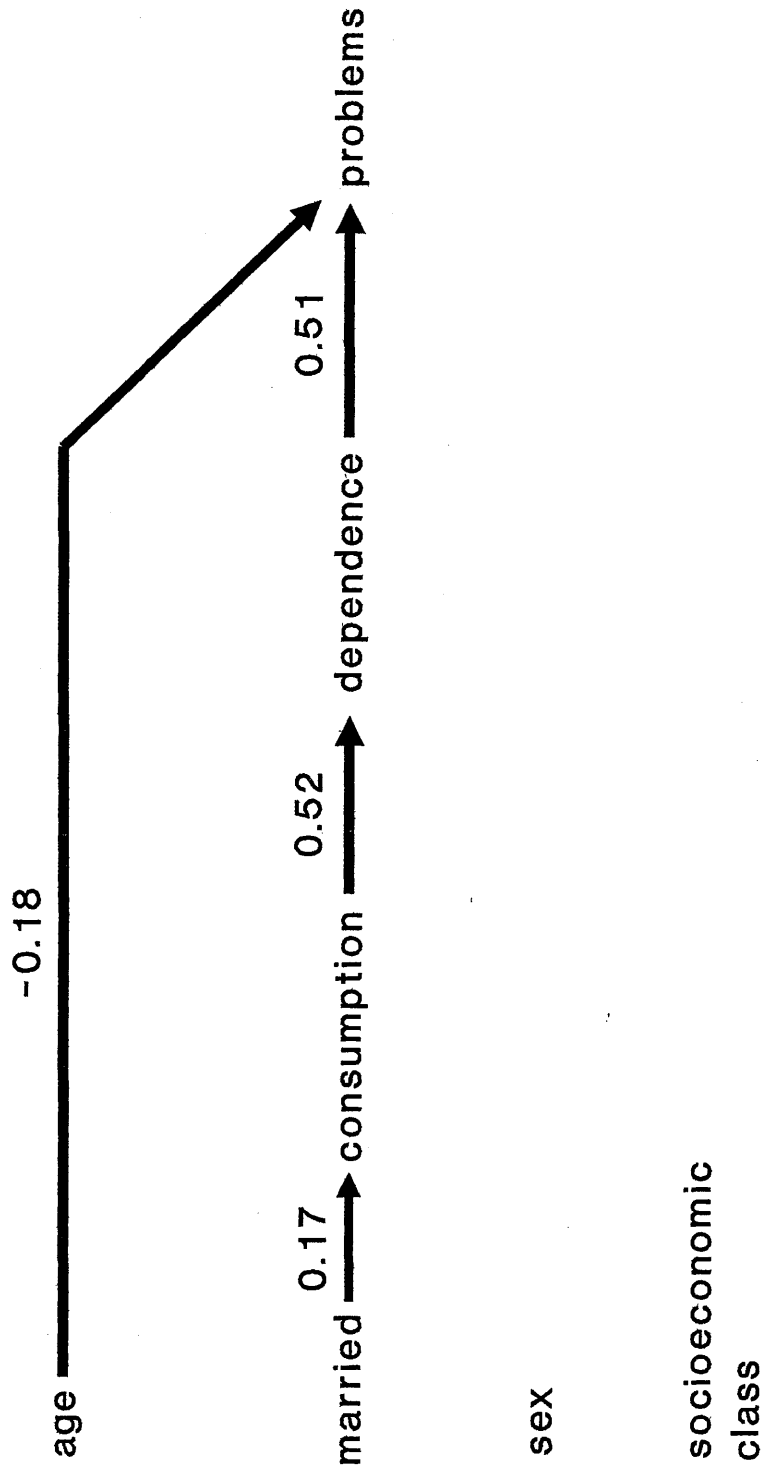
Figure 4.2. Path diagram of problems, dependence, consumption, and sociodemographic variables (Lübeck sample).

CONCLUSIONS.

The findings of the cross-cultural study broadly support the mediational model. First, the structure of, and interrelationships between, problems and dependence are remarkably similar between the London and Lübeck samples. The SADQ showed the same high internal consistency in translated form in the German sample, adding further weight to the conclusion that dependence is a unidimensional phenomenon. As in the London sample, problems tended to be disaggregated with a moderate central tendency in the Lubeck sample. The values observed in correlational and principal components analyses were very similar to the London study.

While fewer significant interrelationships between variables were observed in the path analysis of the Lübeck sample compared to the London sample, the findings were broadly similar. Dependence was the main predictor of problems, and consumption was the only significant predictor of dependence, while age and marital status significantly predicted problems and consumption respectively. This finding represents a replication of the London study with respect to the interrelationships between the main variables of interest and adds further weight the validity of the mediational model.

While this study was supportive of the earlier findings, two important questions remained unaddressed. First, and most importantly, it was unclear whether the findings in clinical populations had any relevance to the situation in the general population. Second, the studies so far conducted had all used the same instruments (albeit translated in the Lübeck study) which were designed for use in clinical populations. It was at this stage that the decision to perform the next study, described in the following chapter, was made.

CHAPTER 5.

ALCOHOL-RELATED PROBLEMS IN THE GENERAL POPULATION.

INTRODUCTION.

It was argued in Chapter 1 that the source of Room's (1977) 'two worlds of alcohol problems' was in part due to the different methods and survey populations of the clinician and the epidemiologist. The studies so far described are supportive of the mediational model, but have been restricted to only clinical populations. In this chapter a re-analysis of a major general population survey of drinking practices aimed to apply the same analytic methods as have been described in preceding chapters.

While several general population surveys of drinking behaviour have employed consumption, dependence and problem measures, the question of whether dependence might be a mediating factor in the consumption-problems relationship has not been examined so far. This may, in part, be explained by the theoretical orientation of the epidemiologist, for whom dependence has represented simply one of many disaggregated problems, and having no potential causal significance. Thus, analyses have focused on predictors of problems and dependence, independently, rather than regarding dependence as a potential intervening variable.

Hilton (1987a), for example, conducted an analysis of the predictors of problems and dependence using data from the 1984 U.S. National Survey of Drinking Practices. This survey employed widely used survey measures of problems and dependence (Cahalan, 1970; Cahalan & Room, 1974; Clark & Midanik, 1982). Hilton, however, performed a separate series of multiple regression analyses to establish the predictors of problems and dependence, independently. In prefacing his analysis Hilton noted the limitations of previous general population studies which had not employed multivariate analysis in identifying predictors of problems:

> "The distribution of both heavy drinking and drinking problems are well known from previous studies. Not surprisingly, drinking problems are more prevalent among the demographic groups where heavy drinking is also more prevalent. This well-known conjunction, however, does little to determine whether some groups are more likely than others to experience drinking problems when we control for the amount of alcohol consumed." (p.913).

Precisely the same criticism, however, can be made of Hilton's analysis in that heavy

drinkers in the population are also more likely to exhibit dependence and alcohol-related problems. Thus before examining the sociodemographic predictors of problems, it is necessary first to determine the relationships between the main variables of interest, namely problems, dependence, and consumption, which are likely to be intercorrelated, but not necessarily conforming to a disaggregation model as suggested by Hilton.

The study described in this chapter is a re-analysis of the 1984 U.S. National Survey data set, previously analysed and reported upon by Hilton (1987a, b, 1988) and Grant & Harford (1990). The survey was conducted by the Alcohol Research Group of the Medical Research Institute of San Fransisco under the direction of Dr. Room, from whom permission to re-analyse the data and report on the findings was obtained. The data is available for public scrutiny under the U.S. Freedom of Information Act.

Hypotheses.

The main hypotheses in this re-analysis were the same as those in the study in Chapter 1, namely:

1. that dependence is a mediating variable in the consumption- problems relationship.
2. that consumption and problems will be more subject to the influence of sociodemographic factors than will dependence.

An additional hypothesis was that the mediational influence of dependence would exist across the spectrum of alcohol consumption levels, although it would be more apparent amongst heavier drinkers than in lighter drinkers. At first sight this may seem to be an obvious suggestion, since heavier drinkers are also likely to be more dependent. However, within a general population sample there is a far greater range of consumption and problems than in a clinical population. Further, returning to a possibility raised in Chapter 1, it may be the case that the influence of dependence is only manifest in the very heaviest drinkers, conforming more to a cluster model and going against the concept of dependence as a phenomenon existing along a continuum of severity throughout the drinking population.

METHODS.

The method used to collect the data has been reported in detail by Hilton (1987b), but will be briefly reviewed here. Face-to-face interviews were conducted with a representative sample of 5221 adults, over the age of 18 years, resident in the contiguous United States. Interviews lasted approximately 1 hr. Oversampling of ethnic minorities was carried out to allow inter-ethnic comparisons to be made between Black, Hispanic, and non-Black, non-Hispanic subjects. The sample was then downweighted to produce an effective sample of 2167 subjects, representative of the U.S. population ethnic mix, and to take account of differences in non-response patterns by age, sex and region. A multistage area probability design was drawn up by the fieldwork agency. The overall response rate was 74.2%.

Measures.

1. Consumption.

The measures of alcohol consumption used in the analyses which follow were derived in an identical way to that employed by Hilton (1987a) to allow direct comparability between the analyses. Several quantity/frequency measures of consumption were used in the survey, three of which were selected for the purpose of this study: the frequency of drinking equal to or more than 5, 8 or 12 standard drinks at a sitting. These categories are nested, in that those who consume more than 8 or 12 drinks on occasion have also by definition taken more than 5 drinks. Thus the number of people in analyses of these different drinking categories diminishes with increasing consumption cut-off points. It should also be noted that these quantity/frequency measures of consumption are not the same as the SADQ consumption subscale used in previous analyses, as they do not provide a direct measure of the total quantity of alcohol consumed over a given period, but rather divide people into frequency categories at a given threshold of consumption. Such a method has proved more useful, however, in predicting the occurrence of problems in general population surveys (Knupfer, 1984), and is likely to be highly correlated with total volume of alcohol consumed.

Analyses of the 5+ drinks category included all subjects who reported drinking at least one drink in the preceding year. As in Hilton's analysis drinking frequencies in each category were capped at 30 times per month (daily drinking) to limit the effect of extreme values. The original questions from which the consumption scores were computed, and the method of computation, are given in Appendix VII.

2. Problems.

An aggregate measure of alcohol-related problems was computed from the 'Tangible Consequences' scale through a method identical to that of Hilton's analysis, with the exception of one item ("a physician suggested I cut down on drinking") which was excluded on the grounds that it was uncertain as to whether this consituted a problem within the working definition described in Chapter 2. The remaining items conform to the working definition which was used to derive the APQ, although the former scale is more weighted towards social problems than the APQ. Identical weighting to that used by Hilton was given to the 31 items which were summed to produce an overall Problems Score. These items and their weightings are given in Appendix VIII.

3. Dependence.

Items were selected from the 'Problematic Drinking' Scale on the basis of conforming to the original description of the Alcohol Dependence Syndrome (ADS)(Edwards & Gross, 1976). All except one item ("I was afraid I might be an alcoholic") was included. The item reflecting alcohol-related amnesia (blackouts) was included although not originally described in the ADS, on the basis that it is probably an indication of high tolerance to alcohol (although the converse is also possible). Nevertheless, a check was subsequently made to establish whether this item was sufficiently related to other dependence items in a principal components analysis (see below).

The Problematic Drinking Scale can be seen as covering more conceptual elements of the ADS than the SADQ, while having the disadvantage of a two point forced-choice, rather than a graded measure of severity, for each item. This has the effect of

providing less variance in the data. The unweighted sum of the remaining 12 items (shown in Appendix IX) provided an overall Dependence Score. No weighting was used as was the case in Hilton's analysis.

4. Sociodemographic factors.

These were derived in an identical way to the method used by Hilton. Age in years was employed as a continuous variable. Sex, marital status and family income were employed as dichotomous variables (carrying the values 0 or 1), and with the exception of sex, where approximately equal numbers already existed in the two gender categories, this dichotomy was made in such a way as to have approximately equal numbers in each category using the same criteria as Hilton. Scoring for these items was as follows: sex, male=0, female=1; marital status, married=0, not married=1; family income, <10,001 dollars=0, >10,000 dollars=1). Educational achievement was scored according to Hilton's scoring system, with low achievement carrying a lower score.

Urbanicity and ethnicity were omitted from the analyses on the basis that no predictive effect for either problems or dependence had been found on these variables in previous multivariate analyses of this data set. It was also possible to examine regional differences in the prevalence of, and relationships between problems, dependence, and consumption. Differences between 'wet' and 'dry' region drinking cultures has been the subject of several previous U.S. surveys of drinking practices (Cahalan & Room, 1974; Clark & Midanik, 1982; Room, 1983), as well as the 1984 National Survey (Hilton, 1988). Such information has been important in the formulation of theories of the causation of alcohol-related problems, and will be further examined in Chapter 6. For the purpose of this analysis, the U.S. population was considered as a whole.

Analytic strategy.

The strategy adopted with this data set closely followed that of the studies described in earlier chapters, with certain exceptions. First, the frequency distributions of the main variables of interest were examined to assess the degree of skewness in the data.

From previous analyses of general population drinking data it was known that the pattern would approximate more to a log normal distribution than a normal distribution (Ledermann, 1956). Such a distribution would present difficulties for subsequent correlational and regression analysis since the results would be influenced disproportionately by extreme values. Scores were therefore transformed to limit such effects.

Second, correlations and partial correlations between problems, dependence, and consumption were then examined to establish the paths between the key variables of interest. A logical assumption was made, as before, that consumption must have preceded both problems and dependence and that the observed pattern represented a state of equilibrium between the variables.

Where the analysis departed form the preceding studies was in dividing the sample into consumption groups based on the variables described above. Thus, three parallel sets of analyses were conducted, representing the three consumption bands (5+, 8+, and 12+ drinks per sitting). The 5+ drinks group therefore includes the whole drinking population. The 8+ drinks band includes only those people who drank more than 8 drinks at least once in the preceding year, and the smallest category, 12+ drinks, includes only those people who drank a least 12 drinks on one or more occasion in the preceding year, (the heaviest drinking group being more akin to a clinical population; see below, under 'Conclusions').

Third, a series of multiple regression analyses was conducted in order to construct a path diagram for each consumption band. The sample size was sufficient to include first order interaction variables. Thus, in each case the original and first order interaction variables were included. For the sake of clarity in the path analyses, first order interaction variables which included dependence as part of the interaction were dealt with in a separate regression analysis which showed that none of these variables significantly predicted problems.

All regression analyses were conducted initially using the SPSS-X 'enter' procedure.

Path diagrams were then constructed on the basis of these results. Then two further regression procedures were used as in previous analyses, as a check to examine the existence of any additional paths when less stringent regression parameters were applied. An SPSS-X 'stepwise' procedure was applied to the 5+ drinks data to eliminate variables with negligible effects. The remaining variables were then entered into SPSS-X 'backward' regression analyses in each of the three drinking categories. This was done in order to compare the relationships between the same group of variables in each drinking band (since different variables might have been eliminated in different analyses). Finally, if any individual variables forming part of an interaction variable were eliminated during the 'backward' procedure, but the interaction variable was retained, that variable was then inserted into a final forced entry procedure. It was therefore possible that reinsertion of a variable, eliminated in an earlier procedure, could reduce the interaction varible coefficients to insignificance in this final forced entry procedure. As will be seen later, this was indeed the case.

Because of the large sample sizes in all drinking categories, only results significant at higher than the 1% level were regarded as representing a significant result.

RESULTS.

Sociodemographic characteristics.

The mean age of the whole sample was 43.0 years (s.d. 18.0) with a range of 18 to 83 years. Drinkers had a lower mean age than the sample as a whole (40.3 years; s.d. 16.7), and those drinking more than 8 or 12 drinks per sitting were younger still (33.0 years; s.d. 11.8; 31.7; s.d. 11.4, respectively). Those drinkers taking 8+ drinks were, compared to the population as a whole (including non-drinkers), more often single (44.0% vs. 35.2%), male (70.8% vs. 47.1%), on higher income (77.4% vs. 70.0%), and had more often completed high school education (81.2% vs. 74.9%). Significance tests were not conducted on these variables, since the subsequent multivariate analyses would take account of such differences between the various drinking groups.

Frequency distribution of problems, dependence and consumption.

The frequency distribution of problems and dependence was almost identical to that found by Hilton (1987b), suggesting that eliminating one item from each scale had not significantly affected the overall scores on these variables. Figure 5.1 shows the frequency distribution of the Problems Score including all subjects who drank any alcohol in the preceding year. As in Hilton's analysis this shows that 10% of the adult drinking population experienced 4 or more problems, and 5% eight or more problems in the preceding year. These levels have previously been described as the criteria for 'moderate level problems' and 'severe level problems' respectively, although these are of course arbitrary cut-off points. 21% of the drinking population experienced one or more problem.

In the case of dependence the frequency distribution (shown in Figure 5.2) revealed 7% of the drinking population experiencing 3 or more symptoms, and 4% experiencing 4 or more symptoms in the past year. These groups have previously been described as having 'moderate' and 'severe' dependence, respectively.

The frequency of reporting individual problems and dependence items was then examined. The rank order and frequency of reporting problems is shown in Table 5.1. The most common problem was 'getting into heated arguments while drinking' which was reported by just over 10% of the population. The least frequently reported items were 'father felt you should drink less' and 'physical illness related to drinking' which were assented to by just 0.3% of the drinking population. The most frequently reported item is therefore approximately 35 times more common than the least reported. Most of the more common problems include interpersonal conflict in the family, whereas physical, financial, and police troubles are much less common. As expected, less severe harm to social relationships is more common than actual rupture of the relationship.

The same trend in the likely symptom severity was noted in the case of dependence (Table 5.2). 'Blackouts' were reported by 9.4% of the population compared to 'strong

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% current drinkers (n=2011)
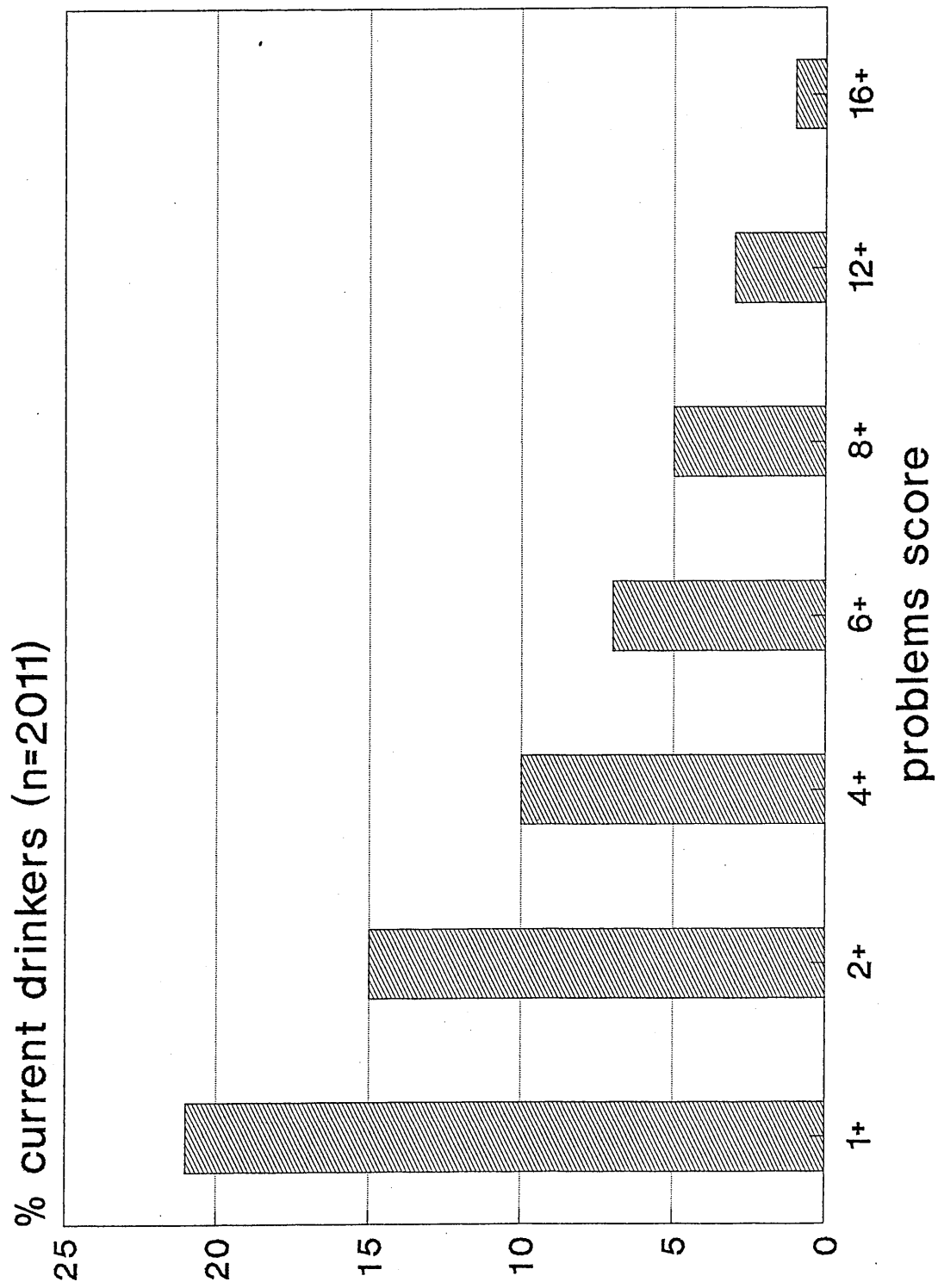
problems score

Figure 5.1. Frequency of alcohol-related problems.

% current drinkers (n=2011)
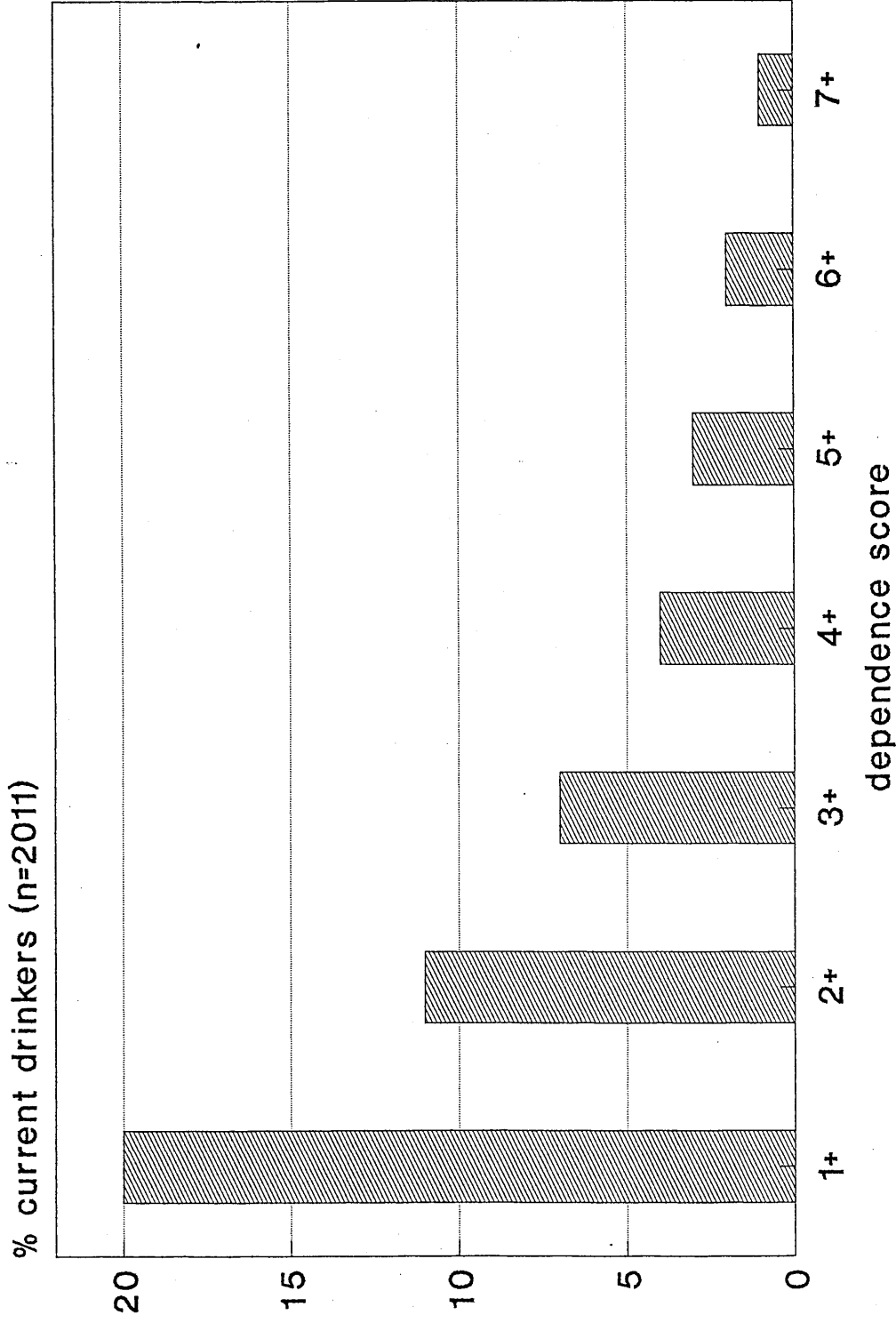
Figure 5.2. Frequency of dependence symptoms.

craving for alcohol' and 'staying drunk for several days' which were much less commonly assented to (1.1% and 1.3% respectively). Nevertheless, in contrast to problems, the ratio between the least and most commonly reported dependence symptoms was 1 : 9. If one includes only symptoms covered by the SADQ, this ratio falls to 1 : 3.4.

Table 5.1. Frequency of alcohol-related problems[1] during the preceding year in the 1984 U.S. National Survey (% of drinkers only).

n = 2011

RANK ORDER	ITEM	%
1	Arguments	10.1
2	Spouse angry	7.4
3	Threatened marital break	4.8
4	Physical harm	4.6
5	Threatened mother break	4.1
6=	Fighting	3.6
6=	Spouse told cut drinking	3.6
8	Social harm	3.3
9	Marital harm	3.0
10	Threatened boyfriend/girlfriend break	2.7
11	Police warning	2.5
12=	Threat to physical health	2.2
12=	Actual marital break	2.2
14	Financial harm	2.1
15	Threatened relative break	1.9
16	Work harm	1.8
17	Threatened father break	1.7
18	Boy/girlfriend told cut drinking	1.6
19	Threatened friend break	1.1
20=	Police trouble	1.0
20=	Accident, other hurt	1.0
22	Mother told cut drinking	0.8
23=	Drunk driving	0.7
23=	Work told cut drinking	0.8
25	Lost job	0.6
26	Accident, self hurt	0.6
27	Relative told cut drinking	0.5
28=	Friend told cut drinking	0.4
28=	Hurt job chances	0.5
30=	Physical illness	0.3
30=	Father told cut drinking	0.3

[1]Items abbreviated. See Appendix VIII for full listing of items.

Factor structure of dependence and problems.

Principal components analysis was performed on data derived from the two questionnaires, separately, to examine their internal structure. In the case of the 12-item Dependence Scale, this revealed one factor which accounted for 32% of the variance (Eigenvalue=3.84). The next largest factor accounted for 9.9% of the variance (Eigenvalue=1.19), and a scree plot confirmed that only one factor could be discerned. Factor loadings for the dependence items on this first factor were all reasonably high (0.45-0.67), suggesting that all the items (including 'blackouts') related fairly closely to this single dimension. An identical analysis was performed on the 31 items comprising the Problems Scale. The first factor accounted for 20% of the variance (Eigenvalue=6.21), the next largest factor accounting for 6.6% of the variance (Eigenvalue=2.06). The scree plot suggested clusters of factors distributed along the slope, in comparison to the smooth slope in the case of the Dependence Scale. Factor loadings on the first factor were also lower than in the case of dependence (0.09-0.61), with the majority having loadings of less than 0.50. There was therefore some central tendency in the Problems Scale, but it was characterized more by numerous small factors.

Taken together, these findings suggest two conclusions. First, that the subjects distinguished between more and less severe problems in a logical and expected way, suggesting adequate validity of the questionnaire. Second, the difference in the ratio of the least to the most commonly reported items between the two questionnaires, together with the results of the principal components analyses, support the view that problems tend to be disaggregated whereas dependence symptoms tend to co-occur, and are in keeping with the results of the clinical studies described earlier.

Log Transformation of the data.

The three consumption measures described above were highly skewed towards lower scores as had been the case with the Dependence and Problems scales. It was therefore necessary to perform log transformation of the data. Hilton had previously used an

ln(x+0.01) transformation, but the ln(x+1) transformation was found to produce the most normalized distribution. In a subsequent parallel set of analyses, however, no important differences were found between this transformation and the ln(x+0.01) or, indeed, the linear data. Where differences existed, the linear data tended to show enhanced effects, including higher correlation coefficients, as expected, due to the influence of extreme scores.

Table 5.2. Frequency of dependence symptoms[1] during the preceding year in the 1984 U.S. National Survey (% of drinkers only).

n = 2011

RANK ORDER	ITEM	%
1	Blackouts	9.4
2	Skipped meals	9.2
3	Kept on drinking	6.6
4	Tolerance	3.7
5	Hands shaking	3.6
6	Difficulty stopping	3.1
7	Unable to cut down	2.7
8	Morning drinks	2.3
9	Night sweats	1.9
10	Relief drinking	1.6
11	Staying drunk days	1.3
12	Strong craving	1.1

[1]Items abbreviated. See Appendix IX for a full listing of items.

The relationship between problems, dependence and consumption.

Problems, dependence, and consumption were all highly significantly intercorrelated in all consumption categories, with lower correlations in the log (Figure 5.3) compared to the linear data (Figure 5.4). As indicated earlier, the analyses were performed on different sample sizes in the three drinking categories (5+ drinks, n=2011; 8+ drinks, n=444; 12+ drinks, n=302).

As in previous studies, partial correlations between each of the variables were then computed controlling for, in each case, the third variable. The results of these analyses for both the linear and log transformed data are displayed in Figure 5.3 and 5.4 respectively. Controlling for consumption had little effect on the

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dependence-problems relationship. While reduced by controlling for problems, the consumption-dependence relationship remained highly significant. The effect of controlling for dependence, however, was to considerably reduce the consumption-problems relationship to insignificance in the case of the 12+ drinks category in the log data and in all categories in the linear data. These results suggests that the effect of dependence on the consumption-problems relationship is most marked in amongst heavier drinkers.

This effect of dependence in the whole drinking population (i.e. in the 5+ drinks group) is graphically displayed in Figure 5.5. For the purpose of this demonstration the population was divided into three consumption categories, 'low', 'moderate' and 'high'. The categories were chosen on the basis of as near equal numbers in each category rather than specific predetermined criteria. Because of the skewed distribution, however, the lower categories contain more subjects than the higher categories. The 'low' category includes 62% of the population who have not taken 5 or more drinks at a sitting in the past year. The remaining subjects are divided into two categories of roughly equal size reflecting increasingly heavy alcohol consumption ('medium' 20%; 'high' 18%). The population was also categorized in terms of log Dependence Score. Eighty percent reported no symptoms ('no dependence'). The remaining 20% of the population were divided into equal sized groups reflecting 'moderate' and 'high' dependence scores (although it should be noted that these groups do not precisely correspond to the earlier definitions described by Hilton, but were chosen instead to provide an adequate distribution). The mean Problems Score was then computed for each of the nine groups defined by these criteria. The 95% confidence intervals are shown around each data point in Figure 5.5.

The striking feature of the resulting graph is that moving from 'low' to 'high' consumption categories results in a modest increase in Problems Score, whereas moving form 'no' to 'high' dependence categories at each consumption level results in a much larger increase in Problem Score. The average ratio of the dependence : consumption effect is approximately 3 : 1. This effect is therefore clearly observed amongst lighter as well as, more predictably, amongst heavier drinkers.

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5+ drinks

CONSUMPTION   CONSUMPTION

0.462*   0.531*   0.174*   0.339*

PROBLEMS   0.662*   DEPENDENCE   PROBLEMS   0.554*   DEPENDENCE

8+ Drinks

CONSUMPTION   CONSUMPTION

0.422*   0.470*   0.174*   0.284*

PROBLEMS   0.650*   DEPENDENCE   PROBLEMS   0.564*   DEPENDENCE

12+ Drinks

CONSUMPTION   CONSUMPTION

0.341*   0.383*   0.130**   0.225*

PROBLEMS   0.654*   DEPENDENCE   PROBLEMS   0.603*   DEPENDENCE

* $p < 0.0001$
** $p < 0.05$

Figure 5.3. Pearson correlations and partial correlations between problems, dependence and consumption by consumption level (log data).

PEARSON   PARTIAL

5+ Drinks

              CONSUMPTION.   CONSUMPTION

    0.376*   0.488*   0.065**   0.341*

PROBLEMS   0.686*   DEPENDENCE   PROBLEMS   0.622*   DEPENDENCE

8+ Drinks

              CONSUMPTION   CONSUMPTION

    0.297*   0.424*   0.028**   0.318*

PROBLEMS   0.655*   DEPENDENCE   PROBLEMS   0.612*   DEPENDENCE

12+ Drinks

              CONSUMPTION   CONSUMPTION

    0.232*   0.338*   0.012**   0.252*

PROBLEMS   0.663*   DEPENDENCE   PROBLEMS   0.638*   DEPENDENCE

*   p<0.000
** p>0.3

Figure 5.4. Pearson correlations and partial correlations between problems,
dependence and consumption by consumption band (linear data).
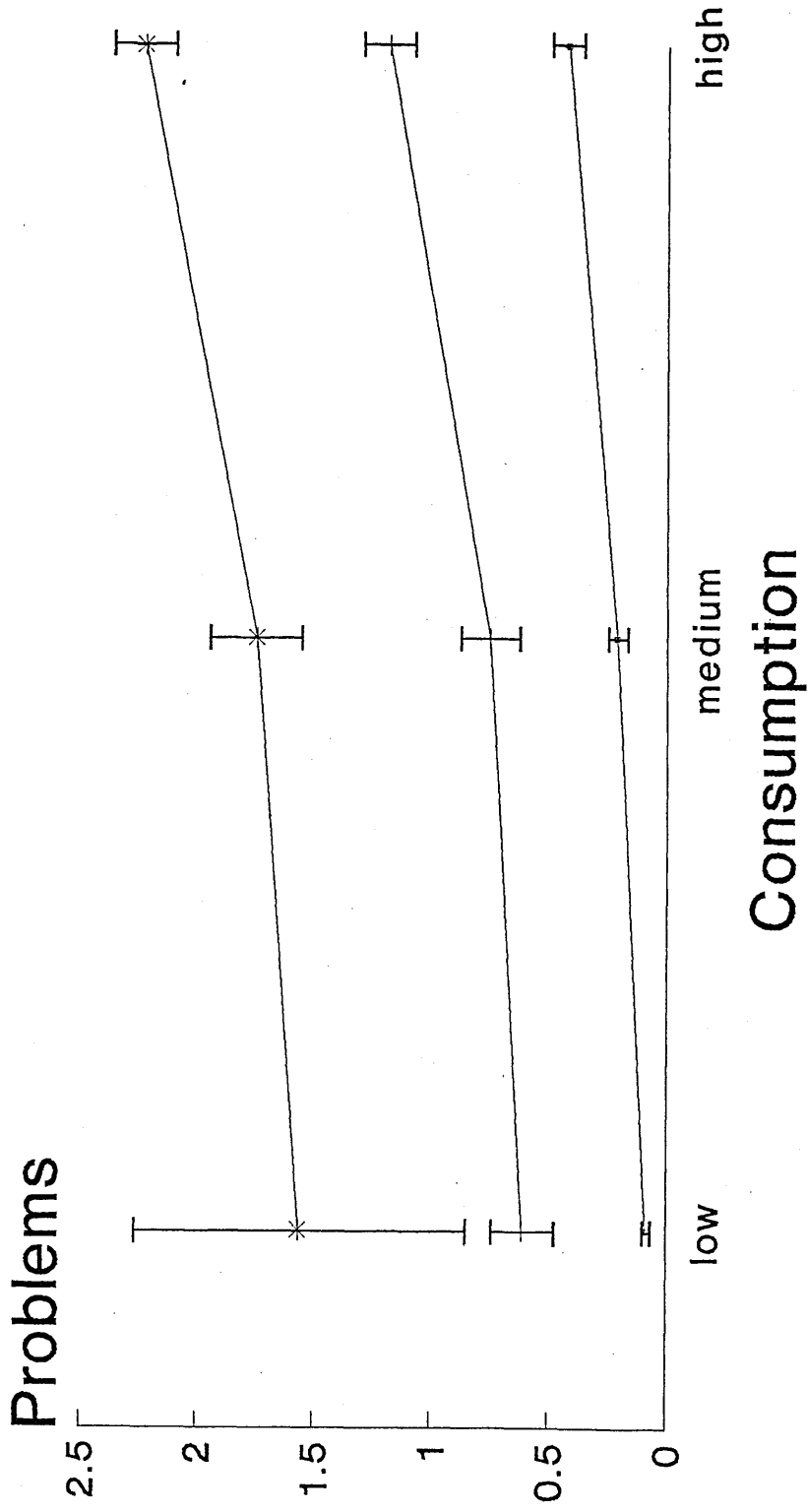
Figure 5.5. Graph of problems versus consumption by dependence (5+ drinks).

Predictors of problems.

While the above results alone provide support for the mediational model, as in previous analyses there was the potential for chance differences in sociodemographic characteristics between different groups of drinkers to confound the findings. Table 5.3 shows the regression of problems on dependence, consumption, and sociodemographic variables, using the log transformed drinking variables, in the three drinking bands. First order interactions are only shown if significant at the 1% level.

Dependence was the only significant predictor of problems in each of the drinking bands, except in the case of the 8+ drinks group where years of education had a smaller, but significant effect in the direction of subjects with less education experiencing more problems. There was a tendency towards higher Beta coefficients in the heavier drinking bands. In no case, however, was consumption a significant predictor of problems.

The results of a backward elimination of non-significant variables from this model is shown in Table 5.4. Using this less stringent model, differences in the number of variables which significantly predicted problems were found across the drinking bands. Dependence, however, remained the strongest predictor in each case. In the 5+ drinks band consumption and the 'sex x marital' interaction variable significantly predict problems. Other predictors which approach, but fail to reach significance include income, sex and the 'income x marital' interaction, in the direction of younger, single males of lower income having more problems. Dependence is the only significant predictor of problems in the 8+ drinks band, and at 12+ drinks, education is the only additional predictor, again in the direction of lower educational attainment predicting more problems.

Overall these results suggest that dependence is the principal predictor of problems, with sociodemographic variables having a lesser effect, particularly when lighter drinkers are included in the analysis (as is the case in the 5+ drinks band). The dependence effect is greater amongst heavier drinkers. Consumption only has a significant direct effect on problems in lighter drinkers and using a less stringent regression procedure

Path analyses.

A further series of multiple regression analyses was performed to examine the predictors of dependence and consumption, and together with the above analysis, to construct a path diagram including all the variables. Only the significant results of the forced entry procedure are included in the path diagrams. A more detailed breakdown of the regression analyses is given in Tables 5.5 and 5.6.

Figures 5.6, 5.7 and 5.8 are the path diagrams for the 5+, 8+, and 12+ drinks consumption bands, respectively. As in previous studies reported in this thesis, only consumption (and in this case consumption interaction variables) significantly predicts dependence in the expected direction in each of the consumption bands. The paths from consumption interaction variables to dependence suggest that differential effects are taking place for subgroups of subjects defined by the associated sociodemographic variable. For example, in the 5+ drinks band, the negative coefficient from 'consumption x income' to dependence in association with a positive 'consumption' coefficient, suggests that the consumption effect on dependence is more marked in the lower income group. In the case of the 8+ and 12+ drinks band, the 'consumption x sex' coefficients suggest a more marked effect in female subjects. 'Consumption x sex' is the only significant predictor of dependence in the 12+ drinks band. This may indicate a greater susceptibility to dependence in younger females at a given consumption level. 'Consumption x age' also significantly predicts dependence at the 8+ drinks level.

Table 5.5. Results of multiple regression analyses of dependence by alcohol consumption band (forced entry procedure).

Variable	5+ drinks			8+ drinks			12+ drinks		
	Beta	T	Sig.	Beta	T	Sig.	Beta	T	Sig.
Consumption	1.335	4.168	(0.000)	0.174	0.427	(0.670)	-0.085	-0.173	(0.863)
Age	-0.018	-0.088	(0.930)	-0.178	-0.503	(0.615)	-0.388	-0.718	(0.474)
Sex	0.055	0.247	(0.805)	-0.158	-0.433	(0.666)	-0.044	-0.095	(0.924)
Marital stat.	-0.088	-0.575	(0.565)	-0.292	-1.028	(0.304)	-0.473	-1.281	(0.201)
Income	-0.208	-1.640	(0.101)	-0.356	-1.501	(0.134)	-0.478	-1.615	(0.108)
Education	-0.047	-0.447	(0.655)	0.010	1.590	(0.113)	0.049	0.168	(0.870)
Consumption x income	-0.366	-2.676	(0.008)						
Consumption x Sex				0.390	2.893	(0.004)	0.483	2.772	(0.006)
Consumption x Age				-0.370	-2.808	(0.005)			

Table 5.6. Results of multiple regression analyses of consumption by alcohol consumption band (forced entry procedure).

Variable	5+ drinks			8+ drinks			12+ drinks		
	Beta	T	Sig.	Beta	T	Sig.	Beta	T	Sig.
Age	-0.906	-4.968	(0.000)	-0.378	-0.157	(0.117)	0.243	0.432	(0.666)
Sex	-0.837	-3.874	(0.000)	-0.261	-0.654	(0.513)	-0.395	-0.775	(0.439)
Marital stat.	-0.250	-1.515	(0.130)	0.121	0.385	(0.701)	0.140	0.345	(0.731)
Income	-0.133	-0.983	(0.326)	-0.193	-0.749	(0.454)	0.043	0.130	(0.897)
Education	-0.323	-2.903	(0.004)	-0.378	-1.570	(0.117)	-0.496	-1.536	(0.126)
Age x Sex	0.322	2.818	(0.005)						

Table 5.3. Results of multiple regression analyses of problems by alcohol consumption band (forced entry procedure).

	5+ drinks			8+ drinks			12+ drinks		
Variable	Beta	T	Sig.	Beta	T	Sig.	Beta	T	Sig.
Dependence	0.548	21.436	(0.000)	0.556	12.674	(0.000)	0.590	11.412	(0.000)
Consumption	0.629	2.302	(0.022)	0.636	1.244	(0.214)	0.396	0.596	(0.552)
Income	-0.188	-1.544	(0.123)	-0.159	-0.792	(0.490)	-0.305	-1.213	(0.226)
Sex	0.150	0.800	(0.424)	0.046	0.136	(0.892)	-0.420	-1.034	(0.302)
Age	-0.091	-0.567	(0.571)	0.151	0.472	(0.637)	0.248	0.529	(0.597)
Marital stat.	0.080	0.570	(0.569)	0.327	1.302	(0.194)	0.140	0.462	(0.645)
Education	-0.124	-1.216	(0.224)	-0.328	-1.654	(0.010)	-0.511	-2.059	(0.041)

Table 5.4. Results of multiple regression analysis of problems by alcohol consumption band (backward elimination procedure).

	5+ drinks			8+ drinks			12+ drinks		
Variable	Beta	T	Sig.	Beta	T	Sig.	Beta	T	Sig.
Dependence	0.553	21.985	(0.000)	0.548	12.948	(0.000)	0.587	12.025	(0.000)
Consumption	0.311	2.839	(0.005)	-0.029	-0.135	(0.893)			
Income	-0.202	-2.383	(0.017)	-0.001	-0.019	(0.985)			
Sex	-0.122	-1.927	(0.054)						
Age	-0.077	-0.977	(0.329)	0.007	0.047	(0.962)			
Education	-0.030	-1.175	(0.240)	-0.078	-1.525	(0.128)	-0.122	-2.712	(0.007)
Marital status	-0.046	-0.396	(0.692)						
Consumption x education	-0.195	-1.823	(0.069)	0.175	0.837	(0.403)			
Income x Marital	0.257	2.499	(0.013)						
Sex x Marital	-0.257	-2.855	(0.004)						
Age x Income				-0.104	-0.570	(0.569)			
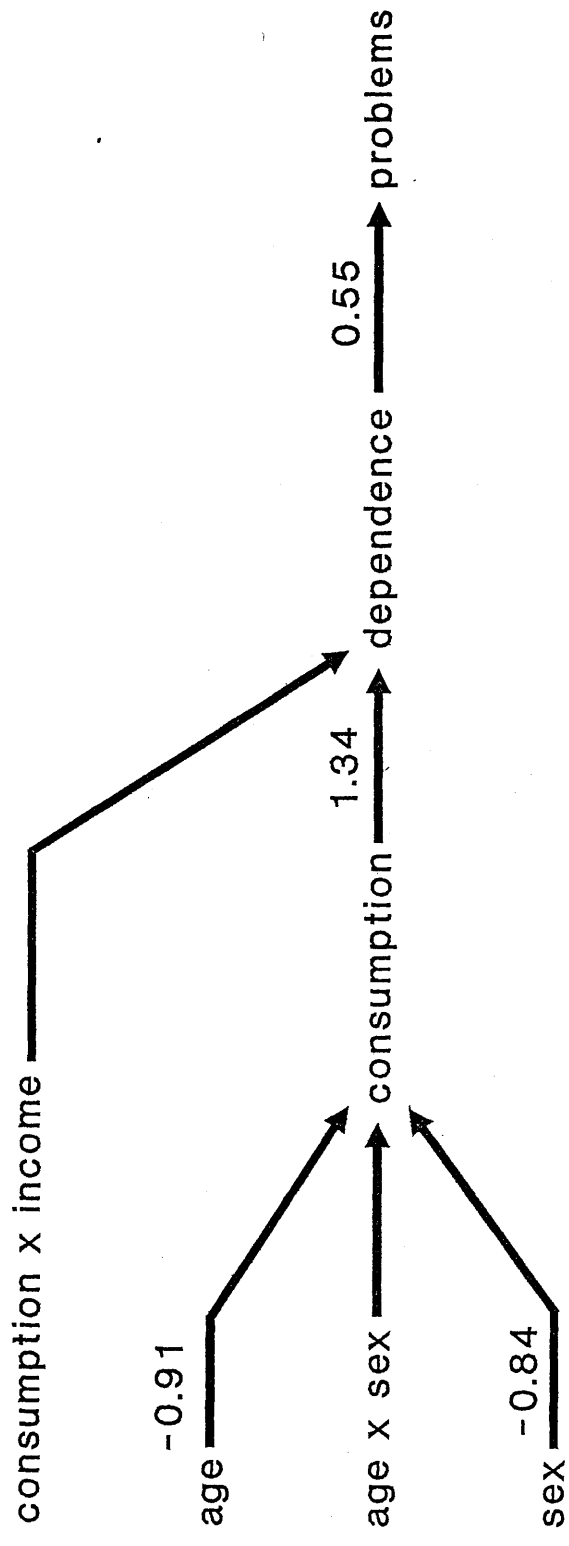
Figure 5.6. Path analysis: predictors of problems, dependence, and consumption (5+ drinks).
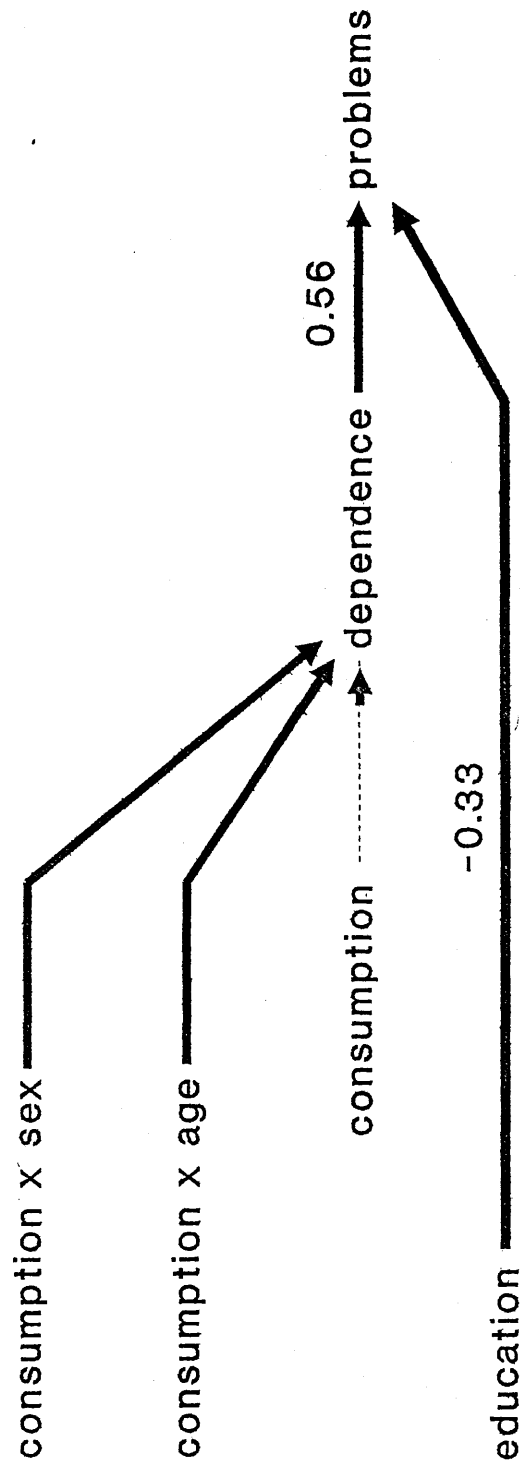
Figure 5.7. Path analysis: predictors of problems, dependence, and consumption (8+ drinks).
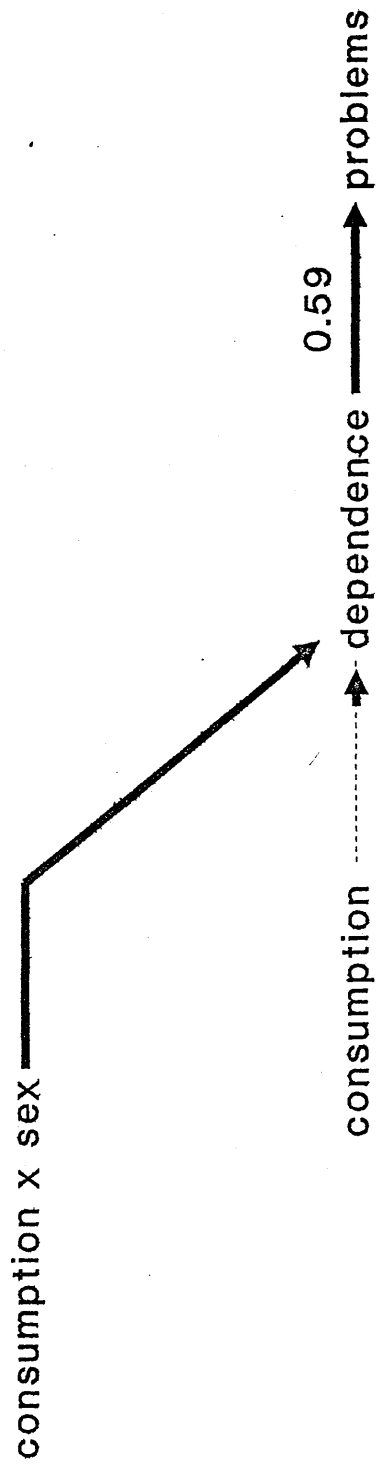
Figure 5.8. Path analysis: predictors of problems, dependence and consumption (12+ drinks).

As illustration of these interaction effects the mean dependence scores of different consumption and sociodemographic groups were computed. While these analyses do not take into account the effects of other variables, they help in understanding the nature of the interaction effects. Figure 5.9 shows the effect of level of log consumption on mean log dependence score for the different sexes. For the purpose of this analysis, consumption at the 8+ drinks level was divided into two categories, 'low' and 'high' in such a way as to obtain groups of approximately equal size. It can be seen that at the 'low' level of consumption males and females had approximately equal scores, but at the higher level of consumption, females were more dependent than males.

A similar interaction effect between log consumption and income on log dependence score is shown in Figure 5.10 In this case, at the 'low' consumption level the two income groups are approximately the same. Moving to the 'high' consumption level has a greater effect on dependence in the low income group.

The interaction between age and consumption is shown in Figure 5.11. The group was split into two in terms of age, giving groups of approxiamately equal size. Here the interaction shows a different pattern from previous interactions. At the 'low' consumption level older subjects are slightly more dependent than their younger counterparts, but at the higher level of consumption the pattern is reversed, the younger being more dependent. This may reflect the effect of ageing on the drinking pattern of more dependent drinkers (see Chapter 7 for a further discussion of this issue).

In the case of consumption, age and sex are both significant predictors in the whole drinking population, supporting earlier findings of younger males being heavier drinkers. Lower educational achievement also predicts heavy alcohol consumption in the 5+ drinks band, although none of these findings pertained to the heavier drinking bands.
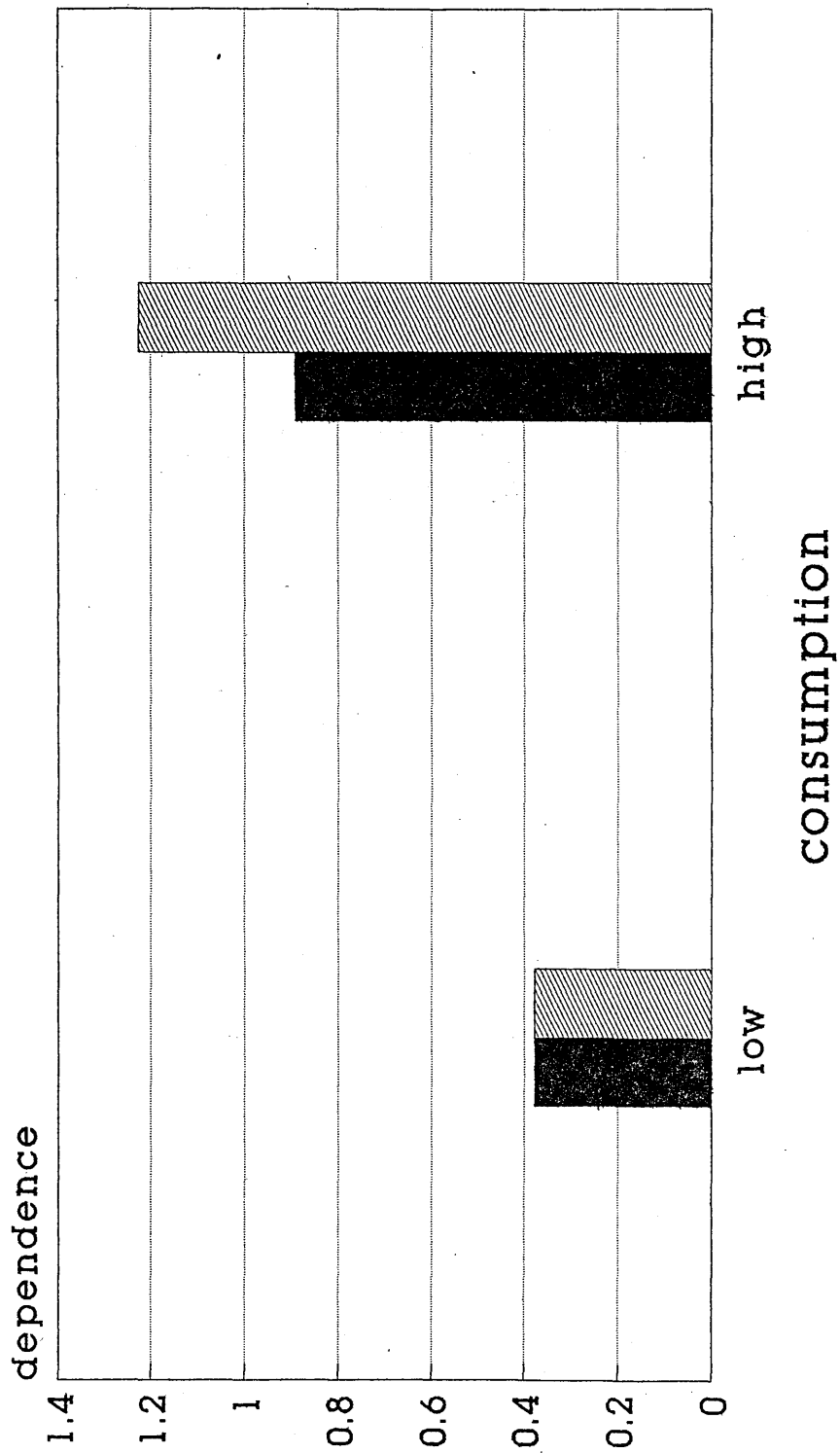
Figure 5.9. Level of dependence by sex and consumption categories (5+ drinks).
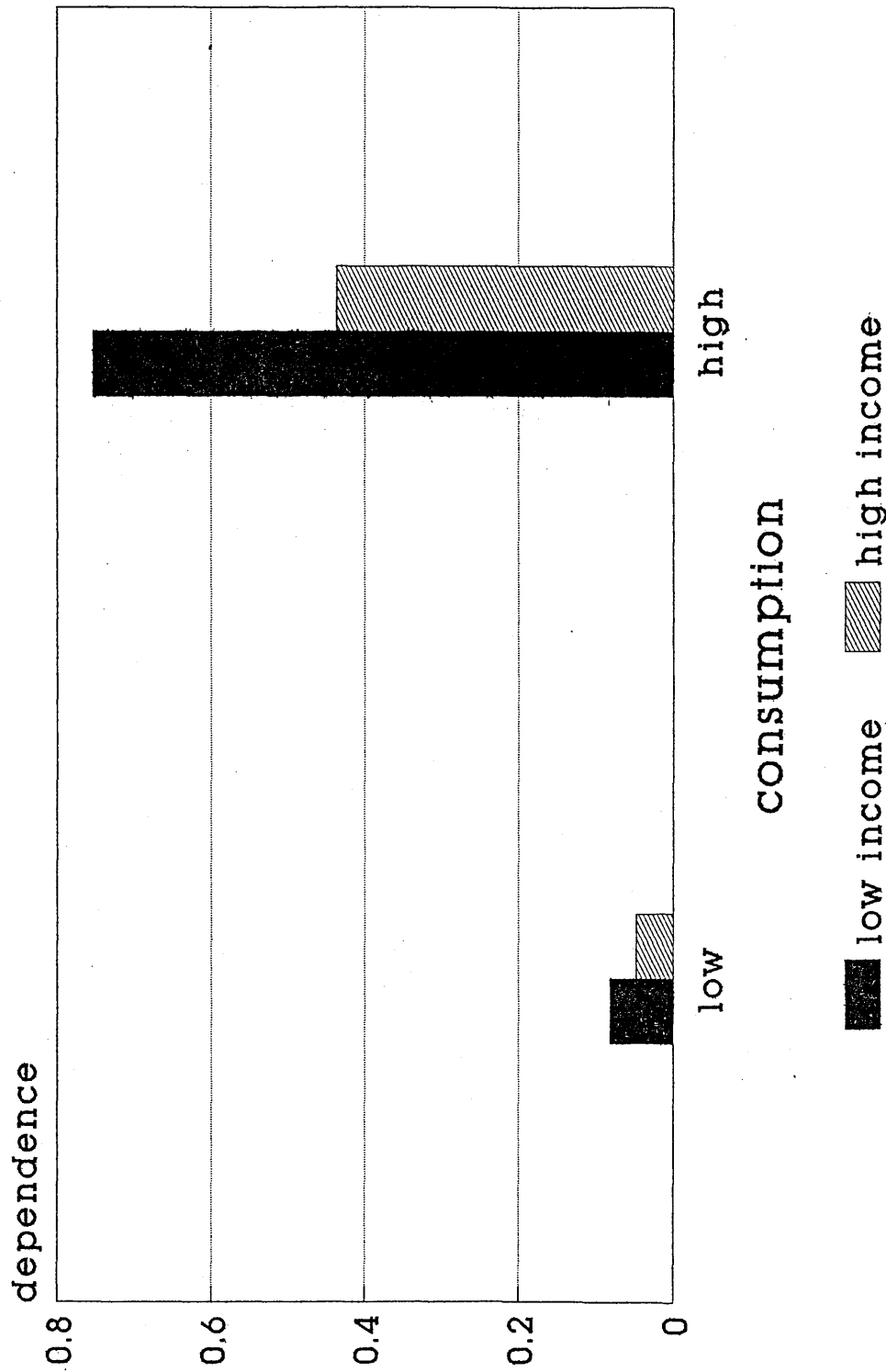
Figure 5.10. Level of dependence by income and consumption categories (5+ drinks).

dependence

consumption

■ <40   ▨ >39
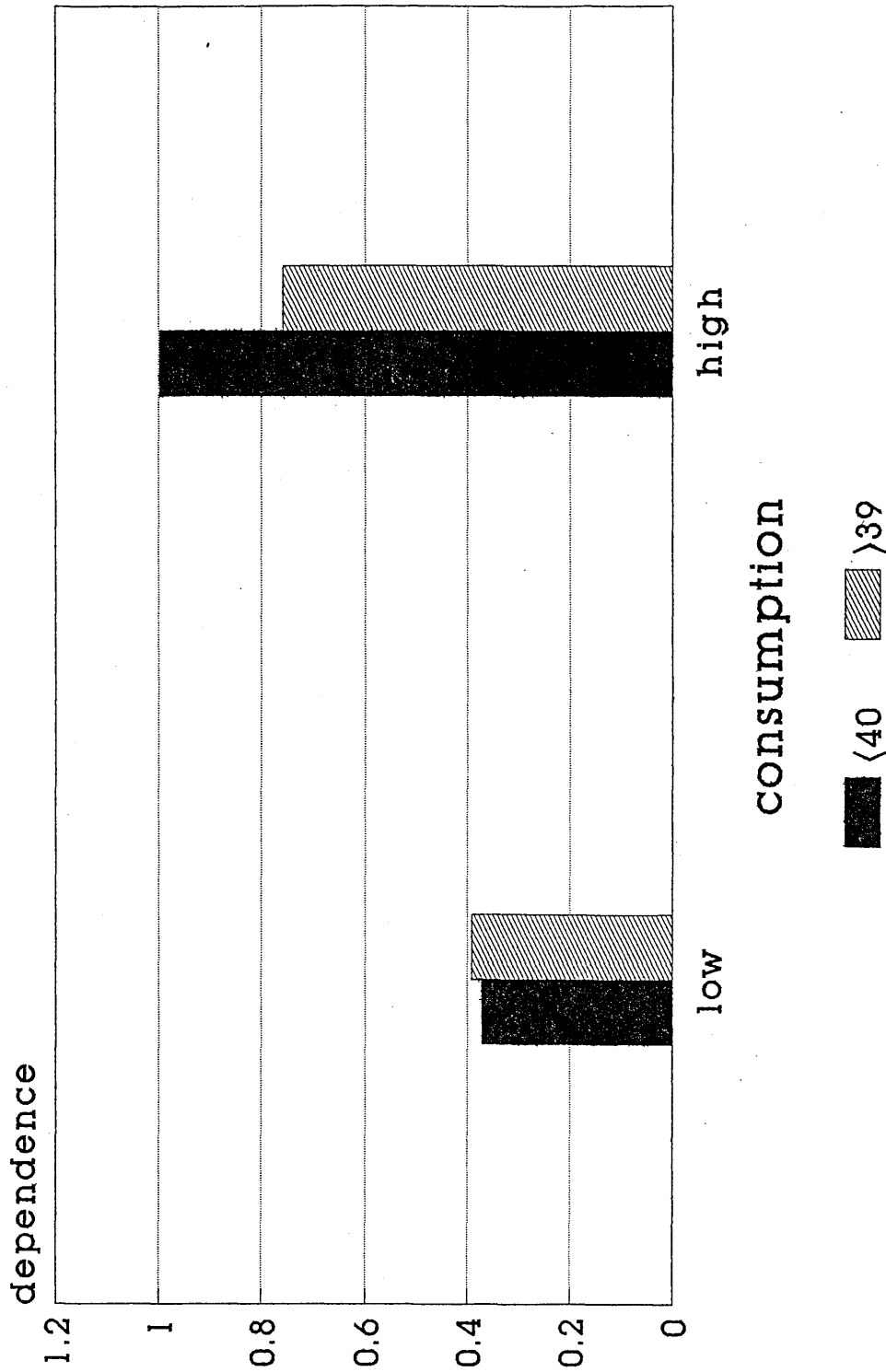
Figure 5.11. Level of dependence by age and consumption
categories (5+ drinks).

CONCLUSIONS.

The principal finding of this study is that, in keeping with the results of the studies reported in previous chapters, dependence is a mediating variable in the consumption-problems relationship. That such a finding pertains in a general population sample in a different country using different instruments adds considerable weight to the validity of mediational model. Further, while no individual sociodemographic factor directly predicted dependence, differential effects of consumption on dependence within different sociodemographic subgroups however were found. Such effects had not been explored in the clinical studies reported earlier due to the limitations of sample size. The greater susceptibility of women to the development of dependence was not previously found by Grant & Harford (1990) in the same data set, although they used different measures of dependence (in the form of a DSM-III-R diagnosis of alcohol dependence based on the existence of a criterion number of dependence symptoms) rather than the aggregate measure used here.

At first sight, this latter finding would seem to go against the studies described earlier, none of which found significant sex influences on dependence, or indeed, predictive effects from any other sociodemographic variables. However, that women are more susceptible than men to the effect of a given level of consumption can readily be explained in biological terms in that women attain a higher blood alcohol concentration following a given dose of alcohol (Kalant, 1971). If dependence is closely related to level of consumption it would therefore be logical to expect women to have a higher susceptibility to dependence. That there are considerably fewer alcohol dependent women in the general population, however, can be explained by their lower level of consumption as a group rather than having a lower biological susceptibility than men (see discussion in Chapter 7 on sex differences in susceptibility to problems).

The apparent higher susceptibility to dependence in lower income groups found in this study (although not in the earlier studies) can be accounted for by reverse causality: higher dependence resulting in lower earning capacity. It could also be explained by

possible differences in the drinking pattern and style of lower socioeconomic status groups. While no data is available to directly address this issue, it is possible that drinking behaviour in such subcultural groups occurs more often in communal settings where heavy drinking is socially reinforced (Mäkelä, 1978), and as a result may be more likely to lead to dependence. These proposals must, however, be seen only as tentative and as being more important in generating hypotheses than testing them.

What do these results tell us of the continuity of problems and dependence in the drinking population? In chapter 1 it was suggested that part of the reason for the difference in theoretical orientation towards drinking problems between the epidemiologist and the clinician lay in the different populations studied. Epidemiologists are likely to find only few subjects in a general population survey who might be viewed as typical of a clinical sample. Clinicians on the other hand find few young problem drinkers, the predominant problematic group in the general population, in clinic populations. Edwards et al. (1973) for example found in a general population based survey, 3.1% of the population who were regarded as being 'needful of treatment'. This label was applied in a somewhat stringent way and is probably more akin to Hilton's definition of 'severe dependence', to which 4% of the U.S. population conformed.

Could it be, then, that the results of this study were remarkably similar to the previous clinical studies, in terms of the mediating influence of dependence on the consumption-problems relationship, due to the inclusion of a few extreme cases influencing the overall result? This is unlikely for two reasons. First, the data underwent log transformation, the effect of which is to limit the influence of extreme values. Second, and more importantly, closely similar results were obtained not only in the heavier drinking bands (the 12+ and 8+ drinks bands representing approximately 14% and 20% of the whole population respectively, and therefore including between 4 and 7 times as many problem drinkers as would normally be viewed as typical of a clinical population) but also in the whole drinking population. The positive finding in this latter group must be seen as particularly remarkable in view of the considerable number reporting neither dependence symptoms nor problems

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(approximately 80% in either case). Further, drinking more than 5 standard drinks less than once per week, a level which few of the sample exceeded, could not be regarded as typical of groups attending alcoholism treatment clinics or indeed of a severely dependent drinker's usual drinking pattern. Such findings therefore support the view that the influence of dependence on the consumption- problems relationship is of importance even at a level of dependence considerably lower than is typically found in the 3, or so, percent of the population who might generally be regarded as needful of treatment: strong evidence for the continuity of dependence beyond the narrow 'severely dependent', or in earlier times, 'alcoholic' stereotype.

The implications of these and the foregoing findings will be further discussed in the concluding chapter.

CHAPTER 6.

THE INFLUENCE OF CULTURE ON ALCOHOL-RELATED PROBLEMS.

INTRODUCTION.

It is the aim of this chapter to examine the influence of culture on alcohol-related problems. Pearson (in press) has drawn attention to the fact that the term 'culture' has been used in a number of different ways in relation to both drug and alcohol problems. In the context of this discussion, 'culture' is used in the social anthropological sense as reflecting 'a whole way of life' rather in its more restricted senses. That different countries, and indeed different cultural groups within countries, have different attitudes and social norms with respect to alcohol consumption, provides an excellent opportunity to test theories concerning the nature of alcohol-related problems. Such a 'cultural relativist' approach proposes that differences in drinking behaviour and related problems observed between cultural groups can be attributed to differences in social organization and practice (Babor, 1986).

In contrast to this position, it is possible that similarities may exist in different cultures, particularly in relation to the pharmacological effects of alcohol. As Babor (1986) has suggested

> "......biologically, all humans are members of the same species, susceptible in the same way to intoxication, dependence, and liver damage. Socially almost all humans find alcohol reinforcing ....This would lead one to expect certain common features in drinking behaviour [between cultures], especially at the biological and psychological levels of analysis." (p.7).

In the context of this thesis, the important question is the extent to which cultural factors may influence the main variables of interest, namely, consumption, dependence, and problems. The multivariate statistical approach taken so far throughout this thesis has particular advantages in studying the interplay between culture and these drinking-related variables. When subject samples are drawn from two different cultural populations, it is quite possible that differences in alcohol consumption and related problems between the groups can be accounted for by chance differences in other variables, known to influence the phenomena of interest. In path analysis it is possible to control for the influence of these factors (providing they can be accurately measured). Such a method will be

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employed in cross-cultural analyses of data which has been presented in earlier chapters.

Before presenting these analyses it is important to review theoretical models of the ways in which culture is believed to influence alcohol-related problems, and to examine relevant existing data.

THE RELATIONSHIP BETWEEN THE DRINKER AND SOCIETY.

The person who takes alcohol cannot be understood in isolation from his surroundings. Even in a purely physical sense, the environment in which drinking occurs can have a profound effect on the consequences of consumption of a given dose of alcohol. For example, as suggested in Chapter 1, the individual who operates dangerous machinery immediately following a drinking session runs a greater risk of encountering serious consequences than one who only drinks at home.

Similarly, the cultural setting in which drinking occurs may crucially determine the individual's style of drinking (Cahalan & Room, 1974), their attitudes and expectations of the effects of alcohol (Jessor, Graves, Hanson et al., 1968), and their behaviour whilst intoxicated (MacAndrew & Edgerton, 1969). Socially determined expectations of the effects of alcohol may modify bahaviour whilst intoxicated (Marlatt & Rosenhow, 1980). Societal reactions towards the intoxicated behaviour of the drinker are also likely to be important, not only in the extent to which drinking takes place, but also in the adverse consequences for the drinker (Mäkelä, 1978). It is extremely difficult, however, to separate the cultural influences on drinking behaviour attributable to the drinker himself from those of the social environment in which he lives. A more useful distinction is that between cultural influences on drinking behaviour, and those on alcohol-related problems (although, here again, these influences are difficult to separate in practice).

Cultural influences on drinking behaviour.

Cultures in which the consumption of alcohol is prohibited or severely restricted tend to have higher rates of abstention and a lower per capita level of alcohol consumption than in countries in which a more permissive attitude prevails (Bruun, Edwards, Lumio et al. ,1975). Hindu, Buddhist and Islamic cultures have very high rates of abstention through, in large measure, religious influence (Mohan, 1990). In the Western World, Levine (in press) observes, per capita consumption is generally lower in countries with a strong temperence tradition, and in countries with more stringent alcohol control policies (Davies & Walsh, 1983). In Table 6.1 it can be seen that in Scandinavian countries, and in English speaking countries such as the U.K., the U.S., Canada, New Zealand and Australia, where the Temperence Movement has historically been strong, lower per capita levels of consumption prevail than in other European, and in particular, mediterranean cultures. In such 'temperence cultures' (Levine, in press), restrictive attitudes towards alcohol are generally supported by more stringent alcohol control policies, such as higher taxation and less easy availability of alcohol.

Table 6.2 shows that European countries with more stringent alcohol control policies tend to have lower per capita consumption levels and a lower cirrhosis mortality rate. France is out of keeping with this trend, but it should be noted that control policies there have only become more stringent relatively recently and that alcohol consumption is declining. The same countries which have stronger temperence traditions tend to have stricter alcohol control policies. Overall, this suggests a strong link between culture and per capita alcohol consumption.

In distinction to this lower per capita consumption level, several studies have noted that per drinker and per occasion consumption tends to be higher in more restrictive cultures (Skolknick, 1958; Mãkelã, 1975; Room, 1983), or indeed, 'explosive' (Cahalan & Room, 1974). In the latter study, the authors concluded that the more restrictive control over drinking in 'dry' cultures in the U.S., led the drinker to concentrate their drinking into short periods, leading to a more disruptive drinking pattern than in 'wet' cultures.

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Several authors have emphasized the importance of drinking pattern, rather than overall level of consumption, per se as a critical determinant of problems (e.g. Knupfer, 1984; Mäkelä, 1978).

Table 6.1. Per capita consumption of alcohol in the adult population[1] of 24 western countries[2] in 1984.

Country	per capita consumption litres absolute alcohol from all drinks.
France	18.2
Portugal	17.8
Italy	15.1
Spain	15.0
Hungary	14.6
West Germany	14.3
Austria	14.3
Switzerland	13.9
Czechoslovakia	13.5
Belgium	13.3
Denmark	12.9
Australia*	12.5
Soviet Union	11.5
New Zealand*	11.0
Netherlands	11.0
Canada*	10.2
United States*	10.2
Ireland*	9.7
United Kingdom*	9.2
Poland	8.2
Finland*	8.2
Sweden*	6.4
Iceland*	5.5
Norway*	5.2

[1] Aged over 15 years.
[2] Adapted from Levine (in press)
* Indicates 'temperence culture'.

Cultural influences on alcohol-related problems.

In the previous section it was suggested that cultural setting may influence the pattern of drinking behaviour as well as the extent of drinking behaviour in the population. However, as has previously been argued, excessive drinking in itself may not necessarily prove problematic to the individual. Societal reactions to a given pattern of drinking may vary from culture to culture. Where drinking is totally prohibited, as in Islamic cultures, consumption of alcohol, without what would be regarded in more permissive

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Table 6.2. Per capita alcohol consumption, liver cirrhosis mortality and alcohol control policy status in the countries of Europe. (Adapted from Davies & Walsh, 1983).

Country	Per capita alcohol consumption in 1979	Liver cirrhosis mortality per 100,000 population in 1978	Alcohol control status
France	20.8	30.4	high
Luxembourg	20.0	27.0	low
Italy	16.0	34.8 (1976)	low
Austria	14.4	31.2	low
Belgium	13.9	14.4 (1976)	average
Switzerland	13.3	12.8	high
West Germany	12.7	27.6	low
Netherlands	12.1	5.2	low
Denmark	12.0	9.8	average
Ireland	10.0	3.6	high
United Kingdom	9.8	4.2	high
Sweden	7.1	12.2	high
Norway	5.7	4.2	high

cultures as objectively serious consequences for society, may result in strong sanctions being taken against the individual. Cahalan & Room (1974), on the other hand, observed that even belligerent behaviour following drinking does not necessarily result in negative consequences for the individual:

> "In some contexts, belligerent behaviour is tolerated or even encouraged, so that there are no social consequences for the individual". (p. 23).

Similarly, Ritson (1985) found that different communities showed a wide variation in their beliefs concerning what constituted an alcohol-related problem and in their tolerance of drunken behaviour.

Relevant to this question are the concepts of 'labelling theory' and 'social reaction theory' (Lemert, 1967; Becker, 1963). In essence, it is suggested that in cultures in which behaviours are perceived of as problematic or deviant, the identified individuals will tend to be ostracized, so reinforcing the unwanted behaviour. 'Problem behaviour theory' (Jessor & Jessor, 1977) similarly posits that the social consequences of drinking will be determined in part by social reactions towards the behaviour, or the individual's

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perception of societal attitudes concerning the deviance of the behaviour.

Empirical findings of cross-cultural studies generally support the view that the pattern and extent of alcohol-related problems tends to vary between different cultures for a given level of alcohol consumption in the direction of more restrictive cultures having more social consequences for the drinker. On the other hand per capita consumption is highly correlated with the occurrence of certain serious physical complications such as hepatic cirrhosis both within and between different cultures (Bruun et al., 1975; Lelbach, 1974; Pequingot & Tuyns, 1978; Skog, 1982). In contrast to the now firm evidence in relation to these physical complications, that in relation to social complications is less clear cut. While it is not possible to review in detail all the studies which have examined cultural differences in alcohol-related problems some examples will be given.

Babor, Massanes, Ferrant et al. (1976) found that while French and American alcoholics in treatment had approximately the same mean daily alcohol consumption, 79% of the Americans compared to 43% of the French reported police trouble. This may suggest the possibility that the police have a greater role in the control of drinking behaviour in the U.S. compared to France. Negrete (1973), on the other hand, found that 74% of Anglo-Protestant Canadian alcoholics in treatment had had a history of police arrests compared to 38% of Franco-Catholics. In this study it was unclear the extent to which the two groups shared the same or different control environments, in that they were both domiciled in Montreal but were drawn from different cultural subgroups.

Hauge & Irgens-Jensen (1986) compared 4 Scandinavian countries in terms of per capita consumption and level of alcohol-related problems reported in a general population survey. Finland had the highest per capita consumption (3.13l) and Iceland, the lowest (2.27l). Norway and Sweden occupied an intermediate position in relation to consumption. The Icelandic respondents, however, reported more adverse consequences of drinking than the Finns. This trend was more marked when drinkers alone were compared. The findings in relation to the other two countries were less consistent with

this trend. Further, the data did not allow comparisons to be made controlling for individual consumption levels, although it was noted by the authors that when frequency of intoxication was held constant, only small differences existed between the countries.

Perhaps the strongest evidence comes from successive U.S. national surveys comparing 'wet' and 'dry' regions (Room, 1983; Hilton, 1988). Drier regions tend to have more restrictive public drinking, and stronger temperence traditions. In these areas drinking tends to be a public rather than a private issue (Gusfield, 1981). In an analysis of the 1984 National Survey, Hilton (1988) found that while there were more abstainers in 'dry' regions, per drinker consumption in these regions was marginally higher. Further, alcohol-related problems (Tangible Consequences) were significantly higher in the 'dry' regions (only in men, significant at the 5% level). These variables were not, however, examined in a multivariate analysis, leaving open the possibility that the differences in problem rates could have been confounded by chance sociodemographic and other differences between the groups. This problem will be addressed later in the chapter.

Culture and dependence.

So far this discussion has been restricted to cross-cultural differences in alcohol consumption and related problems. This is principally because most of the cross-cultural research has focused on these variables and has not considered dependence as an important variable in its own right.

In the first chapter, Jellinek's (1960) vulnerability-acceptance theory was contrasted with the mediational model. Jellinek proposed that cross-cultural differences in patterns of problems and dependence could be attributed to the permissiveness of a culture determining the predominant species of alcoholism. Thus in a cultural setting where heavy drinking is scorned, only the most 'deviant' species (or gamma alcoholism) will tend to emerge. This species, characterized by both dependence and problems, will, he argued, predominate in Anglo-Saxon cultures. In more permissive cultures such as France, which require less vulnerability in order for addiction to develop, the "inveterate drinker" or

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"delta alcoholic" will predominate: dependence without significant problems.

A disaggregation model would suggest instead that the extent of both dependence and problems in a population would depend on the level of consumption, which in turn would be subject to cultural influences. As suggested in the previous section, however, several theorists who hold to the view that dependence is disaggregated from other alcohol-related problems have also argued for a model in which culture not only shapes the pattern style and quantity of alcohol consumption, but is also directly responsible the definition of 'a problem'. This in turn will determine the extent of opprobrium which the drinker experiences. Thus, culture, within this modified disaggregation model, will have direct causal influences on both consumption (pattern, style, and quantity) and on problems.

The mediational model adds a further layer of complexity to this causal analysis of culture and alcohol-related problems. Edwards & Gross (1976) argue that the clinical presentation of elements of the Alcohol Dependence Syndrome would be coloured by personal and social factors. They suggested that dependence is "subtle and plastic", capable of being shaped by the cultural setting in which it develops. They suggest for example that:

> "For the labourer the idea of keeping drink in the house may be so against subcultural expectations that he will always wait for the pubs to open (perhaps travelling to an early-morning market pub) rather than 'keep a drink indoors'. The man of rigid personality may endure considerable withdrawal for some hours rather than take a drink before lunch. Fully to understand what the patient reports always requires that these shaping factors are taken into account". (p.5).

It has previously been argued that within the mediational model, dependence will be a key determinant of problems. It may be precisely these cultural constraints on heavy drinking behaviour which will determine the effect of dependence on problems, however, rather than culture having a direct causal effect on dependence. In other words, it can be argued that rather than dependence phenomena differing from one culture to another, restrictions in the availability of alcohol (or in the social appropriateness of drinking heavily throughout the day, irrespective of the situation) will force the dependent drinker, more than other drinkers, into the dilemma of experiencing severe withdrawal symptoms or

drinking in a socially inappropriate way: risking social disapproval either by taking regular doses of alcohol through the day or engaging in binges (or explosive drinking episodes) when the socially sanctioned alcohol outlet becomes accessible. It is therefore likely that in more permissive cultures, dependence will appear less prevalent, as suggested by Jellinek, but this may be because the drinker is not forced to abstain (and hence experience aversive withdrawal distress), rather than being simply having an "inability to abstain".

Thus, within the mediational model it is likely that dependence is more prevalent in permissive cultures by virtue of there being fewer abstainers and a higher per capita consumption. Such a culture would also have a higher prevalence of problems for the same reasons. But amongst drinkers it is likely that at a given level of consumption those who drink in a more restrictive culture will experience more problems rather than being more dependent.

Existing cross-cultural evidence for the mediational model.

There are no studies which have directly examined the validity of the mediational model in a cross-cultural research design, and few, indirectly. One recent study which throws some light on this issue is that of Larsen & Nergård (1990) who compared patterns of consumption and related problems between Saami and Norwegian problem drinkers in treatment. General population studies had previously noted that the prevalence of alcoholism and alcohol abuse was lower in the Saami, than in the Norwegian population (Keskitallo, Solbakk, Nordsletta et al., 1977) and that in the former:

> "alcohol use seems to be associated with holidays and absence of work obligations and family obligations.... Furthermore, it is possible that, to a greater extent than the Norwegian one, the Saami culture tends to accept heavy drinking on certain occasions." (Larsen & Nergård, 1990)(p.1472).

While Larsen & Nergård observed differences in drinking pattern, the mean alcohol consumption was not significantly different between the two ethnic clinical groups. Similarly, levels of dependence did not differ. Psychosocial consequences of drinking as

measured by a Norwegian version of the MAST (Andersen, 1987), however, were significantly lower in the Saami than in the Norwegian subjects. While these observations are in keeping with the mediational model, they must be interpreted with caution in view of the fact that the MAST is not an ideal measure of problems (see Chapter 2) and that a multiple regression analysis would have been better able to control for potential confounding effects caused by sociodemographic and other differences between the groups occuring by chance. Further the authors raise doubts about the applicability of the MAST in Saami culture.

The Negrete study (1973) cited above which found a higher level of problems in Anglo-Protestant than in Franco-Catholic alcoholics in treatment, reported that this difference existed in spite of no marked differences in "physiological symptoms of alcoholism". While providing some support for the mediational model there are difficulties in interpretation of the results as described above.

One of the more potentially promising sources of information relating to the role of dependence and culture in determining alcohol problems is the successive U.S. national surveys. These studies provide not only a method to assess regional differences in restrictiveness of attitudes towards drinking behaviour, and the extent of abstinence in the population, but also have employed measures of consumption, dependence, and problems as described in Chapter 5. The data, with respect to regional differences, has not previously been subjected to a path analysis. The reported univariate analyses do not provide a sufficiently sophisticated means of testing the validity of the models described above.

TWO STUDIES OF THE INFLUENCE OF CULTURE ON PROBLEMS.

Two further analyses of studies described in previous chapters were conducted to examine the relationship between culture and alcohol-related problems, taking into account the separate influences of consumption, dependence and other sociodemographic factors.

Where these studies differ from the foregoing is in the use of path analysis which, as shown in earlier chapters, assesses the independent contribution of individual variables to the target variable of interest, namely problems, and the interrelationships between variables.

The first study compares problems, dependence, and consumption in the London and Lubeck clinical populations described in Chapters 2 and 4. Of the two, this study must be interpreted with more caution in that a cross-cultural comparison is being made between two highly selected clinical populations in two European cities. The results of this Anglo-German study can, however, be interpreted in conjunction with the second study as providing evidence which points in the same direction.

The second study is a further analysis of the 1984 U.S. National Survey data set described in Chapter 5, comparing drinkers resident in 'wet' and 'dry' regions of the U.S., and employing the same measures used by Hilton (1988). It is argued, however, that the analytic method employed here represents an advance on those previously adopted with this data set.

Hypotheses.

The main hypothesis, predicted by the mediational model, is that at a given level of consumption and dependence, drinkers resident in a more restrictive culture will experience more problems, but that dependence at a given level of consumption will not differ between cultural settings.

This hypothesis differs from the prediction of the disaggregation model, namely, that drinkers in a more restricitve culture would experience higher levels of both dependence and problems through their higher per drinker consumption level. It should be said, however, that the modified disaggregation model (described above) is similar to the mediational model in its prediction that the higher level of particularly social problems in more restrictive cultures would result from greater social opprobrium towards the

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drinker as well as the higher per drinker consumption level.

Jellinek's vulnerability-acceptance theory predicts a higher level of both problems and dependence in more restrictive cultures. In this latter case, however, the higher level of these two phenomena should occur through the emergence of different species of alcoholism, rather than because of higher per drinker consumption levels.

STUDY 1: ANGLO-GERMAN STUDY.

The U.K. and West Germany are useful countries for the purpose of cross-cultural comparison. Both are industialized countries within the European Economic Community with a similar standard of living. The U.K. has to a large extent an Anglo-Saxon ethnic origin. They are both predominantly beer drinking cultures (Sulkunen, 1976), but differ markedly in terms of alcohol control policies and permissiveness towards drinking. In Germany, alcohol is generally available in restaurants and cafes, in some cases 24 hours a day (Fuerlein & Küfner, 1986), whereas in the U.K., and in particular in England and Wales, licensing of the sale of alcohol is much more restricted. Per capita alcohol consumption in West Germany was 14.31 in 1984 compared with 9.21 in the U.K., although the difference is narrowing (in 1970, per capita consumption differed by a factor of 2). Correspondingly, mortality from hepatic cirrhosis in West Germany was 6.6 times that in the U.K. in 1978 (see Table 6.2).

METHOD.

The measures, subjects and procedures were as stated in Chapters 2 and 4.

Analytic strategy.
This was identical to the method described in previous chapters except the London and Lübeck data sets were combined to allow multivariate analyses to be conducted including

the dichotomous variable 'culture' to be introduced. (Culture was coded 0 for London, and 1 for Lübeck). The predictors of problems, dependence, and consumption were then examined in a path analysis.

RESULTS.

Sample characteristics.

Table 6.3 shows the sociodemographic characteristics of the Lübeck and London samples. The table also includes drinking-related variables, which will be discussed later. The two groups were broadly similar, although differed in a number of important respects. The mean age of subjects was not significantly different between the two groups (T=1.81, p=0.07). The same was true of the sex ratio (X^2=0.35, p=0.56). There were, however, significant differences in socioeconomic class, with fewer in professional or managerial occupations in the Lübeck sample (X^2=36.8, p<0.0001), reflecting the inclusion of private patients in the London sample. In addition a smaller proportion of the Lübeck sample were married (X^2=16.22, p<0.0001) and a greater proportion divorced (p<0.01). There was a similar proportion who had children in the two samples, however.

Table 6.3. Comparison of sociodemographic characteristics between the London and Lübeck samples (standard deviations in parentheses).

Variable	London		Lübeck		Significance[1]
Mean age (years)	41.5	(10.2)	43.9	(9.9)	0.07
Male (%)	80.6		76.5		0.56
Married (%)	50.4		24.2		0.0001
Never married (%)	24.3		39.3		0.02
Divorced (%)	11.7		27.3		0.005
Separated (%)	11.7		3.8		0.04
Parent (%)	64.0		48.0		0.02
Employed (%)	61.0		67.0		0.34
Social class I & II (%)	46.2		9.4		0.0001

[1]Significance tests refer to t-tests in the case of continuous variables, and chi-square tests in the case of interval variables.

Table 6.4. Frequency of reported alcohol-related problems in the
Lübeck sample (%). (London sample rank order and frequency (%)
in parentheses.)

Common (n=132)   Marital (n=76)

1.	Vomiting	63	(6=,59)	1.	Prevents drinking	77	(3,46)
2.	Drinking alone	59	(1, 79)	2.	Spouse complains	76	(1,55)
3.	Diarrhoea	55	(5, 64)	3.	Threaten to leave	48	(4,38)
4.	Lost enjoyment	50	(3, 70)	4.	Shouting	45	(2,47)
5.	Weight loss	47	(14,47)	5.	Refuses sex	43	(7,22)
6.	Drinking friends	46	(8=,56)	6.	Spouse separated	29	(9, 9)
7.	Paraesthesiae	44	(6=,59)	7.	Spouse ignores	33	(5,34)
8.	Abdominal pain	43	(10=,55)	8.	Put to bed	20	(6,25)
	Self neglect		(2, 71)	9.	Spouse injured	3	(8,11)
	Depression		(10=,55)				
11.	Worried meeting	43	(8=, 56)	Children (n=64)			
12.	Police trouble	42	(17, 37)				
13.	Debt	41	(15, 46)	1.	Children criticize	66	(1,36)
14.	Lost interest	39	(12=,49)	2.	Prevent drinking	56	(4,20)
15.	Friends criticize	31	(4, 69)	3.	Children avoid	39	(2,27)
16.	Fail to wash	30	(20, 25)	4.	Rows with children	29	(3,22)
17.	Money excuses	26	(16, 39)				
18.	Accidents	24	(19, 26)	Work (n=58)			
19.	Drunk driving	22	(22, 19)				
20.	Money lies	21	(18, 28)	1.	Lost day's work	50	(1=,39)
21.	Suicidal thoughts	19	(12=,49)	2.	Lost efficiency	45	(1=,39)
22.	Prison	16	(23, 9)	3.	Complaints	38	(6,18)
23.	Pawn belongings	14	(21, 23)	4.	Lost interest	35	(3,30)
				5.	Warnings	32	(5,21)
				6.	Lost time	31	(4,27)
				7.	Dismissal	28	(7,10)

Table 6.5. Comparison of drinking-related characteristics between
the London and Lübeck samples (standard deviations in parentheses).

Variable	London	Lübeck	Significance[1]
Consumption	5.6 (2.8)	6.1 (3.4)	0.24
SADQ score	21.7 (12.6)	22.8 (11.9)	0.50
APQ common score	11.6 (4.6)	8.6 (4.1)	0.0001
APQ subscale scores:			
Physical	3.9 (1.9)	3.2 (1.9)	0.004
Affective	2.9 (1.5)	1.8 (1.1)	0.0001
Money	1.5 (1.5)	1.0 (1.2)	0.016
Police	0.7 (0.9)	0.8 (0.9)	0.19
Friends	2.7 (1.0)	1.8 (1.1)	0.0001
Marital	4.9 (1.7)	3.8 (2.1)	0.001
Work	2.9 (2.0)	2.6 (2.3)	0.42
Children	2.1 (1.5)	1.9 (1.5)	0.51

All drinking-related variables are expressed as mean values.
[1] T-tests were used for all analyses.

Cultural similarities and differences in problems, dependence and consumption.

1. Frequency of alcohol-related problems.

First, a comparison was made between the samples in terms of the rank order and frequency of reporting individual alcohol-related problems (Table 6.4). A similar rank order was found, but there were some notable differences. Friends criticizing drinking behaviour, and suicidal thoughts had a lower rank order, whereas physical problems, such as weight loss and vomiting after drinking had a higher rank order than in the London sample. This may reflect both a greater tendency to somatize drinking problems, but is possibly also an indication of a greater social acceptance of heavy drinking behaviour amongst the Lübeck subjects' peer group. Rank ordering of marital problems was also similar between the two samples, except that separation from spouse had a higher order in the Lübeck compared to the London sample in whom this was the least common marital problem. Complaints from employers also had a higher order in the Lübeck sample.

2. Univariate comparison of problems, dependence, and consumption.

Second, the London sample reported a significantly higher level of problems (as measured by the APQC score) in spite of having no significant differences in either consumption or dependence scores (Table 6.5). This was reflected in all the APQ common subscales except police problems, where the Lübeck sample had a higher mean score, although this was not statistically significant. The London sample also reported a higher mean number of marital, children and work problems, but these differences again, were not significant.

There was the potential, however, for these univariate comparisons of problems to be confounded by the significant sociodemographic differences between the groups, noted earlier.

3. Path analysis.

A further series of multiple regression analyses were therefore conducted to construct a path diagram including the sociodemographic variables. Once again only the results of the forced entry procedures are reported, but there were no important differences found in a parallel series of analyses using backward elimination and forward insertion procedures. In this instance, because of the theoretical importance of possible interactions between culture and dependence, it was felt appropriate to include the 'culture x dependence' interaction variable in the problems regression.

Tables 6.6, 6.7 and 6.8 show the full results of these analyses, and the path diagram is presented in Figure 6.1. As in previous analyses, dependence is the main predictor of problems, with culture having a smaller but highly significant path to problems. The 'culture x dependence' interaction variable did not significantly predict problems, suggesting that the effect of 'culture' was no more marked for the more, compared to the less, severely dependent.

Age also remains a significant predictor of problems. Again, only consumption significantly predicts dependence. Gender and marital status were significant predictors of consumption, in the same direction as previous analyses. Socioeconomic class and age were not significant predictor variables.

Table 6.6. Results of multiple regression analysis of problems in the combined sample (forced entry procedure).

Variable	Beta	T	Significance
Dependence	0.481	7.539	0.0001
Culture	-0.339	-5.641	0.0001
Age	-0.215	-3.992	0.0001
Social class	0.050	0.847	0.398
Married	0.072	1.245	0.215
Sex	0.003	-0.701	0.944
Consumption	0.082	1.262	0.208

Table 6.7. Results of multiple regression analysis of
dependence in the combined sample (forced entry procedure).

Variable	Beta	T	Significance
Consumption	0.580	9.883	0.0001
Age	-0.018	-0.316	0.752
Social class	-0.033	-0.510	0.610
Married	0.019	0.302	0.895
Sex	0.083	1.416	0.158
Culture	0.003	0.051	0.959

Table 6.8. Results of multiple regression analysis of
consumption in the combined sample (forced entry procedure).

Variable	Beta	T	Significance
Age	-0.091	-1.330	0.184
Social class	0.102	1.377	0.169
Married	0.175	2.432	0.016
Sex	-0.198	-2.952	0.004
Culture	0.058	0.783	0.435

4. Predictors of specific problem areas.

Finally, predictors of specific types of problem, as reflected by individual APQ subscales, were examined in a series of multiple regression analyses in the combined sample. Physical problems were predicted by both dependence (Beta$=0.40$; $p<0.0001$) and culture (Beta$=-0.23$; $p=0.006$), in the direction of being British associated with more problems. Affective problems were significantly predicted by these variables in the same direction (dependence: Beta$=0.33$, $p<0.0001$; culture: Beta$=-0.43$, $p<0.0001$), as well as being female (Beta$=0.16$, $p=0.01$). Several factors predicted financial problems, including dependence (Beta$=0.44$; $p<0.0001$), younger age (Beta$=-0.23$; $p=0.0002$), lower social class (Beta$=0.17$; $p=0.005$), and, to a small extent, being British (Beta$=-0.13$; $p=0.03$). Unusually, problems with friends were only predicted by consumption, but only to a small extent (Beta$=0.34$; $p=0.03$). Police problems were commoner in young males as had been found previously (age: Beta$=-0.22$, $p=0.002$; sex: Beta$=-0.19$, $p=0.007$). Culture, in the direction of being German fell just short of

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age

−0.22

problems

sex −0.20

consumption

0.48

married 0.18

dependence

0.58

culture

−0.34

socioeconomic
class
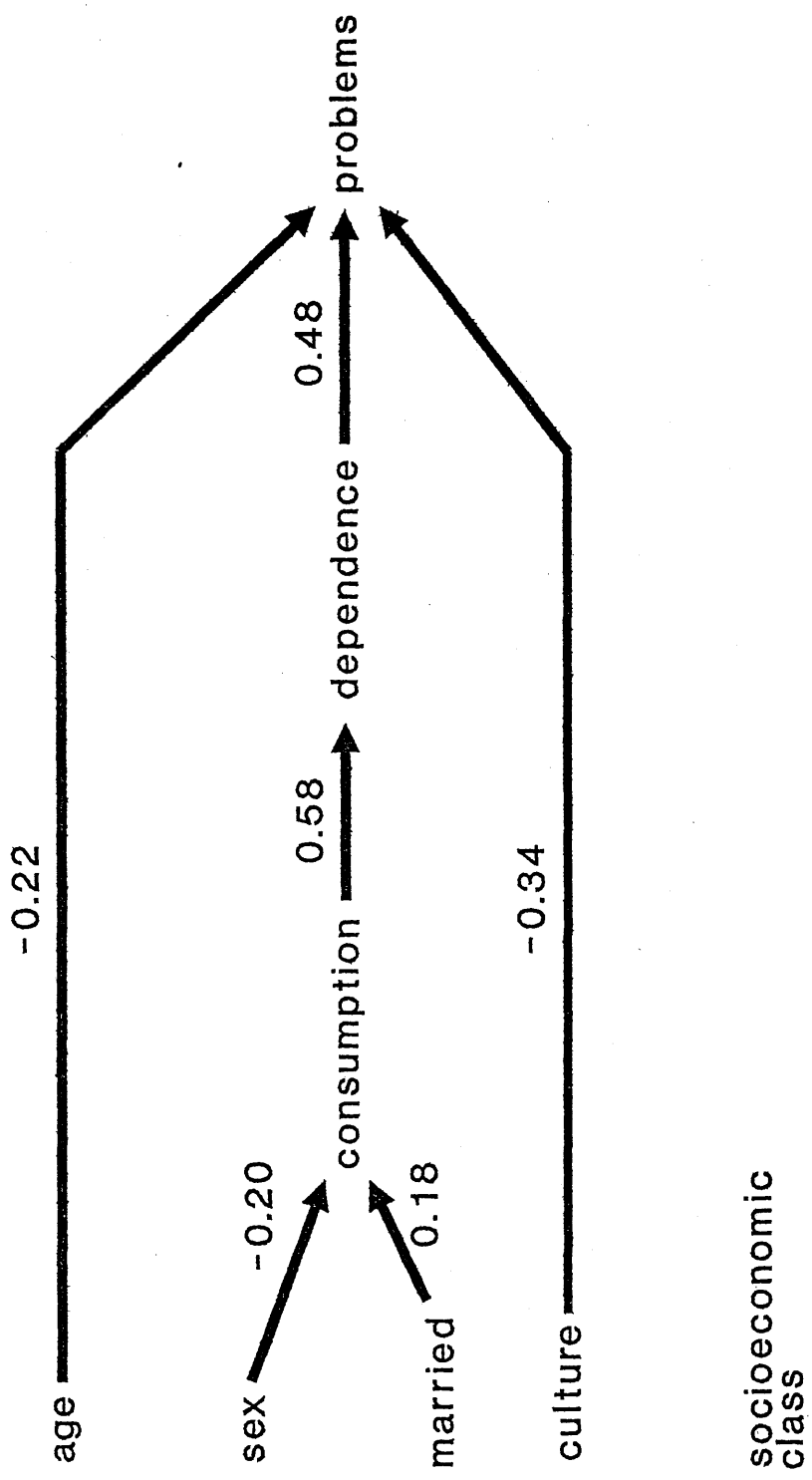
Figure 6.1. Path diagram of problems, dependence, consumption, and sociodemographic variables (combined sample).

significance as a predictor of police problems (Beta=0.12; p=0.09).

Marital problems were commoner in the more dependent (Beta=0.30; p=0.006) British subjects (Beta=-0.38; p=0.0001). Problems at work were only predicted by dependence (Beta=0.34; p=0.005). Against the general trend, problems with children were predicted by being older (Beta=0.32; p=0.001) and female, although this latter coefficient failed to reach significance (Beta=0.18; p=0.07). This may be an indication, however, of the tendency for women to be child carers, and that older parents may be expected to have older children who are perhaps more vocal in their criticism of drinking behaviour than younger children.

CONCLUSIONS.

The findings of this cross-cultural study broadly support the mediational model, in keeping with the hypotheses set out at the beginning of the chapter. In the combined sample, culture was found to be an important predictor of problems but not of dependence and consumption, with the London subjects experiencing most types of problem to a greater extent than their German counterparts (controlling for other factors including dependence and consumption). Dependence appears to be experienced as a similar phenomenon in different cultures, and is dependent on level of alcohol consumption rather than on social factors.

Cultural factors emerged as important predictors of particular types of problem, including physical, psychological, financial, and marital problems, with, controlling for other factors, the London sample having more problems in these areas than the Lübeck sample. Police problems showed a trend in the opposite direction. Differences in the rank order of problems were also noted between the samples.

STUDY 2: COMPARISON OF DRINKERS IN 'WET' AND 'DRY' REGIONS IN THE 1984 U.S. NATIONAL SURVEY.

The rate of abstention from alcohol varies widely across the U.S., Southern and Mountain states having much higher abstention rates than elsewhere in the U.S. (Hilton, 1988)(Table 6.9). This observation has formed the basis of the 'wet'/'dry' distinction between states. 'Dry' states are also found to have more negative attitudes towards drinking, stronger legal restraints on drinking, and a stronger tradition of temperance and prohibition. Some states have been found to have become 'wetter' since the early surveys of drinking attitudes and practices. The rate of absention in the West North Central region was typical of 'dry' states in 1964, with a rate of 34%. By 1984 only 20% of the adult population were abstainers, a rate more typical of 'wet' regions. This region has subsequently been reclassified as a 'wet' region for the purpose of this research (Hilton, 1988).

In Hilton's (1988) analysis of the 1984 U.S. National Survey, it was found that residents in 'dry' regions (including drinkers and non-drinkers) had less favourable attitudes towards drinking and drunkenness, in keeping with the above predictions.

Table 6.9. 'Wet' and 'dry' regions in the 1984 U.S. National Survey (adapted from Hilton, 1988).

Wet regions	Dry Regions
New England	South Atlantic
Mid Atlantic	East South Central
East North Central[1]	West South Central
West North Central[1]	Mountain
Pacific	

[1] Previously categorized as a dry region.

METHOD.

The measures, procedures, and subjects have been described in Chapter 5, except for 'region'. 'Wet' and 'dry' regions were coded according to the scheme in Table 6.9 'Wet' regions were given a code of 1, and 'dry' regions, 0.

Analytic strategy.

Initially the univariate statistics reported by Hilton (1988) were examined. From then on, the analytic strategy was virtually identical to the path analysis in Chapter 5, with some exceptions. As before separate analyses were conducted for the 5+, 8+, and 12+ drinks bands, with 'region' as a further independent variable, the aim of the analyses being to assess the independent contribution of 'region' as a predictor of problems, dependence, and consumption.

A further set of path analyses was then conducted, incorporating interaction variables which included 'region' in the term (i.e. 'region x dependence', 'region x consumption' etc.). The purpose of these analyses was to examine whether the effects of living in a 'wet' or 'dry' region were different for subgroups of subjects. In all cases only the results of the forced entry regression procedures are reported, although a parallel series of analyses was conducted, using a backward elimination procedure.

RESULTS.

Univariate comparison of consumption, dependence, and problems.

Table 6.10 shows the results of Hilton's (1988) univariate comparisons of consumption, dependence, and problems between 'wet' and 'dry' regions for males and females, separately. No comparison was made for the 12+ drinks level, but for the 5+ and 8+ drinks levels no significant regional differences for either males or females when whole regions are considered. (Although marginally significant differences existed when certain regions were compared). The trend, however, was towards marginally higher mean

frequency of heavy drinking amongst drinkers resident in 'dry' regions.

Table 6.10. Mean level of consumption, dependence[1], and problems[2] in males and females by region[3].

Variable	males		females	
	'wet' region	'dry' region	'wet' region	'dry' region
Frequency 5+ drinks > twice/week	18.0	18.8	5.1	5.2
Frequency 8+ drinks > weekly	8.7	12.3	2.6	2.3
Problematic drinking[1]	8.1	10.5	4.9	3.1
Tangible consequences[2]	10.3	21.0*	6.3	5.7

[1]Problematic drinking is equivalent to dependence.
[2]Tangible consequences equivalent to problems.
[3]Adapted from Hilton (1988).
See text for definition of 'wet' and 'dry' regions.

*$p < 0.05$ (Chi square test).

Similarly, while the mean 'problematic drinking' (dependence) score was higher in 'dry' regions this difference was not statistically significant. There was, however, a significantly higher level of 'tangible consequences' in 'dry' regions compared to 'wet' regions (at the 5% level; and only amongst males).

As suggested earlier, however, these results could have been confounded by other differences between the groups, not taken into account in the univariate analyses.

Path analyses.

The results of the path analyses for the 5+, 8+ and 12+ drinks levels are shown in Figures 6.2, 6.3, and 6.4, respectively. The details of each regression analysis which was conducted in order to construct the path diagrams are show in Tables 6.11, 6.12, and 6.13.

Predictors of problems.

In common with earlier analyses of this data set described in Chapter 5, the inclusion of 'region' did not significantly alter the place of dependence as the principal predictor of problems. In the 5+ drinks band, however, consumption now appears as a significant predictor. Consumption does not significantly predict problems in the higher consumption bands. While the path coefficients from 'region' to problems are small, they are all highly significant, in keeping with the hypothesis that drinkers resident in 'dry' regions have more problems than their 'wet' region counterparts, controlling for level of consumption and dependence.

Interestingly however, there were no 'region x consumption' or 'region x dependence' interaction effects. This suggests that the excess of problems experienced by drinkers in 'dry' regions is not significantly different for light versus heavy drinkers, or for the more versus the less dependent. There is a tendency, however, for the region --> problems coefficient to become larger as one moves from the 5+ to the 12+ drinks band.
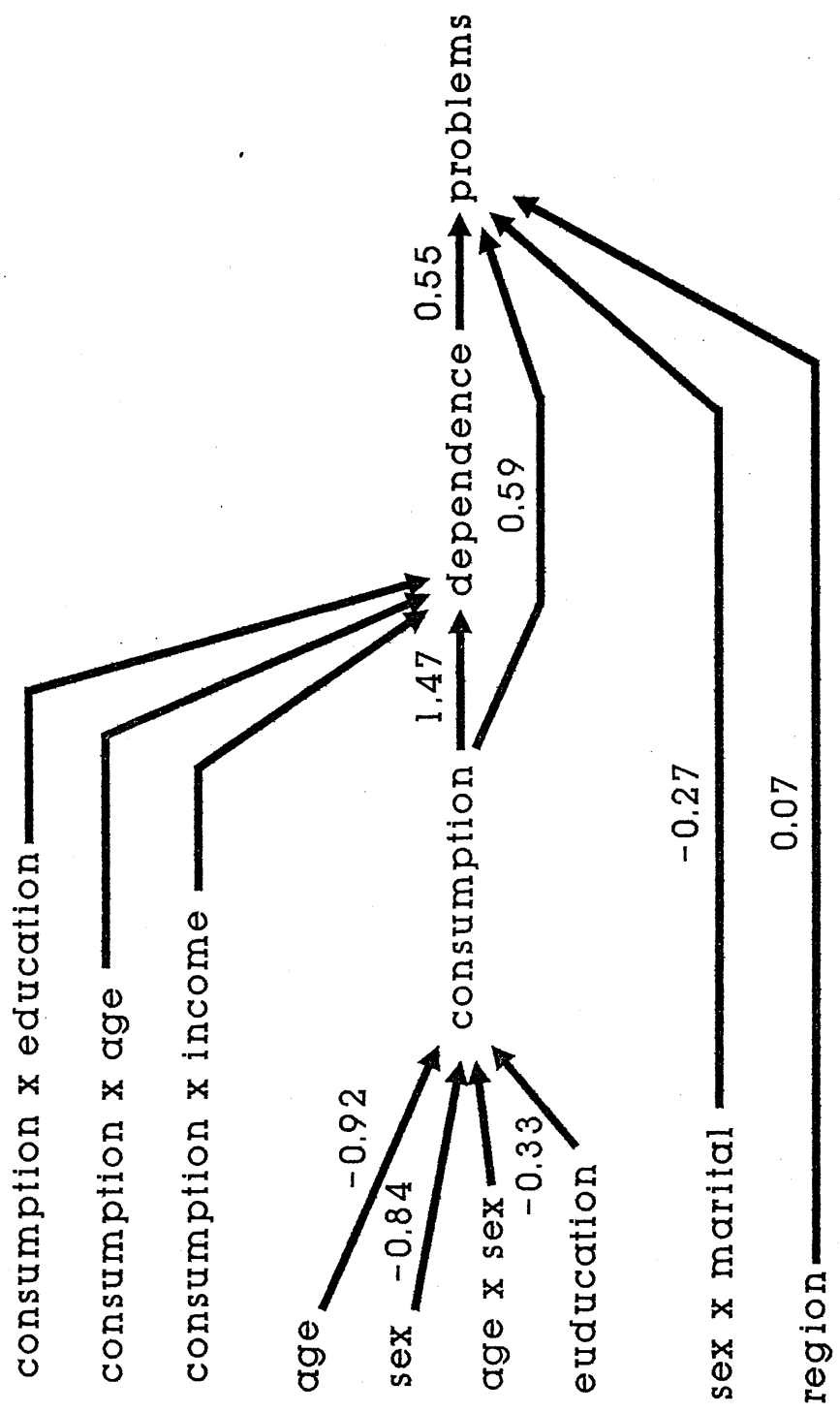
Figure 6.2. Path analysis: pedictors of problems, dependence
and consumption, including 'region' (5+ drinks).
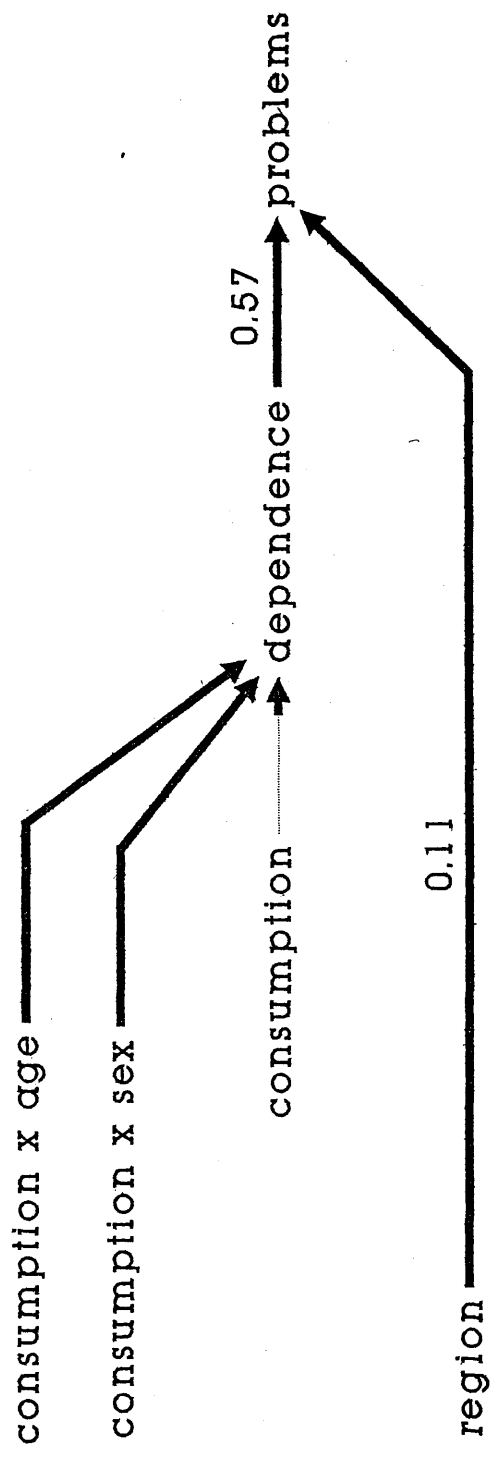
Figure 6.3. Path analysis: predictors of problems, dependence, and consumption, including 'region' (8+ drinks).
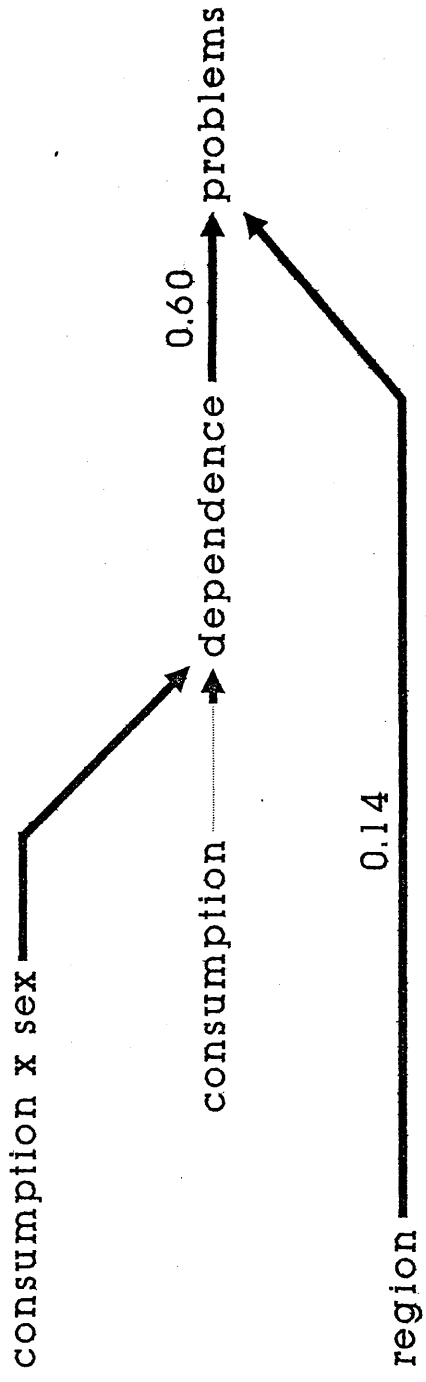
Figure 6.4. Path analysis: predictors of problems, dependence, and consumption, including 'region' (12+ drinks).

Table 6.11. Results of multiple regression analyses of problems by
alcohol consumption band, including 'region' (forced entry procedure).

Variable	5+ drinks			8+ drinks			12+ drinks		
	Beta	T	Sig.	Beta	T	Sig.	Beta	T	Sig.
Dependence	0.549	21.586	(0.000)	0.567	13.100	(0.000)	0.596	11.708	(0.000)
Consumption	0.633	3.096	(0.002)	0.069	0.197	(0.844)	0.038	0.095	(0.924)
Income	-0.162	-1.335	(0.182)	-0.214	-1.034	(0.302)	-0.272	-1.099	(0.273)
Sex	0.166	0.887	(0.375)	0.017	0.053	(0.958)	-0.478	-1.246	(0.213)
Age	-0.054	-0.341	(0.732)	0.144	0.467	(0.640)	0.238	0.529	(0.597)
Marital stat.	0.115	0.827	(0.408)	0.391	1.572	(0.117)	0.173	0.564	(0.573)
Education	-0.109	-1.075	(0.282)	-0.189	-0.945	(0.345)	-0.421	-1.707	(0.089)
Region	0.071	3.407	(0.000)	0.109	2.914	(0.003)	0.141	3.017	(0.003)

Table 6.12. Results of multiple regression analyses of dependence by
alcohol consumption band, including 'region' (forced entry procedure).

Variable	5+ drinks			8+ drinks			12+ drinks		
	Beta	T	Sig.	Beta	T	Sig.	Beta	T	Sig.
Consumption	1.466	6.555	(0.000)	0.162	0.399	(0.689)	-0.093	-0.190	(0.850)
Age	-0.154	-0.881	(0.378)	-0.207	-0.584	(0.559)	-0.399	-0.737	(0.461)
Sex	0.290	1.392	(0.163)	-0.195	-0.531	(0.596)	-0.049	-0.106	(0.916)
Marital stat.	-0.034	-0.221	(0.825)	-0.311	-1.091	(0.276)	-0.487	-1.291	(0.197)
Income	-0.087	-0.643	(0.520)	-0.364	-1.532	(0.126)	-0.484	-1.628	(0.104)
Education	-0.081	-0.712	(0.476)	-0.032	-0.140	(0.888)	0.034	0.117	(0.907)
Region	-0.008	-0.366	(0.714)	-0.040	-0.930	(0.353)	-0.022	-0.387	(0.699)
Consumption x Income	-0.444	-3.489	(0.000)						
Consumption x age	-0.290	-4.078	(0.000)	-0.371	-2.814	(0.005)			
Consumption x Education	-0.473	-3.592	(0.000)						
Consumption x Sex				0.389	2.889	(0.004)	0.481	2.751	(0.006)

Table 6.13. Results of multiple regression analyses of consumption by
alcohol consumption band, including 'region' (forced entry procedure).

Variable	5+ drinks			8+ drinks			12+ drinks		
	Beta	T	Sig.	Beta	T	Sig.	Beta	T	Sig.
Age	-0.925	-5.063	(0.000)	-0.301	-0.772	(0.441)	0.334	0.597	(0.551)
Sex	-0.843	-3.906	(0.000)	-0.186	-0.463	(0.643)	-0.354	-0.700	(0.485)
Marital stat.	-0.264	-1.599	(0.110)	0.151	0.482	(0.630)	0.163	0.406	(0.685)
Income	-0.146	-1.077	(0.282)	-0.176	-0.683	(0.494)	0.078	0.242	(0.808)
Education	-0.335	-3.004	(0.003)	-0.294	-1.196	(0.232)	-0.398	-1.234	(0.218)
Region	-0.038	-1.482	(0.138)	0.082	1.675	(0.095)	0.148	2.410	(0.017)
Age x Sex	0.318	2.787	(0.005)						

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Predictors of dependence.

The effect of including 'region' in the dependence regression analyses was to increase the number of consumption interaction variables which significantly predicted dependence in the 5+ drinks band. Only consumption and consumption interaction variables predicted dependence in any of the drinking band as in previous regressions reported in Chapter 5. Importantly, however, 'region' did not significantly predict dependence in any consumption band.

Predictors of consumption.

Again, the tendency here, with the inclusion of 'region' was to increase the number of significant predictors at the 5+ drinks band. As in previous analyses, age, sex, and the 'age x sex' interaction were significant predictors of consumption, in the direction of younger males drinking more heavily. In this case lower educational achievement also predicted higher consumption. As was the case with dependence, however, 'region' was not a significant predictor of consumption in any drinking band.

CONCLUSIONS.

In both studies presented here, then, the results are in keeping with the hypothesis that that drinkers resident in more restrictive cultural settings with respect to alcohol, experience more problems than those resident in more permissive environments. The hypothesis that this is due to an interaction between culture and degree of dependence has not been supported by the data, however. Those who are more dependent do experience more problems, and at a given level of dependence, those people who reside in more restrictive cultures experience more problems. However, the effect of culture is to increase the extent of problems in the same proportion in more and less dependent drinkers. Put another way, it appears that the more dependent drinker is not especially singled-out for social disapproval or forced into a more problematic form of drinking. It should be noted, however, that the problems measures used in both studies were not purely concerned with problems in interpersonal relationships (although in the U.S.

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National Survey the problems measure was heavily weighted towards this type of problem). Thus it is possible that if an interaction between dependence and social disapproval was the only mechanism involved in the development of problems, the inclusion of other types of problem might have made it more difficult to find this effect. In the Anglo-German study, however, cultural factors had a significant predictive relationship with both physical, psychological, and financial problems as well as interpersonal problems, suggesting that the effect is not specific to problems associated with cultural disapproval.

The results of both studies are also in keeping with the view that at a given level of consumption, dependence does not differ significantly between more and less restrictive cultures. This stands in contrast to the findings with respect to problems, again suggesting that different causal factors are involved in the development of dependence and problems. It also tends to go against Jellinek's vulnerability-acceptance theory, in which it is hypothesized that both dependence and problems will be influenced by the restrictiveness of the cultural environment.

Nor does it appear that those drinkers in more restrictive cultures drink more heavily. These findings would seem to run contrary to earlier observations concerning consumption (Cahalan & Room, 1974; Mäkelä, 1978) and dependence (Edwards & Gross, 1976). One must be cautious in forming too firm a conclusion on the basis of this data alone, however. It is likely that the cultural mechanisms involved the development of problems are highly complex, involving more than the simplistic notion of cultural restrictiveness or social disapproval. Observations based on aggregate level data may conceal more subtle interactions and processes. It is not clear, for example, the extent to which a more dependent drinker in a 'dry' area manages to isolate himself from socially disapproving teetotallers, drinking only in the company of those who share a more permissive view. A more appropriate concept of 'culture' in this context might be that of the immediate cultural environment of the drinker rather than a population level view of the nature of regions or countries, which are likely to comprise a patchwork of cultural

beliefs and practises with respect to alcohol: one village or suburb may be much the same as another only a few miles away, or they may differ as much as say, Govan and Giffnock. Clearly a more precise measure of the cultural context in which drinking occurs will be necessary more fully to understand the subtle interaction between culture and drinking behaviour.

Further, it is possible that the consumption measures used here do not faithfully portray the precise pattern or style of drinking which may crucially inflame 'drier' societies. The 'explosive' nature of drinking in certain 'dry' cultures in the U.S., described by Cahalan & Room (1974) as being in cases "peculiarly obnoxious" (p. 177), is not easily captured by a questionnaire. Nor is it easy to understand what the precise mechanism for the development of problems might be in people who, according to Cahalan & Room (1974) "apparently end up with social consequences out of all proportion to at least their current drinking" (p. 179). Such an occurrence might be the result as much of personal factors as of cultural setting.

In view of these reservations, it is all the more surprising that the data should reveal findings consistent with theoretical predictions with respect to the influence of culture on problems. While this analysis represents no more than a small step forward in understanding cultural influences on problems, dependence, and consumption, it serves more to highlight the complexity of causal mechanisms in the development of alcohol-related problems and the need for further research in this area. In particular, more sophisticated measures which aim to capture more subtle aspects of drinking pattern and style are needed to explore cultural differences in drinking behaviour. It is likely that a measure of narrowing of drinking repertoire will prove useful in studying the effect of dependence on the consumption-problems relationship both within and between cultures. This research also points to the need for a means to measure the control environment as perceived by the individual, as opposed to the more global and less informative categorizations of 'country' and 'region' employed here. It is likely that within countries and regions there will be variation in the social response towards drinking behaviour, as

well as variation in the perception of the control environment from person to person. The implications of this research are further discussed in the next chapter.

CHAPTER 7.

CONCLUSIONS.

INTRODUCTION.

This concluding chapter is organized, following this introduction, under 6 main headings. The first section aims to summarize and integrate the findings of the studies described in the preceding chapters, and to formulate conclusions regarding the main hypotheses described in Chapter 1. The extent to which the results presented here support or contradict those of previous research studies will also be examined. In the second section, factors which may limit the theoretical and practical inferences which can be drawn from the results are discussed. This includes the important issue of the extent to which causal inference can be made on the basis of correlational data, one which has not so far been addressed.

The next three sections will explore the implications of the research described in this thesis for theories of addiction, diagnosis and classification, and for public health policies, respectively. The concluding section will identify important new research leads suggested by the results.

Throughout this discussion, it is important to note that while these results challenge earlier concepts, much of this research should best be regarded as a preliminary step towards a new understanding of the nature of alcohol-related problems. The need for further research will be emphasized, particularly in relation to the practical application of theory supported here by empirical findings. It is concluded that the most important contribution which the research presented here makes is in identifying the potential importance of dependence as a key mediating factor in the development of problems. Further, this mediating effect of dependence has been observed in a considerably larger sector of the population than is defined by the narrow stereotypic image of the severely dependent or 'alcoholic' drinker. This finding points to an important new focus of research for both clinician and epidemiologist.

INTEGRATION OF THE COLLECTED RESEARCH FINDINGS.

1. The dimensionality of dependence and problems.

In keeping with earlier studies (described in Chapter 1) which have explored the factor structure of dependence, all studies reported here suggest that it is, statistically, a unidimensional phenomenon existing in degrees of severity. In other words, different elements of the Alcohol Dependence Syndrome (Edwards & Gross, 1976) tend to co-occur, and exist in different degrees in both clinical and general populations. This coalescence, or clustering, of phenomena is remarkably similar in different cultural groups, using different instruments, and is in keeping with Edwards & Gross's (1976) contention that while all elements of the syndrome need not be present simultaneously, they will tend to co-occur.

In contrast to this finding, the factor structure of problems suggests that while there is some tendency for different problems to co-occur, they tend more to be disaggregated, and vary considerably in their frequency of occurrence. Such a finding is in keeping with Room's (1983) view of the disaggregated nature of problems related to alcohol consumption. The observation that there exist different predictors of problems and dependence, as well as indeed predictors of different types of problem, adds weight to the view that they are different kinds of phenomena, and that problems tend to be disaggregated.

2. The predictors of problems.

a) Dependence.

In all the studies presented in this thesis, dependence has emerged as the main predictor of problems. Further, while consumption and problems are highly correlated, when dependence is controlled for, this direct relationship is reduced to insignificance. As has been suggested earlier, this does not imply that consumption and problems are unrelated. Such a view would be at odds with a considerable body of research, and indeed, common experience. On the contrary, heavier drinkers experience more problems than lighter

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drinkers. But at a given level of consumption, the main factor which predicts the extent of problems is dependence. Such findings are in keeping with the mediational model rather than either the cluster or disaggregation models described in Chapter 1. That these relationships between the main variables of interest pertain in different countries, in both clinical and general populations, and with different questionnaire measures, adds considerable weight to the validity of the mediational model.

The findings with respect to sociodemographic variables as predictors of problems are, however, less consistent across the different studies described here than is the case with dependence and consumption.

b) Age.

Age emerged as a significant predictor of problems in both clinical studies, in the direction of younger subjects having more problems. In the U.S. National Survey, however, age did not directly predict problems, although younger subjects had a higher level of problems by virtue of being more susceptible to dependence, and their higher level of consumption (in the 5+ drinks band). In Hilton's (1987b) analysis of the same data set, age did emerge as a significant predictor of problems (at the 1% level). It is likely, however, that the failure to include first order interaction variables and dependence in the problems regression, accounts for the difference between his analysis and that reported here. Indeed, in an analysis conducted to check this, in which interaction variables and dependence were eliminated from the problems regression, age was found to be a significant predictor. This suggests that the difference in results was not accounted for by a computational error, but rather through the superiority of the more complex regression model used here, as a means of establishing direct and indirect effects. Age was found to predict problems in another general population sample using a linear modelling method, controlling for annual intake (Mäkelä & Simpura, 1985). Dependence was not, however, measured or controlled for in this study either.

The findings with respect to age are in keeping with the interpretation that younger

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drinkers, at least in a clinical population, are more vulnerable to the development of problems at given levels of consumption and dependence through possible differences in age-specific cultural drinking styles. Both Room (1982) and Mäkelä (1978) have proposed that youthful drinking tends to be more intermittent and potentially "explosive" than that in older age groups. Thus, the pattern and style of drinking rather than the total volume of alcohol consumed may be the important determinant of problems. Mäkelä (1978) has also argued that the degree of social oppriobrium directed towards subordinate groups in society, such as the young, women, and those of lower socioeconomic status, will be greater than that directed towards other groups. (Although, Knupfer (1984) has argued the converse; that heavy drinking in those in a greater imputed position of responsibility will be less tolerated). While this possibility cannot be ruled out, the results presented here suggest that dependence is a much more important predictor of problems than age, or indeed other sociodemographic factors. Whatever, the explanation for the findings with respect to age, this certainly warrants futher investigation, particularly in terms of drinking pattern and style rather than simply annual, or typical, volume of consumption.

c) Socioeconomic class.

Socioeconomic class emerged as a significant predictor of problems in only the London study. This factor specifically predicted financial and police problems (although in the expected direction, the latter relationship failed to reach significance). That the less advantaged in society may be more prone to problems has previously been observed (Knupfer, 1967; Mäkelä, 1970; Cahalan & Room, 1974; Kreitman, in press). Such findings could be explained by socioeconomic class-specific differences in drinking style, and the experience of a differential extent of social opprobrium (as discussed above). People of lower socioeconomic status may possess fewer resources to counter the development of problems. It also is likely that they will live in more highly policed neighbourhoods, leading to greater problems with this particular social agency (Mäkelä & Simpura, 1985). No additional relevant data was available to confirm these contentions, however.

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The fact that socioeconomic class differences in the experience of problems were not found in the Lübeck sample may be accounted for by the narrower social class distribution, discussed in Chapter 4. A comparable measure was not available in the U.S. National Survey. The measure which most closely approximated to socioeconomic class in the latter study, annual income, did not reveal any predictive effect for problems. An effect was, however, found in terms of lower educational achievement predicting more problems (in heavier drinkers, but not for the whole drinking population). The lack of a strong predictive relationship between socioeconomic status and problems in this general population sample contrasts with several previous general population studies described above, and might in part be explained by controlling for other confounding factors in the analysis reported here.

d) Gender.

Gender was not a significant predictor of the total number of problems experienced in any study reported here. This is in keeping with studies which have controlled for gender differences in alcohol consumption (Hilton, 1987b; Mäkelä & Simpura, 1985)(although Knupfer (1964) observed a higher level of problems in females after controlling for consumption). Thus, while males consume, on average, more alcohol than females, at a given level of consumption and dependence, there are no significant sex differences in the total number of problems experienced. There were, however, sex differences in psychological and police problems in the London study, with women reporting more and less of each type of problem, respectively. That males report more police problems than females, controlling for alcohol consumption, has previously been noted (Mäkelä & Simpura, 1985) and could be explained by a higher level of belligerence in the male drunken comportment (Cahalan & Room, 1974), or by differential police attitudes and practices towards male and female drinking. Heavy male drinking may more often be a public activity than in the case of females (Ferrence, 1980; Sandmaier, 1980).

It has previously been proposed that women are more prone to social problems due to greater social opprobrium towards heavy drinking in females (Polich & Orvis, 1979; Knupfer, 1982). It is possible that the total number of problems experienced by women

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in the studies reported here, controlling for consumption and dependence, was not found to be higher in women because the questionnaires used were more weighted to male-orientated problems. It has been proposed that women will be more prone to problems in the interpersonal and family realms (Wilsnack, Wilsnack & Klassen, 1984a), although the same authors did not find this to be the case in the 1981 U.S. National Survey (Wilsnack, Wilsnack & Klassen, 1984b). The results of the studies reported here suggest a more likely explanation for the inconsistencies in the findings with respect to gender is that of failure to control for other important factors which independently predict problems.

Although not found in the studies reported here, women have previously been reported to be more prone to certain physical complications of heavy alcohol consumption. They are more often admitted with alcoholic hepatitis (Lischner, Alexander & Galambos, 1971), and the progress of liver disease is more rapid in women (Saunders, Davis & Williams, 1981). Women with cirrhosis drink, on average, less than their male counterparts (Saunders et al., 1981). They are more prone to brain damage than men (Jacobson, 1986). These studies have not, however, taken account of other potentially important factors such as age, degree of dependence and level of consumption (see discussion below under 'predictors of dependence'). It seems most likely that with perhaps the exception of physical pathologies, such as hepatic cirrhosis and brain damage which may have a different aetiology from other problems (and were not specifically examined in the research presented here) the results do not support the view that women are more prone to problems at a given level of consumption and degree of dependence.

e) Culture.

Cultural factors were found to have a small but significant direct predictive effect on problems in both studies reported here, in keeping with the hypothesis that, controlling for other factors, people resident in more restrictive cultures with respect to alcohol experience more problems. This finding is in keeping with earlier observations discussed in Chapter 6 (Jellinek, 1960; Room, 1983; Hilton, 1988; Larsen & Nergård, 1990). The

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absence of any significant interaction effects with culture runs contrary to the hypothesis that dependence mediates the culture-problems relationship, as was found to be the case with the consumption-problems relationship.

This observation has important implications for the proposed mechanism of effect of dependence on problems. It was argued in Chapter 1 that within the mediational model the degree of dependence experienced by the individual would be a key factor in leading the drinker into drinking in a way that goes against social norms resulting in social opprobrium. If problems are entirely dependent on the social reactions towards an extreme form of drinking behaviour, as in a social constructionist view (e.g. Lemert, 1967), then two things would be apparent. First, problems in the domain of interpersonal conflict would be more heavily influenced by cultural factors than, for example, financial or physical problems, in less tolerant societies. Second, those people who showed more extreme forms of the behaviour perceived of as offensive, or deviant, (i.e. the more dependent or heavier drinkers) would be particularly singled-out for reproach. Neither of these predictions is supported by the results reported here. The more likely mechanism of the mediating effect of dependence is that it interacts with consumption in such a way as to increase the likelihood of occurrence of problems of many different types (i.e. more than simply interpersonal problems), and is likely to encourage continued heavy drinking in spite of adverse consequences, so leading to increasingly severe problems.

It may be the case, as suggested in Chapter 6, that the measures used in these studies did not adequately capture the pattern, or style of drinking which might interact with cultural factors in determining problems, thus accounting for the absence of a consumption-culture interaction. This possibility warrants further investigation.

3. The predictors of dependence.

a) Consumption.

A most striking feature in all studies reported here is that consumption is the strongest predictor of dependence: the clinical and general population studies being in accord on

this issue. In the case of the clinical studies, amongst the variables studied, consumption was the only predictor of dependence. It is likely that this reflects the strong reciprocal relationship between these variables, in addition to the proposed unidirectional causal relationship. Within the Alcohol Dependence Syndrome, consumption is proposed to lead to increased tolerance and the development of withdrawal symptoms (Edwards & Gross, 1976). As dependence develops, so drink seeking behaviour will become increasingly salient, reflecting the reinforcing effect of alcohol (Mello, 1989). In advanced degree, dependence will determine the priority to maintain a high blood alcohol level throughout the day, further increasing the quantity and frequency of consumption. Thus, consumption and dependence are strongly bound together in a mutually facilitatory relationship.

b) Sociodemographic factors.

Edwards & Gross (1976) argued that while there may be strong learning and biological mechanisms involved in the development of the Alcohol Dependence Syndrome, social, cultural, personal, and environmental factors were also likely to have an important influence. The studies reported here can only hope to make a small contribution to the understanding of a complex phenomenon. Nevertheless some tentative conclusions can be made. Demographic and socioeconomic characteristics (in the form of age, sex and social class) did not emerge as significant predictors of dependence in the clinical studies. This contrasts with their relative importance as predictors of consumption and problems. The clinical studies, however, were conducted with a selected population who were more severely dependent than is typically the case in general population studies.

c) Gender. In the general population the effect of consumption was different for male and females. While at low consumption levels males and females had an almost identical degree of dependence, as consumption increased, females were more susceptible to the development of dependence than males (although in both sexes heavier drinking was associated with a higher degree of dependence).

Sex difference in susceptibility to the effects of alcohol has been the focus of several

research studies (Dunne, 1988). There are a number of theoretical reasons why women might be more susceptible to both dependence and problems than men. Women have a lower blood volume, and absorb alcohol more rapidy, and metabolize it more slowly than men (Kalant, 1971; Lelbach, 1974), although Sutker, Tobakosa, Gaut et al. (1983) found that when differences in body water are controlled for, metabolic rate does not differ between males and·females. Women are likely therefore to obtain higher blood alcohol concentrations than men for a given level of consumption. Women are more likely to become intoxicated after a given dose of alcohol, particularly during the menstrual phase (Jones & Jones, 1976).

The results of the studies reported here suggest that women are more susceptible to problems through their greater susceptibility to dependence, particularly at a higher level of consumption. Further, the type of problems to which they have been reported to be particularly prone, including hepatic cirrhosis and brain damage, may share with dependence a pattern of sustained heavy drinking which is likely to lead to their development. Indeed, Tuyns & Pequignot (1984) found increases in the relative risk of the development of cirrhosis in women which are analogous to the 'sex x consumption' interaction found for dependence in the general population study reported here. At low levels of alcohol consumption (0-19g/day) Tuyns & Pequignot found that the relative risk of cirrhosis was the same for males and females (1.0). But in those drinking >80g/day, the relative risk for women had increased to 99.7 compared to 38.3 in men.

Other types of problem, such as those involving belligerence or problems with the police, may be more related to intermittent, heavy bouts of drinking (as in Cahalan & Room's 'explosive' drinking), more predominant in young males (e.g. Mäkelä, 1978), rather than sustained heavy drinking.

d) Age. The relationship between dependence and age appears more complex. In the clinical studies, age did influence dependence insofar as younger people drank more than their elders, leading to a higher level of dependence. But there was no direct path between

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age and dependence. In the general population study, there was an interaction effect in such a way that the relationship between consumption and dependence differed between different age groups. At a low level of consumption older drinkers were slightly more dependent than younger drinkers. At the higher level of consumption, however, this situation was reversed with the young being more dependent than the old.

One possible, and what must be a very tentative, explanation for this may be that as dependent drinkers grow older, their dependence progresses, but in comparison to less dependent drinkers they have more incentive to abstain. They may be physically less well equipped to tolerate the adverse effects of sustained heavy drinking. For the ageing dependent drinker, then, their drinking pattern, previously characterized by high and sustained intake which may have given rise to dependence in the first place, may change towards attempts to maintain abstinence interspersed with brief heavy drinking bouts. While they drink heavily on occasions when drinking takes place, overall they will appear to drink less than their less dependent counterparts. Such a possibility adds meaning to Seldon Bacon's (1958) enigmatic suggestion that "alcoholics do not drink".

Some additional support for this hypothesis comes from Taylor, Brown, Duckitt et al.'s (1986) multivariate analysis of patterns of outcome in a ten year follow-up of 'alcoholics'. In this study it was found that individuals with a high degree of dependence had fewer weeks of 'troubled drinking' and were more often completely abstinent during follow-up than the less dependent. Evidence to the contrary also exists, however (Polich et al., 1980; Osejo, 1981).

e) Socioeconomic status. The interaction between consumption and income might be explained, as suggested in Chapter 5, both by a reverse causality, the more dependent being less able to sustain high incomes, or in terms of differences in patterns or scheduling of drinking in the less financially well off.

With all these interpretations of sociodemographic influences on dependence, one must

urge extreme caution. These analyses must be seen as only very preliminary, but pointing to important potential areas for future research. In particular, the measures of consumption used in these studies must be see as providing only limited information concerning patterns of drinking. The pattern and schedules of alcohol intake which most readily predict the development of problems and dependence, and indeed different types of problem, represènt an important future area of inquiry. The findings with respect to age also emphasize the potential importance of long term longitudinal research in developing a better understanding of the nature of dependence.

4. The Predictors of consumption.

That males drink more than females and that consumption declines with advancing age, a finding of numerous general population surveys (Cahalan & Room, 1974; Cahalan, Cisin & Crossley, 1969; Cahalan, 1970; Clark & Midanik, 1982; Mäkelä & Simpura, 1985), is clearly supported by the path analysis of the 1984 U.S. National Survey data. What is perhaps surprising is that the same age and sex differences were found in a comparable analysis of a clinical population. This tends to go against the stereotypic image of the alcoholic clinic attender only coming forward in middle age after reaching "rock bottom" (both psychologically and in terms of the amount drunk) versus the typical youthful, transient problem drinker in the general population. It is true that the mean age of the clinic sample in Chapter 2 was around 7 years higher than the heavy drinking group in the U.S. general population survey, but the analysis suggests that clinic attenders in their 20s and 30s were also drinking more heavily than those in their 40s and 50s. While the studies were conducted in different countries and in a relatively small clinic sample, these findings point to the conclusion that problem drinkers in these two populations may not behave as differently as has been held to be the case (Room, 1977). Of course, there is no data available from these studies on the course of heavy drinking and related problems, which may provide the crucial source of differences between clinical and general populations. The need for longitudinal research in this area is discussed below.

Explanations for the reducing level of alcohol consumption with increasing age are several and include increasing responsibilities, changes in peer pressures, the onset of physical illness (Hilton, 1987a), and declining tolerance (Edwards & Gross, 1976). Whatever the explanation for this change, it appears that similar factors may be in operation in both the clinical and the general population.

5. Similarities between clinical and general populations.

Throughout the foregoing discussion comparisons have been made between the findings of the clinical and general population studies. A striking number of similarities have been observed. In particular, there is support for the mediational model in all the populations studied. Where differences exist, they are more of a quantitative rather than a qualitative nature. In the general population study, for example, dependence becomes a more important predictor of problems as one moves from a lower to a higher consumption level. There is no evidence, however, that a characteristic clustering of problems, dependence, and heavy consumption emerges suddenly amongst the minority of very heavy drinkers, as would be predicted by a cluster model. Instead these phenomena are related in the same way at each consumption level, suggesting that they exist along continua of severity. This finding also goes against a view that, while dependence may exist in degrees of severity, it only has an impact on drinking behaviour and related problems in the most severely affected individuals: the influence of dependence on the consumption-problems relationship has, instead, been found throughout the drinking population.

It is also the case that those experiencing alcohol-related problems in the general population were to a large extent the same people who had symptoms of dependence: the path coefficient between dependence and problems being highly significant. The only factor, other than dependence, which independently and consistently predicted problems in the general population was the region in which the person lived. Here the coefficient was small compared to that of dependence, indicating their relative importance as predictors of problems. Therefore, in answer to Mäkelä's (1978) rhetorical question "to

what extent could a person get rid of his alcohol problems not by cutting his drinking, but by simply moving to another neighbourhood or another country", it would seem likely that relocation to a 'wet' region would have little effect if the drinker is heavily alcohol dependent.

Evidence for continuity between the clinical and the general population has already been discussed in relation to the predictors of consumption and dependence in earlier sections in this chapter as well as in previous chapters. The overall conclusion with respect to the question of continuity is that the evidence points to there being no disjunction between drinkers in general and clinical population in terms of the relationships between the main variables of interest, and that there exists more similarities than differences in the sociodemographic predictors of problems, dependence, and consumption between these two population groups.

6. The discrepancy between survey and official data in the strength of the consumption-problems relationship.

In Chapter 1 it was noted that several commentators have found only a limited degree of correspondence between level of consumption and alcohol-related problems in both clinical and general population surveys (Mäkelä, 1978; Sadava, 1985). Such findings stand in contrast to the remarkably high correlations between per capita consumption and mortality rates from, in particular, hepatic cirrhosis (Pequignot, Tuyns & Berta, 1978). That such a firm connection has repeatedly been found in widely differing cultural settings and in analyses of time series data in individual countries suggests that this link between consumption and, at least certain types of problem, represents an undeniable and robust phenomenon. How can these conflicting findings be resolved, and does the research presented here shed any light on this question?

It is possible that the low correlation between consumption and problems in surveys is due to an inadequate degree of validity in the measures used or biases in self report (as reviewed in Chapter 2), compared to, perhaps, more reliable official data provided by the

pathologist and the Inland Revenue. While this thesis provides no further information on the relative validity of these data sources, it is likely that they are to some extent both subject to error.

An important implication of the results presented here, however, is that while the level of problems found in surveys of clinical and general populations is linked to consumption (heavier drinkers do have more problems than lighter drinkers) there are a number of important factors which influence, or interfere with, this relationship. In a sense, dependence, and personal and sociocultural factors which have been found directly to influence problems, or to interact with dependence, as described above, represent measured sources of error in the consumption-problems relationship. When considered together, they account for a larger amount of variance in problems than does consumption alone. It is possible that the occurrence of hepatic cirrhosis, and hence mortality therefrom, is less subject to the direct influence of sociocultural factors than are the type of problems tapped by surveys. Such factors may exert a more indirect influence on the prevalence of cirrhosis through their influence on level of consumption and hence, dependence. It should be noted, however, that patients in a liver unit have been found to have a lower mean SADQ score than those attending an alcoholism treatment unit (Wodak, Saunders, Ewusi-Mensah et al., 1983), and that the probability that even very heavy long-term drinking will result in cirrhosis is much less than unity (Lelbach, 1974). The risk of developing cirrhosis rises fairly steeply after a threshold level of consumption is reached and sustained, whereas other diseases such as pancreatitis have a more linear relationship with consumption level (Babor, Kranzler & Lauerman, 1987). Such observations are in keeping with the finding of this thesis that different types of problem may be subject to the influence of different putative causal factors while sharing with cirrhosis, the common factor of exposure to alcohol. Nevertheless, heavy alcohol consumption is not a necessary condition for the development of many kinds of problem, including cirrhosis, which are often related to drinking.

FACTORS WHICH MIGHT LIMIT INTERPRETATION OF THE RESULTS.

Before turning to a discussion of the implications of the results it is important to examine factors which might limit interpretation. Such factors have already been discussed in Chapters 2 and 3 in relation to reliability and validity. It was concluded in the latter chapter that the APQ is a reliable instrument. Evidence has also been presented to support the validity of this questionnaire, and the mediational model, the strongest of which is the replication of the results in different populations. Further, it has been argued that differential biases in reporting problems, dependence, and consumption were unlikely to have occurred.

In this section two further important issues which have not so far been discussed will be explored. The first concerns the relationship between correlation and causality, and the second, the extrapolation from cross-sectional surveys to dynamic processes.

Correlation and causality.

The question arises as to the extent to which one might impute the existence of causal relationships between variables on the basis of correlations. While a detailed review of this issue is not possible in the context of this thesis, the main factors will be discussed.

The conclusions of this thesis must rely, as is the case with much of medical and social science research, to a large extent on the observation of correlations between objects in a static system which is viewed to be in a state of equilibrium. That is, the observed relationships between variables are believed to have come about through a causal process, believed to have existed, and to have shaped the effects, up to the point of the survey. According to Hume (cited in Beauchamp & Rosenberg, 1981) the three essential elements of causation are contiguity, priority, and constant conjunction. Therefore, not only must two phenomena occur together, they must have a predictable temporal relationship to each other. In a cross-sectional survey, this element of precedence is difficult to validate,

although logic will dictate likely and unlikely temporal relationships. In the case of alcohol consumption and alcohol-related problems, the former must by definition have preceded the latter.

The confidence with which one can impute a causal relationship will be based on the level of statistical probability, inductive support and non-spuriousness of the correlation. Evidence of the statistical significance of the findings in this thesis has been presented. Inductive support (Beauchamp & Rosenberg, 1981) refers to the replication of findings under different conditions in different populations. An isolated finding engenders less confidence than that which is repeatedly demonstrated. Clearly, inductive support has been provided here for the mediational model.

Suppes (1970) probabilistic theory of causation proposes that if a correlation between two variables is eliminated by controlling for a third variable, the correlation is said to be spurious. This type of analysis assumes particular importance in the study of relationships between multiple variables which are known to be interrelated, as is the case in this thesis. Most conclusions in the alcohol research field which have been based on epidemiological data have relied on correlations between two variables (such as consumption and problems) without controlling for other potentially important variables. The results presented here demonstrate some of the limitations of this form of analysis, and the advantages of path analysis. More recently, however, there has been a trend towards the use of multivariate analysis in this field (e.g. Mäkelä & Simpura, 1985; Hilton, 1987b).

With correlational analysis comes a further difficulty, namely multicolinearity. The lack of a relationship between A and B when C is controlled for, may either be an indication that no causal relationship exists between A and B, or that controlling for C has increased the standard errors of the path coefficients, and hence reduced the power of the statistical test (Gordon, 1968). Multicolinearity, however, does not represent a significant problem where there is a large sample size (as is the case in the U.S. National Survey analysis),

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and any problem which it may cause is offset by the increase in external validity of multiple regression procedures (Campbell & Stanley, 1963).

In situations where it is not possible to introduce experimental manipulations, such as is the case in general population research, correlational analysis provides a valuable method of testing theory. Correlations do not necessarily imply a causal relationship, but instead provide support for theoretical hypotheses of causation (Kenny, 1979).

Extrapolation to dynamic processes.

A further extention of the above discussion concerns the question of what observations made in a cross-sectional survey tell us of dynamic processes. This has considerable importance in the context of this thesis in relation to the extent to which the findings have implications for public health policies directed towards alcohol-related problems. In Doll and Hill's (1950) classic study in which an unexpected correlation (Doll, 1991) was found between smoking and carcinoma of the lung, the authors believed this correlation to represent cause and effect. Accurate as this conclusion was, the authors themselves remained skeptical until the findings were replicated and prospective studies demonstrated a temporal association between the phenomena. Even then, cause and effect had not been proven, but there were sufficient grounds in view of the grave nature of the disorder to institute public health policies aimed at reducing smoking.

Similarly, while it is not possible on the basis of the results presented here to say with certainty that dependence mediates the consumption-problems relationship, or indeed that heavy drinking actually causes problems, the data is in keeping with the mediational model. Complimentary evidence from prospective studies would add futher weight to the validity of the model. In the remaining sections, with the caution which the foregoing discussion advises, the potential implications of the mediational model for theory, practice, and further research will be explored.

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IMPLICATIONS FOR THEORIES OF ALCOHOL-RELATED PROBLEMS.

Shaw (1979) has criticized the concept of Alcohol Dependence Syndrome as being

> "an attempt to create a particular kind of substitute concept -- one which coped with all the critiques of the disease theory of alcoholism, yet which retained all of its major assumption and implications" (p.347).

Does the evidence presented here support this view, or is there cause to regard dependence as a substantially different kind of concept from earlier cluster theories? Dependence does represent a cluster phenomenon, with the different elements tending to co-occur, but it exists in degrees of severity in both clinical and general populations, rather than being a case of all-or-nothing. Further, instead of representing an epiphenomenon, disaggregated from other kinds of problem related to drinking the evidence points to dependence having a special kind of relationship with both consumption and problems: a mediational relationship. More importantly, instead of being confined, both in terms of its occurrence and its mediational effects, to a small handful of severely affected individuals in the general population, dependence appears to be considerably more pervasive than earlier cluster theories have implied. This may have important public health implications which are discussed below.

The concept of dependence cannot, as has often been the case, be disarticulated from its relationship with problems and consumption, or the sociocultural setting in which it occurs. To do so represents a sterile exercise in phenomenology, a fruitless debate over semantics, and disregards its functional importance. It is in function rather than structure where dependence crucially differs from earlier cluster models. Thus, the concept of dependence and the mediational model in which it is a key actor, is not so much "a re-introduction of the disease concept by stealth" (Edwards, 1986), as an explicit and distinct formulation, which significantly parts company with earlier cluster theories in many important functional respects and offers very different predictions as to the nature and causation of alcohol-related problems.

Towards a causal model of alcohol-related problems.

The purpose of describing a causal model of alcohol-related problems based on the evidence presented in this thesis is principally to assist in the development of further hypotheses, rather than to propose definitive answers to age-old questions. The author is indebted to the models described by Edwards, Arif & Hodgson (1980, published in shortened form in the British Journal of Addiction, 1982) and Babor et al. (1987). The model which follows draws from both these sources and adds new information from the research findings presented in this thesis. In doing so, certain parts of the model must be regarded as tentative, as indicated in the foregoing discussion, whilst there is evidence more strongly supportive of other parts. As further evidence emerges, so the model can be further modified and refined.

The term 'causal' is used here in the sense of describing the predictive relationships between variables, and the conceptual relationships within the mediational model, rather than imputing causal laws. It is not suggested, for example, that if dependence is increased, ceteris paribus, problems will also increase. Nevertheless, without such a causal model further hypothesis generation and testing is restricted.

Figure 7.1 describes the main elements of the model. Variables on the left of the figure are described as 'vulnerability factors' which in most cases (although not invariably) precede alcohol consumption. These factors are grouped according to the level of the model at which they are believed to exert an effect. Age, socioeconomic and cultural factors can have a direct influence on problems independent of other factors. Together with gender, they may also exert an indirect effect on problems through their influence on level of consumption and dependence (although there was no evidence for the effect of culture on consumption or dependence found in the studies reported here). Finally, age, gender and socioeconomic factors can interact with dependence to mediate the consumption-problems relationship, but do not exert a direct effect on dependence. Genetic factors have not been included in the diagram as there is, at present, no clear
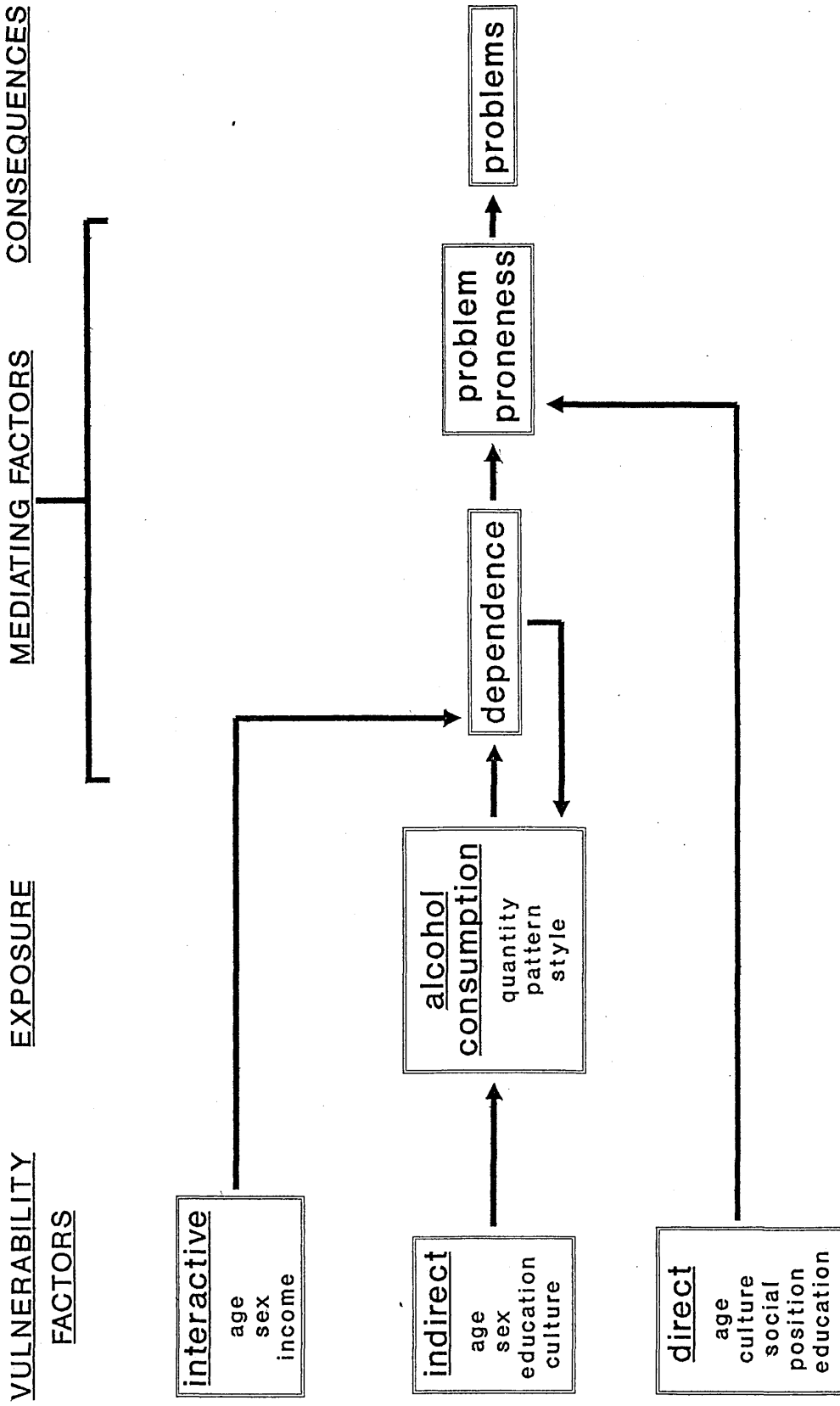
Figure 7.1. Causal model of alcohol-related problems.

evidence to suggest exactly where they may exert an influence. Although, as suggested earlier, it is possible that genetic factors may predispose the development of dependence.

The pattern and style of drinking are likely to be as important in the development of dependence, and hence problems, as the quantity of exposure to alcohol, although such a distinction represents an important area for further research. Consumption does not exert a direct effect on problems, but is mediated instead by dependence. It is likely that this mediational effect of dependence operates at least in part through a positive feedback loop (or positive reinforcement) to consumption. Such an effect is reinforcing, not just in terms of the quantity of alcohol consumed, but also in the pattern, or repertoire of drinking which it engenders, most likely through its mood enhancing effect and the drive to relieve aversive withdrawal symptoms.

The principal difference between the model so far described and those of Edwards et al. (1982) and Babor et al. (1987) is in the absence of direct causal path between consumption and problems. Babor et al. make a distinction in terms of causal paths between acute and long-term consequences of alcohol consumption, which seems intuitively reasonable. Indeed, evidence has been presented in this thesis which supports the view that different problems are influenced by different causal factors. The sort of drinking history which might precede the breakdown of a marriage or the descent from an exemplary work record to begging in the street is likely to be of a very different order to that associated with, for example, accidents and violence in young people. The difficulty in isolating the causal paths to these different kinds of problem arises out of aggregation of problem measures in survey research. Much information is also lost in looking at individual types problem out of context: of viewing them as being completely disaggregated. Just as the dependent drinker with a broken marriage and foundering career can be involved in accidents and engage in violent acts related to drinking, so can a single heavy drinking episode result in similar serious consequences for the less alcohol dependent young professional who is engaged to be married. Thus, one can find numerous theoretical examples where the acute toxic effects of alcohol may be little

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different for the more and less dependent individual.

Nevertheless, the results of this thesis suggest that the important mediating effect of dependence on consumption determines the number of problems which the individual experiences, and that dependence is an important predictor of the majority of diverse problem domains covered by the APQ. So while consumption may theoretically have direct paths to certain kinds of problems it is the 'problem proneness' of the drinker which dependence predicts, as suggested by Jessor & Jessor (1977), rather than the occurrence of specific problems. Just as not all dependent drinkers experience hepatic cirrhosis, and not all cases of hepatic cirrhosis occur in dependent drinkers, the same is likely to be true of marital or financial problems. The likelihood of occurrence of individual problems may involve a complex interplay between different environmental and personal factors, including dependence. Certain problems, such as hepatic cirrhosis, may be less subject to the direct influence of certain sociocultural and personal factors, and more directly related to level of consumption. But the role of dependence is to increase the likelihood of having problems in general. It may also be the case that through a similar mechanism, dependence will determine the chronicity of problems, but this hypothesis requires further investigation (as will be discussed below).

The causal nexus of problem proneness.

The principal contribution of this model of alcohol-related problems, and the evidence on which it is based, is that one is forced to move away from more simplistic unicausal ideas of 'heavy drinking causes problems' towards the notion of Edwards et al. (1977) which was cited in Chapter 1, namely "that alcohol is part of the causal nexus of....disability"(p. 17). One can go further by suggesting that while the precise causes of individual problems are likely to be highly complex, and may vary from one individual to another, dependence and consumption, as well as social, cultural and personal factors are part of the causal nexus of problem proneness.

What are the likely implications of such a model? Does such a model have implications

for public health policy, and what new research questions does it suggest?

IMPLICATIONS FOR CLASSIFICATION AND DIAGNOSIS.

The principal purposes of classification are to find a common language with which to describe phenomena, and hence to standardize diagnosic practices. Definition of 'the problem' however, needs to take account not only of the adequacy with which it describes phenomena in the real world, but in the ease with which it can be practically implemented. This latter issue is of particular relevance to developing countries, where resources and training are likely to limit the usefulness of more complex classificatory systems (Edwards et al, 1982). Without adequate definitions it is impossible accurately to enumerate the prevalence of disorders in populations.

DSM-III-R (American Psychiatric Association, 1987) and ICD 10 (World Health Organization, 1988) introduce separate diagnoses of problems related to drinking ('alcohol abuse', and 'harmful use', respectively), and alcohol dependence. These categories are uniaxial in that one is diagnosed as either having one disorder or the other (or of course neither). This recognition of the importance of problems in the absence of a significant degree of dependence represents a significant advance on earlier classificatory systems (Grant, 1989). (DSM-III-R does provide a multiaxial classification, recognizing for example, physical disorders and psychosocial stressors as independent dimensions, while the alcohol use disorders described here are both located on Axis I). The research presented here supports the view that problems and dependence (as well as level of consumption) should be treated as separate dimensions while clearly being related phenomena. Grant (1989) draws attention to the need for research which "provide[s] better conceptualizations of the relationship between abuse (harmful use) and dependence categories."

An implication of this research is that rather than problems (abuse, harmful use), in a

sense, being a less serious form of disorder related to drinking than dependence (Rounsaville, Spitzer & Williams, 1986), they should more accurately be located on a separate dimension, classified in terms of degree of severity or pervasiveness, with associated aetiological factors such as dependence located on one or more separate dimensions. Such a classification would be more in keeping with the clinical process of formulation. It is the problems associated with drinking which are after all, rather than dependence in itself, the source of societal concern about alcohol. Such a scheme would also encourage clinicians to consider more carefully the aetiological significance of different factors associated with alcohol-related problems, which in turn might assist in the appropriate matching of treatment to individual needs.

A further important implication of the research presented here is that it is impossible to place with confidence a cut-off point along a continuum of problems or dependence (or indeed alcohol consumption itself) which defines 'a case' in need of treatment. A person scoring one point on a scale less than the needed criterion is not necessarily any less needful of help than one scoring the requisite number. Clearly for official purposes some form of categorization is needed, but this is likely to be of less value particularly in the clinical setting where degree of disorder will be important in determining management. DSM-III-R offers the alternatives of 'mild', 'moderate', and 'severe' dependence, which must represent an improvement on more basic all-or-none classifications. The use of standard questionnaire measures in diagnostic practice, such as those described in this thesis, would be a further refinement of this principle, although this would need to take account of the practical difficulties in using the instruments where resources are limited. Nevertheless, self-completion questionnaires which take 15 or so minutes to complete should not provide major difficulties in most clinical settings, and could significantly improve the precision of diagnostic practice.

IMPLICATIONS FOR PUBLIC HEALTH.

It was suggested in Chapter 1 that a lack of agreement as to the nature of alcohol-related problems, principally between clinicians and epidemiologists, had led to a dichotomy in policies directed at alleviation. The strong observed associations between the price of alcohol, per capita consumption, and measures of harm, together with the 'preventive paradox' (Kreitman, 1986) has engendered confidence in control policies aimed at the whole population, rather than the minority of very heavy drinkers. The policy of the specialist clinic on the other hand has been to direct the maximal level of attention only towards those at the most extreme end of the drinking spectrum. The history of public health policies in Western countries towards alcohol problems reveals lurches from one extreme approach to the other (Drummond, in press, b). There remains resistance on both sides to consider the alternative point of view. What does the evidence presented in this thesis suggest as the most appropriate way forward?

Dependence has emerged as a key mediating factor in the relationship between consumption and problems both in the general population as well perhaps more predictably in clinical populations. Prediction of the implications of this finding for general populations, however, requires extrapolation from our knowledge of the effects of dependence in the clinical setting. In Chapter 1 evidence was presented from previous research to suggest that an important effect of dependence was to limit the extent to which an individual could moderate their drinking, and that this effect is likely to exist in degrees. While noting existing evidence to the contrary (Kendell et al, 1983) it is likely that at least at some level of dependence, increasing the cost of alcohol through taxation will be less effective in reducing consumption in more dependent compared to less dependent drinkers. Price control of alcohol is likely to have a sliding scale of effectiveness in reducing problems, dependent on the degree of dependence of the target population.

While such a view appears plausible on the basis of the available evidence, it requires to

be demonstrated in a sufficiently large scale, prospective general population study, which incorporates an adequate number of drinkers with different levels of dependence. The needs of such a research design will be further discussed in the next section. Thus while the mediating effect of dependence has been observed in a significant proportion of the general population, the level at which dependence represents a limiting variable in the individual's responsiveness to population level public health strategies, such as taxation, remains to be established.

Even without such further evidence, however, the propensity of certain individuals to continue drinking large quantities of alcohol in spite of appalling adverse consequences is only too apparent; both from the evidence presented here and in everyday clinical experience. Society has an obligation not only to continue to attempt to understand why this is the case, but also to provide humane helping facilities which are responsive to the needs of those who are unable or unwilling to modify their behaviour towards a less harmful relationship with alcohol. There is likely to be no simple unitary explanation. The history of public health efforts to deal with alcohol-related problems cautions against overconfidence in any single master strategy. We need to move away from thinking in terms of alternative strategies towards establishing the most appropriate way in which different approaches can be combined in achieving a common goal.

IMPLICATIONS FOR RESEARCH.

Throughout this thesis potential areas for further research have been identified. The most important implication of the model presented here is that no single scientific discipline or line of enquiry is likely to offer a complete understanding of the nature of alcohol-related problems. Sociology, psychology, economics and medicine, amongst many other disciplines, have been shown here to offer important pieces of the jigsaw. An unwillingness to cross the traditional boundaries of different disciplines and to focus on only one aspect of the problem is likely to stifle progress, and to lead to oversimplistic formulations.

The studies presented here have demonstrated the advantages of conducting parallel research in both clinical and general populations. Such a strategy is likely in the future to help in finding common ground between epidemiologists and clinicians. One is forced to move away from the study of either alcohol-related problems or dependence (or indeed 'alcoholism') towards a more sophisticated model which takes account of the functional relationships between alcohol consumption itself, and the environment in which drinking takes place.

Further, this underlines the need more precisely to define what it is one is researching. It is inappropriate to regard everyone who presents for treatment as being members of a homogeneous group defined by the label 'alcoholic'. Just as people may present for treatment with widely differing beliefs and expectations, so they have been found in the studies reported here to differ in terms of the amount of alcohol they consume, their degree of dependence, and in the type and extent of problems they endure, to name only three distinguishing characteristics. Several recent studies have identified interactive, or matching, effects between patient characteristics and the type of treatment provided (Institiute of Medicine, 1990). Improvements in methods of measuring clinical phenomena, such as those described in this thesis, and a more sophisticated understanding of the functional relationships between variables, will allow further development of treatment matching research. Multivariate statistical methods are also likely to prove useful in such research endeavours.

As discussed in Chapter 2, genetic research in the addictions field could also benefit from more precise specification of clinical phenomena. Until relatively recently geneticists have been investigating the 'genetics of alcoholism', working with the unitary and all-or-nothing conceptualization of the cluster model. The key mediational role of dependence identified in this thesis, suggests that we should be more interested in identifying the genetic basis of dependence as distinct from other consequences of heavy drinking. Such an analysis should take account of the possibility that the development of different degrees of dependence might vary in the extent of genetic predisposition. The

development of more severe dependence, particularly at an early age, might for example involve a higher genetic loading in its aetiology (a possibility raised by Cloninger et al. (1981), albeit in terms of typologies of alcoholism rather than degrees of dependence).

Moving to more specific research questions prompted by this thesis, there are four which deserve particular mention. First, there is the question of the extent to which existing measures of alcohol consumption adequately reflect the pattern and style of drinking in addition to quantity and frequency. It is possible that a more fine grained analysis of drinking behaviour will provide further information on the causes of alcohol-related problems. It has been suggested that while two people may drink the same quantity of alcohol over a given period of time they may differ in terms of their style and scheduling of drinking. It is possible that these latter factors may be more important in determining problems than simply the quantity of alcohol consumed.

This leads directly to the second area of research. Dependence may exert its key mediating effect on problems through alterations in the drinking repertoire. Little research has been conducted on narrowing of drinking repertoire, partly through difficulties in operationalization of this concept, as indeed is the case with the related concept of 'salience of drink seeking behaviour' (Stockwell et al., 1983). Further research should aim to establish more precisely the alteration in drinking repertoire which is occasioned by increasingly severe dependence. This also leads one to ask what the central alteration might be around which the various elements of dependence are clustered. Narrowing of drinking repertoire is only a description of a changing pattern of behaviour towards alcohol which may, as Edwards & Gross (1976) suggest, be subject to a variety of personal and environmental influences. Thus, such symptoms may at best provide only limited infomation about the nature of the underlying disorder, or habit, itself. As described in Chapter 1, we have at present only a limited understanding of the reinforcing nature of alcohol and other drugs, and the contingencies and schedules of consumption which are most likely to lead to the development of dependence. Human studies of operant and classical conditioning in drug and alcohol dependence represent an important

potential area for future research. We need to develop a better understanding of what it is that, for example, leads monkeys to self-administer increasingly large quantities of alcohol to the point of death (Winger & Woods, 1973). Such experiments provide tangible evidence of the reinforcing effect of alcohol, and a rationale for continued heavy drinking in humans in spite of increasingly severe social, psychological and physical consequences.

Third, in Chapter 6 it was suggested that our current understanding of the cultural factors which give rise to differences in the experience of alcohol-related problems at a given level of consumption and dependence is limited. In particular, the precise cultural influences which might impinge on drinking patterns and styles, as well as the way in which they are perceived by the drinker are at present unknown. As suggested by Jessor & Jessor (1977), the way in which the drinker perceives the attitudes of others towards their drinking may be important in the development of problems. There is a need, therefore to design a measure of the individual's perception of the control environment. Further, improvements in the measurement of drinking pattern and style, as described above, could assist in understanding cultural differences in problem experience.

Finally, longitudinal research is needed to establish the predictive significance of dependence in the development and persistence of both heavy drinking and problems. As suggested earlier in this chapter, the research presented here points to the potential importance of dependence as a limiting factor in the effectiveness of alcohol control policies, and as a determinant of the chronicity of alcohol-related problems. Evidence from prospective studies is, however, necessary to establish the practical significance of this finding. Such research requires the prospective study of cohorts of subjects experiencing alcohol-related problems, but distinguished by differing degrees of dependence. The chronicity of problems and responses to changes in the price of alcohol would then be examined in relation to subjects' degree of dependence.

CONCLUDING REMARKS.

> "I think the difficulties facing us today have to do with, not the liver, or the kidney, or the genes, but have to do with 'what is a problem?' 'How do you know?' 'How do you describe it?' 'How do you measure it?' 'How do you define it?' It is not sufficient to pick up a word, such as alcoholism or drunkenness, and blandly go on and say, 'well, that's the problem,' when it turns out that many of the people who are directly involved differ violently on what they consider those words to refer to. I think social scientists have to be able to give working definitions....of problems and categories of problems, and relate these problematic phenomena to drinking phenomena....... Then we will be able to make use of more specialized sciences and use the knowledge they give us to greater effect." (Bacon, 1990. pp75-76).

This quotation of Selden Bacon succinctly captures what this thesis has aimed to do. Its contribution has been more to define the framework for further research than to offer final answers to age old debates. The journey which it has taken has passed through many different lands: from the clinical land of the 'alcoholic' to the community of the 'problem drinker'; from the nineteenth century land of the 'habit of drunkenness' to the late twentieth century land of the Alcohol Dependence Syndrome. The natives of these different lands have been found to have much more in common than has previously been held to be the case by earlier explorers. For those who follow along this route it is hoped that the signposts provided by this work will help in making further progress. Before embarking on the next journey, however, the next explorers, be they clinicians or epidemiologists, should consider the possibility that rather than travelling through two worlds of alcohol problems, as suggested by Room (1977), there is instead, one world containing two dimensions: problems and dependence.

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APPENDIX I.

THE ALCOHOL PROBLEMS QUESTIONNAIRE.

ALCOHOL PROBLEMS QUESTIONNAIRE

NAME _____ DATE _____

We would like to find out if you have experienced any of the difficulties which other people with alcohol problems sometimes complain of.

Below you will find a list of questions which we would like you to answer.

Read each question carefully and answer either YES or NO by putting a TICK in the

appropriate box (e.g. YES) .... ☑ ☐

<table>
<tr><td></td><td>YES</td><td>NO</td></tr>
</table>

┌───┐
│ **PLEASE ANSWER ALL THE QUESTIONS WHICH APPLY TO YOU.** │
│ All the questions apply to your experiences in the **LAST SIX MONTHS.** │
└───┘

IN THE LAST SIX MONTHS: YES NO

1. Have you tended to drink on your own more than you used to? .... ☐ ☐

2. Have you worried about meeting your friends again the day after a drinking session? ..... ☐ ☐

3. Have you spent more time with drinking friends than other kinds of friend? .... ☐ ☐

4. Have your friends criticised you for drinking too much? .... ☐ ☐

5. Have you had any debts? .... ☐ ☐

6. Have you pawned any of your belongings to buy alcohol? .... ☐ ☐

7. Do you find yourself making excuses about money? .... ☐ ☐

8. Have you been caught out lying about money? .... ☐ ☐

9. Have you been in trouble with the police due to your drinking? .... ☐ ☐

10. Have you lost your driving licence for drinking and driving? .... ☐ ☐

11. Have you been in prison? .... ☐ ☐

12. Have you been physically sick after drinking? .... ☐ ☐

13. Have you had diarrhoea after a drinking session? .... ☐ ☐

14. Have you had pains in your stomach after a drinking session? .... ☐ ☐

15. Have you had 'pins and needles' in your fingers or toes? .... ☐ ☐

16. Have you had any accidents, needing hospital treatment after drinking? .... ☐ ☐

17. Have you lost any weight? .... ☐ ☐

18. Have you been neglecting yourself physically? .... ☐ ☐

19. Have you failed to wash for several days at a time? .... ☐ ☐

20. Have you felt depressed for more than a week? .... ☐ ☐

21. Have you felt so depressed that you have felt like doing away with yourself? .... ☐ ☐

22. Have you given up any hobbies you once enjoyed because of drinking? .... ☐ ☐

23. Do you find it hard to get the same enjoyment from your usual interests? .... ☐ ☐

PLEASE MAKE SURE YOU HAVE ANSWERED ALL THE QUESTIONS WHICH APPLY TO YOU
PLEASE TURN PAGE

IF YOU ARE NOT MARRIED, MISS OUT QUESTIONS 24-32, GO TO QUESTION 33
(these questions apply to you if you have lived with your spouse or partner during the last six months)

IN THE LAST SIX MONTHS: YES   NO

24. Has your spouse complained about your drinking?..................................... ☐   ☐

25. Has your spouse tried to stop you from having a drink? .... ☐   ☐

26. Has he/she refused to talk to you because you have been drinking?..................... ☐   ☐

27. Has he/she threatened to leave you because of your drinking?......................... ☐   ☐

28. Has he/she had to put you to bed after you have been drinking?........................ ☐   ☐

29. Have you shouted at him/her when you have been drinking? .... ☐   ☐

30. Have you injured him/her after you have been drinking? .... ☐   ☐

31. Have you been legally separated from your spouse? .... ☐   ☐

32. Has he/she refused to have sex with you because of drinking? .... ☐   ☐

IF YOU HAVE NO CHILDREN MISS OUT QUESTIONS 33-36. GO TO QUESTION 37.
(these questions apply if you have lived with your children during the last six months)

IN THE LAST SIX MONTHS: YES   NO

33. Have your children criticised your drinking? .... ☐   ☐

34. Have you had rows with your children about drinking? .... ☐   ☐

35. Do your children tend to avoid you when you have been drinking? .... ☐   ☐

36. Have your children tried to stop you from having a drink? .... ☐   ☐

IF YOU HAVE BEEN UNEMPLOYED FOR THE LAST SIX MONTHS, MISS OUT QUESTIONS

37-44.

IN THE LAST SIX MONTHS: YES   NO

37. Have you found your work less interesting than you used to?.......................... ☐   ☐

38. Have you been unable to arrive on time for work due to your drinking? .... ☐   ☐

39. Have you missed a whole day at work after a drinking session?........................ ☐   ☐

40. Have you been less able to do your job because of your drinking?...................... ☐   ☐

41. Has anyone at work complained about you being late or absent?........................ ☐   ☐

42. Have you had any formal warnings from your employers? .... ☐   ☐

43. Have you been suspended or dismissed from work? .... ☐   ☐

44. Have you had any accidents at work after drinking?.................................. ☐   ☐

PLEASE MAKE SURE YOU HAVE ANSWERED ALL THE QUESTIONS WHICH APPLY TO YOU

END OF QUESTIONNAIRE
THANK YOU FOR YOUR HELP

APPENDIX II.

THE SEVERITY OF ALCOHOL DEPENDENCE QUESTIONNAIRE.

SEVERITY OF ALCOHOL DEPENDENCE QUESTIONNAIRE

NAME _____ DATE _____

Please recall a typical period of heavy drinking in the last 6 months.
When was this? Month:_____ Year:_____

Please put a tick (√) to show how often each of the following statements applied to you during this time.

DURING THAT PERIOD OF HEAVY DRINKING:	NEVER OR ALMOST NEVER	SOMETIMES	OFTEN	NEARLY ALWAYS
1. I woke up feeling sweaty	☐	☐	☐	☐
2. My hands shook first thing in the morning	☐	☐	☐	☐
3. My whole body shook violently first thing in the morning if I didn't have a drink	☐	☐	☐	☐
4. I woke up absolutely drenched in sweat	☐	☐	☐	☐
5. I dreaded waking up in the morning	☐	☐	☐	☐
6. I was frightened of meeting people first thing in the morning	☐	☐	☐	☐
7. I felt at the edge of despair when I awoke	☐	☐	☐	☐
8. I felt very frightened when I awoke	☐	☐	☐	☐
9. I liked to have a morning drink	☐	☐	☐	☐
10. I always gulped my first few morning drinks down as quickly as possible	☐	☐	☐	☐
11. I drank in the morning to get rid of the shakes	☐	☐	☐	☐
12. I had a very strong craving for drink when I awoke	☐	☐	☐	☐
13. I drank more than ¼ bottle spirits a day (or 4 pints beer/2 cans strong lager /1 bottle table wine)	☐	☐	☐	☐
14. I drank more than ½ bottle spirits a day (or 8 pints beer/4 cans strong lager /2 bottles wine)	☐	☐	☐	☐
15. I drank more than 1 bottle spirits a day (or 15 pints beer/8 cans strong lager /4 bottles wine)	☐	☐	☐	☐
16. I drank more than 2 bottles spirits a day (or 30 pints beer/15 cans strong lager /8 bottles wine)	☐	☐	☐	☐

PLEASE MAKE SURE YOU HAVE ANSWERED ALL THE QUESTIONS WHICH APPLY TO YOU

(CONTINUED)

Imagine the following situation:

(1) You have been COMPLETELY off drink for a FEW WEEKS

(2) You then drink VERY HEAVILY for TWO DAYS

How would you feel the morning after those two days of heavy drinking?

THE MORNING AFTER:

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A LOT
17. I would start to sweat	☐	☐	☐	☐
18. My hands would shake	☐	☐	☐	☐
19. My body would shake	☐	☐	☐	☐
20. I would be craving for a drink	☐	☐	☐	☐

SCORE ☐☐

ALCOHOL PROBLEMS STUDY DEMOGRAPHIC DATA SHEET.

TO BE COMPLETED BY THE INTERVIEWER

---

1. Initials of christian name and surname: ....
                              '   christian   surname
                                                 name

2. Date of birth: ....

3. Today's date: ....

   Please tick appropriate box in the following questions.

4. Sex: ....   ☐   ☐
                                     male   female

5. Marital status: ....   married/cohabiting
                                     never married
                                     widowed
                                     divorced
                                     separated

6. Children: How many children does the patient have? ....

7. Employment:
7a) Is he/she employed? ....   ☐   ☐
                                      yes   no

*If 'yes' go to question 7c.
*If 'no' go to question 7b.

7b) Is the patient a married woman,   ☐   ☐
    not in employment? ....
                                      yes   no
*If 'yes', go to question 7c and answer in terms of husband's
occupation.
*If 'no', go to question 7f.
                                              ☐   ☐
7c) If employed, is the patient self employed?
                                              yes   no

*If 'yes', go to question 7d.
*If 'no', go to question 7e.

7d) If self employed, how many employees
    does the patient have? ....

7e) What is the patient's full
    occupational title?   ....

*Go to next page.

7f) If unemployed, what was the patient's
    last occupation (give full
    occupational title)?   ....

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APPENDIX IV.

NOTES ON THE USE OF PATH ANALYSIS.

The purpose of these notes is not to provide a detailed description of path analysis, but instead to familiarize the reader new to this statistical method, with its basic principles. Path analysis represents a systematic approach to causal analysis which has particular advantages in non-experimental research designs, as is the case in this thesis. It was first developed by the biologist Sewall Wright (1921) and introduced into the social sciences by Duncan (1966).

Causal models.

Path analysis can be understood as a sophisticated form of multiple regression analysis. If a theory specifies that A causes B, there exist a number of methods to examine this causal relationship. In an experimental design one can manipulate A and observe changes which occur in B and compare such change with a control group where A is not manipulated. If all other factors known to influence B are held constant during the experiment, then differences in B between the experimental and control group are attributed to the experimental manipulation of A.

In non-experimental designs where it is not possible to manipulate contingencies, as is often the case in social and medical science, one must rely on correlational analysis. Theory is tested by examining the interrelationships between variables, in the case of the studies reported in this thesis, assumed to have reached a state of equilibrium. If both A and B are known to vary in a population simple Pearson product-moment correlations will reveal the extent to which A and B co-occur. If an additional variable, C is believed also to be correlated with both B and A, there is the possibility that the correlation between A and B can be accounted for by C. In other words, C may be an intervening variable in the A-B relationship, and the A-B correlation is therefore spurious.

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Path coefficients.

The situation is further complicated when additional variables are introduced. The extent to which each of these additional variables is correlated with A, B, and C, is likely to influence the relationships between the main variables of interest. For example, if males tend to have higher values of A compared to females, and the relationship of interest is sex differences in C, if A and C are highly correlated, males will appear to have higher values of C. But this sex difference in C can be accounted for by sex differences in A. A regression of C on A and sex will establish the independent causal significance of these two predictor variables on C, or in other words, the path coefficients of C on A, and C on sex. Figure A3.1 displays the causal model, or path diagram, just described. a represents the path coefficient of C on A, and b, the path coefficient of C on sex.

The looped arrow between A and sex indicates that the path coefficient between C and sex controls for A (and that between C and A controls for sex).

Hierarchical path models.

If in the previous example a mutual relationship existed between A and C, in such a way that A caused C, and C in turn caused A (such as in the economic model of supply and demand), such a causal model would be described as non-hierarchical. If, however, as was proposed above, A is hypothesized to cause C, but not vice versa, such a model would be described as hierarchical, C being higher in the hierarchy than A. When B, which is an intervening variable in the A-C relationship is introduced, B occupies an intermediate position in the path hierarchy. Constitutional variables such as sex can logically be assumed to have temporal precedence over acquired attributes, such as alcohol consumption or problems, and are hence, located lower in the path hierarchy. The position of variables in the hierarchy is therefore specified by the theoretical model which is being tested in the path analysis.

Thus, in the examples presented in this thesis, it is hypothesized within the mediational model that consumption precedes the occurrence of alcohol-related problems. It is also
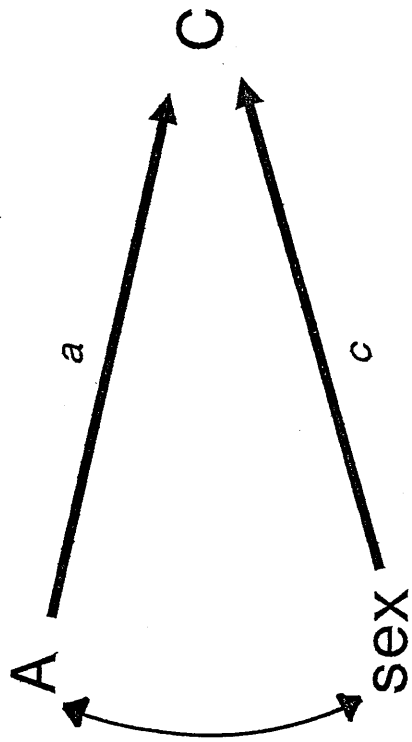
Figure A3.1. Path diagram of A, C, and sex.

hypothesized that dependence is an intervening variable in the consumption-problems relationship. Attributes such as sex and age temporally preceded consumption of alcohol. A hierarchical path model is therefore described as displayed in Figure A3.2.

In the ensuing path analysis, each variable is, in turn, regressed on all the variables further down the hierarchy. Therefore problems are regressed on all variables, dependence, on consumption, age and sex, and consumption on age and sex. The path coefficients between each of the variables represent the extent to which the 'lower' variable predicts the 'higher' variable controlling for all variables below the level of the 'higher' variable. The path coefficients a-i shown in Figure A3.2 can therefore be computed. It should be noted that the curved path between age and sex indicates that regressions on age control for sex, and vice versa. With the number of paths that exist in a more complex model, it will readily be seen why only statistically significant paths have been included in the analyses in the path diagrams presented in this thesis!

While several methods can be used to compute path coefficients, the method chosen for this thesis is that of SPSS REGRESSION procedures. The LISREL statistical package could equally have been used.

Conclusions.

Path analysis is a sophisticated method of testing complex theoretical models, and represents an advance over both simple correlational and regression analysis. The value of path analysis becomes all the more apparent in non-experimental research designs and in situations where complex models are proposed, as in the research presented in this thesis. For further information on this technique the reader is directed to Kenny's (1979) valuable review.
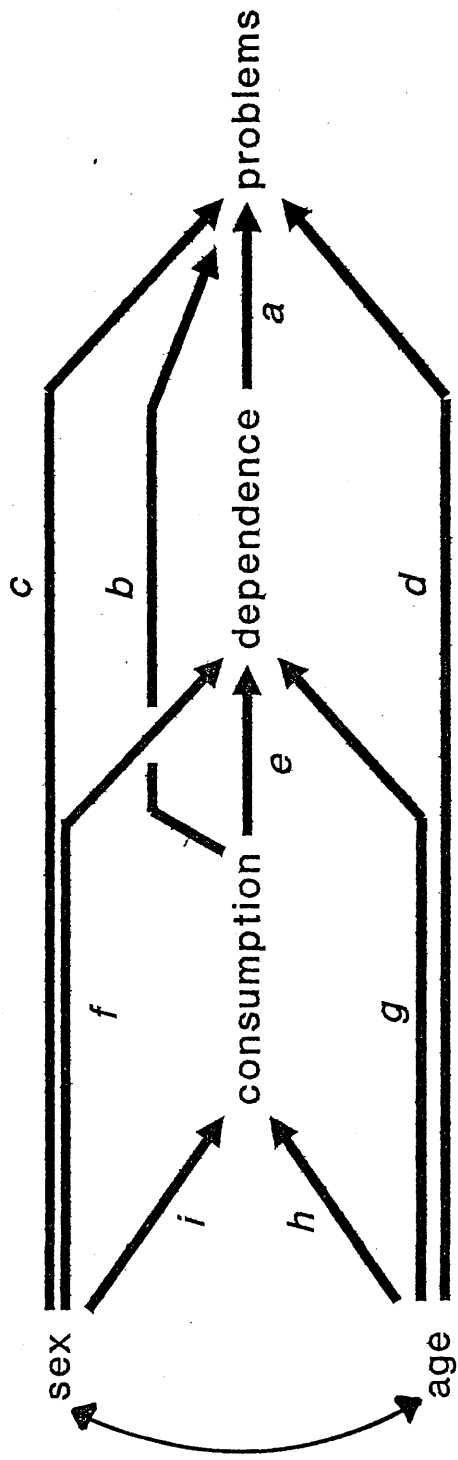
Figure A3.2. Hierarchical path diagram.
(path coefficients shown in italics.)

APPENDIX V.

FRAGEBOGEN ZU ALKOHOLPROBLEMEN

1. Neigten Sie dazu, mehr als sonst gewöhnlich allein zu trinken?

2. Hatten Sie Angst, Ihre Freunde an einem Tag wiederzutreffen, nachdem Sie kräftig getrunken hätten?

3. Haben Sie mehr Zeit mit Freunden verbracht, die trinken, als mit anderen Freunden?

4. Haben Ihre Freunde Sie wegen zu vielen Trinkens kritisiert

5. Hatten Sie Schulden?

6. Haben Sie von Ihrem Besitz etwas gegen Geld verliehen, um Alkohol zu kaufen?

7. Ertappten Sie sich dabei, sich im Zusammenhang mit Geld zu entschuldigen?

8. Sind Sie dabei erwischt worden, das Sie im Zusammenhang mit Geld nicht die Wahrheit gesagt haben?

9. Haben Sie einmal Schwierigkeiten mit der Polizei wegen Ihres Trinkens gehabt?

10. Haben Sie Ihren Führerschein wegen Alkohol am Steuer verloren?

11. Waren Sie im Gefängnis?

12. Waren Sie körperlich krank nach Trinken?

13. Hatten Sie Durchfall, nachdem Sie kräftig getrunken hatten?

14. Hatten Sie Magenschmerzen, nachdem Sie kräftig getrunken hatten?

15. Hatten Sie das Gefühl, das in Ihren Fingern oder Zehen etwas pikst oder kribbelt?

16. Hatten Sie Unfälle nach Trinken, die eine Krankenhausbehandlung notwendig machten?

17. Haben Sie Gewicht verloren?

18. Haben Sie sich körperlich vernachlassigt?

19. Haben Sie sich einige Tage nacheinander nicht gewaschen?

20. Haben Sie sich länger als eine Woche niedergeschlagen gefult?

21. Haben Sie sich so niedergeschlagen gefhült, das Sie mit dem Gedanken gespielt haben, sich umzubringen?

22. Haben Sie wegen des Trinkens Hobbies aufgegeben, die Sie einmal

gern ausgeübt haben?

23.   Genieben Sie Ihre Interessen genauso wie frÜher?

WENN SIE NICHT IN EINER PARTNERSHAFT LEBEL, LASSEN SIE DIE FRAGEN
24 - 32 AUS. DANN GEHEN SIE ZU FRAGE 33.

24.   Hab Ihr (Ehe-)Partner sich über Ihr Trinken beklagt?

25.   Hab Ihr (Ehe-)Partner versucht, Sie vom Trinken abzuhalten?

26.   Hat sie/er es abgelehnt mit Ihnen zu sprechen, weil Sie getrunken haben?

27.   Hat sie/er gedroht, Sie zu verlassen wegen Ihres Trinkens?

28.   Muste sie/er Sie ins Bett bringen, nachdem Sie getrunken haben?

29.   Sind Sie mit ihr/ihm laut geworden, wenn Sie getrunken haben?

30.   Haben Sie ihr/ihm eine Verletzung zugefügt, nachdem Sie getrunken
      haben?

31.   Haben Sie in Trennung von Ihrem (Ehe-)Partner gelebt?

32.   Hat sie/er Sex mit Ihnen abgelehnt wegen Ihres Trinkens?

WENN SIE KEINE KINDER HABEN, LASSEN SIE DIE FRAGEN
33 - 36 AUS. DANN GEHEN SIE ZU FRAGE 37.

33.   Haben Ihre Kinder Sie wegen Ihres Trinkens kritisiert?

34.   Hatten Sie heftige Auseinandersetzungen mit Ihren Kindern wegen
      Ihres Trinkens?

35.   Neigen Ihre Kinder dazu, Sie zu meiden, wenn Sie getrunken haben?

36.   Haben Ihre Kinder versucht, Sie davon abzuhalten, Alkohol zu
      trinken?

WENN SIE IN DEN LETZTEN SECHS MONATEN NICHT BERUFSTATIG

WENN SIE IN DEN LETZTEN SECHS MONATEN NICHT BERUFSTATIG
WAREN, LASSEN SIE DIE FRAGEN 37 BIS 43 AUS.

37. Fanden Sie Ihre Arbeit weniger interessant als fruher?

38. Waren Sie nicht in der Lage, rechtzeitig zur Arbeit zu kommen wegen
Ihres Trinkens?

39. Haben Sie einen ganzen Arbeitstag versäumt, nachdem Sie kräftig
getrunken hatten?

40. Waren Sie wegen Ihres Trinkens weniger als als sonst in der Lage,
Ihre Arbeit zu machen?

41. Hat sich jemand bei der Arbeit beschwert, weil Sie zu spät oder gar
nicht zur Arbeit kamen?

42. Haben Sie Verwarnungen oder Verweise von Ihrem Arbeitgeber bekommen?

43. Sind Sie von der Arbeit vorübergebend nach Hause geschickt oder ganz
entlassen worden?

SEVERITY OF ALCOHOL DEPENDENCE QUESTIONNAIRE (GERMAN)

(Response options given in parentheses).

Erinnern Sie sich bitte an einen Monat aus der letzten Zeit, als sie schwer getrunken haben: eine Zeit, die fur Sie eine ziemlich typische schwere Trinkeperiode war. Bitte tragen Sie Monat und Jahr dieser schweren Trinkeperiode ein.

Monat: Jahr: 19...

Bitte kreuzen Sie immer die Antwort an, die bei Ihnen am meisten zutrifft.

BITTE BEANTWORTEN SIE JEDE FRAGE!

Die ersten Sate beziehen sich auf die körperlichen Symmptome, die Sie morgen als erstes erfahren haben, wahrende dieser typischen Periode schweren Trinkens.

(FAST NIE, MANCHMAL, OFT, FAST IMMER)

1.   In einer schweren Trinkperiode wache ich verschwitzt auf.

2.   In einer schweren Trinkperiode zittern morgens als erstes meine Hande.

3.   In einer schweren Trinkperiode zittere ich morgens stark am ganzen Körper, wenn ich nichts Alkoholisches zu trinken habe.

4.   In einer schweren Trinkperiode wache ich absolut schweibgebadet auf.

5.   Wenn ich stark trinke, habe ich grobe Angst, morgens aufzuwachen.

6.   In einer schweren Trinkperiode habe ich Angst, morgens als erstes Menschen zu begegnen.

7.   In einer schweren Trinkperiode fühle ich mich am Rande der Verzweiflung, wenn ich aufwache.

8.   In einer schweren Trinkperiode habe ich starke Angst, wenn ich

aufwache.

9. In einer schweren Trinkperiode trinke ich morgens gern etwas
Alkoholisches.

10. In einer schweren Trinkperiode kippe ich morgens erst einmal so
schnell wie möglich etwas Alkoholisches hinunter.

11. In einer schweren Trinkperiode trinke ich morgens Alkohol, um das Zittern
loszuwerden.

12. In einer schweren Trinkperiode habe ich einen Jieper (starken Drang) nach etwas
Alkoholischem, wenn ich aufwache.

13. In einer schweren Trinkperiode trinke ich mehr als eine viertel Flasche Schnapps
pro Tag (4 Doppelte oder 1 Flasche Wein oder mehr als 4 halbe Liter Bier).

14. In einer schweren Trinkperiode trinke ich mehr als eine halbe Flasche Schnapps pro
Tag (oder 2 Flaschen Wein oder mehr als 8 halbe Liter Bier).

15. In einer schweren Trinkperiode trinke ich mehr als eine Flasche Schnapps pro Tag
(oder 4 Flaschen Wein oder mehr als 15 halbe Liter Bier).

16. In einer schweren Trinkperiode trinke ich mehr als 2 Flaschen Schnaps pro Tag
(oder 8 Flaschen Wein oder mehr als 30 halbe Liter Bier).

Stellen Sie sich bitte die folgende Situation vor:

1. Sie waren einige Wochen völlig ohne Alkohol.

2. Danach trinken Sie 2 Tage sehr stark.

Wie wurden Sie sich am Morgen nach den 2 Tagen schweren Trinkens fühlen?

(ÜBERHAUPT NICHT, SEHR WENIG, MASSIG, ZIEMLICH STARK)

17. Ich würde zu schwitzen anfangen.

18. Meine Hande würden zittern.

19. Mein Korper würde zittern.

20. Ich würde ein starkes Verlangen nach Alkohol haben.

ALCOHOL CONSUMPTION ITEMS AND METHODS USED TO COMPUTE DRINKING SCORES. (Adapted from Hilton, 1987a).

Alcohol consumption items.

(Parentheses indicate values used in scoring).

A. How often do you usually have wine (or punch containing wine)?

B. How often do you usually have beer?

C. How often do you usually have drinks containing whiskey or any other liquor, including scotch bourbon, gin, vodka, rum, etc.?

Response choices for Questions A to C:

1. Three or more times a day (90)
2. Two times a day (60)
3. Once a day (30)
4. Nearly every day (22)
5. Three or four times a week (15)
6. Once or twice a week (7)
7. Two or three times a month (2.5)
8. About once a month (1)
9. Less than once a month but at least once a year (0.5)
10. Less than once a year (0)
11. I have never had wine (beer or liquor) (0)

E. When you drink wine, how often do you have as many as five or six glasses?

H. When you drink beer, how often do you have as many as five or six glasses or cans?

K. As for H., I., and J. except instead of 'beer', 'whiskey or liquor', and instead of

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'glasses or cans', 'drinks'.

Response choices Questions E to K:

1. Nearly every time (0.80)

2. More than half the time (0.60)

3. Less than half the time (0.40)

4. Once in a while (0.20)

5. Never (0)

N. During the past year, how often did you have 12 or more drinks of any kind of alcoholic beverage in a single day, that is, any combination of cans of beer, glasses of wine, drinks containing liquor of any kind?

O. During the past year, how often did you have at least eight, but less than 12 drinks of any kind of alcoholic beverage in a single day, that is, any combination of cans of beer, glasses of wine, drinks containing liquor of any kind?

Response choices Questions N and O:

1. Every day or nearly every day (30)

2. Three to four times a week (15)

3. Once or twice a week (7)

4. Once to three times a month (2)

5. Seven to eleven times in the past year (0.75)

6. Three to six times in the past year (0.38)

7. Twice in the past year (0.17)

8. Once in the past year (0.08)

9. Never in the past year (0)

Method of computing consumption scores.

1. 5+ drinks score.

Responses to Questions A, B, and C were assigned the values given in parentheses, representing the monthly frequency of drinking each kind of drink. Responses to Questions E to K were assigned the values which followed, given in parentheses. The monthly frequency of consuming each beverage was then multiplied by the proportion of occasions on which 5 or more drinks were consumed. The total 5+ drinks score was computed as the sum of the resulting socres for each beverage.

2. 12+ drinks score.

Responses to Question N were assigned the values given in parentheses, giving the monthly frequency of drinking 12 or more drinks of any kind.

3. 8+ drinks score.

Responses to Question O were assigned the values given in parentheses and added to the 12+ drinks score, giving the monthly frequency of consuming 8 or more drinks of any kind.

APPENDIX VIII.

Alcohol-related problems items (Hilton, 1987a)

(Weighting given in parentheses.)

1. I have gotten into a fight while drinking (2).

2. I have gotten into a heated argument while drinking (1).

3. Did your spouse's feelings about your drinking break up your relationship with him/her or threaten to break it up? (3)

4. A spouse or someone I lived with threatened to leave me because of my drinking (3).

5. A spouse or someone I lived with got angry about my drinking or the way I behaved while drinking (2).

6. Was there ever a time when you felt that your drinking had a harmful effect on your home life or marriage? (2)

7. Did your spouse or someone you lived with ever feel that you should drink less or act differently when you drank? (1)

8. Did your mother's feelings about your drinking threaten to break up your relationship with her? (3)

9. Did your father's feelings about your drinking threaten to break up your relationship with him? (3)

10. Did any other relative's feelings about your drinking threaten to break up your relationship with him or her? (3)

11. Did your mother ever feel that you should drink less or act differently when you drank? (1)

12. Did your father ever feel that you should drink less or act differently when you drank? (1)

13. Did any other relative ever feel that you should drink less or act differently when you drank? (1)

14. Did a girlfriend's or boyfriend's feelings about your drinking threaten to break up your relationship with him/her? (3)

15. Did any other friend's feelings about your drinking threaten to break up your relationship with him/her? (3)

16. Was there ever a time when you felt that your drinking had a harmful effect on your friendships and social life? (2)

17. Did your boyfriend or girlfriend ever feel that you should drink less or act differently when you drank? (1)

18. I lost a job, or nearly lost one, because of drinking (3)

19. Drinking may have hurt my chances for promotion or raises or better jobs (2).

20. Was there ever a time when you felt that your drinking had a harmful effect on your work and employment opportunities? (2)

21. People at work indicated that I should cut down on drinking (1).

22. I had trouble with the law about drinking when driving was not involved (2).

23. I have been arrested for driving after drinking (2).

24. A policeman questioned or warned me because of my drinking (1).

25. I had an illness connected with drinking which kept me from working on my regular activities for a week or more (3).

26. I felt that my drinking was becoming a serious threat to my physical health (1).

27. Was there ever a time when you felt your drinking had a harmful effect on your health (1).

28. My drinking contributed to my getting hurt in an accident in a car or elsewhere (2).

29. My drinking contributed to getting involved in an accident in which someone else was hurt or property such as an auto was damaged (2).

30. Was there ever a time when you felt that your drinking had a harmful effect on your financial position? (2)

31. My drinking has interfered with my spare time activities or hobbies (1).

APPENDIX IX.

Dependence items (Hilton, 1987a)

1. Once I started drinking it was difficult for me to stop before I became completely intoxicated.

2. I sometimes kept on drinking after I had promised myself not to.

3. I deliberately tried to cut down or quit drinking, but I was unable to do so.

4. Sometimes I have needed a drink so badly that I couldn't think of anything else.

5. I have skipped a number of regular meals while drinking.

6. I have often taken a drink the first thing when I got up in the morning.

7. I have taken a strong drink in the morning to get over the effects of last night's drinking.

8. I have awakened the next day not being able to remember some of the things I had done while drinking.

9. My hands shook a lot the morning after drinking.

10. I need more alcohol than I used to, to get the same effect as before.

11. Sometimes I have awakened during the night or early morning sweating all over because of drinking.

12. I stayed intoxicated for several days at a time.