



UNIVERSITY OF LEEDS

**The nature and measurement of
change in substance dependence**

by

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The author confirms that the work is her own and that appropriate credit
has been given where reference is made to the work of others

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To my father *in memoriam*

ABSTRACT

The aim of this thesis is to investigate the nature of change in substance dependence with particular reference to the course of its decline. It is argued that theories of dependence have concentrated on the development of the condition while less attention has been paid to the course of its decline. Furthermore the way in which dependence is measured does not allow for the measurement of the phenomenon during periods of abstinence, thus implying that it does not continue when use of the substance has ceased. A psychological theory of substance dependence has generated a measurement instrument (LDQ) which accounts for dependence across the spectrum of severity and patterns of use including abstinence and this instrument is used to chart the course of change and decline.

The psychometric properties of the LDQ are further examined to establish the sensitivity of the measure for the purpose of the present study. Correlates of change in dependence are examined and two measurement instruments, one for impaired control and one for coping, are adapted for the purpose of charting the course of change in dependence in both heroin users and alcohol drinkers. These measures, together with measures of psychological and social functioning, are used to investigate the predictors of change in dependence.

It is found to be the case that dependence declines and such decline is accompanied by improvement on other measures of functioning; the predictors of decline in dependence remain elusive given the measures used in the study. Evidence is produced for the role of cognitive and behavioural coping strategies in change, though the nature and direction of the relationships remain unclear. The inter-relationships between use and dependence are identified and again the direction and influence of such relationships require further research.

The value of the measurement of dependence is proposed for the purpose of improved understanding which underlies the development of effective treatment modalities and meaningful outcome evaluation.

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Chapter 1

Dependence

1.0 Introduction

The nature of dependence and the ways in which it develops have been the subject of some debate, while the nature of change in dependence once established has earned less consideration. Theories of dependence, broadly speaking, have fallen into two categories: those associated with the idea that dependence, once established, does not diminish but becomes covert in the absence of the use of the substance and those based upon the idea that dependence can and does diminish. The two sides of this dichotomy have been described under the headings of disease theories on the one hand and learning theories on the other hand (see Heather and Robertson 1997). The position which has come to be associated with the ‘disease concept’ is generally characterised by irreversibility, while the latter is embedded in social learning theory broadly asserting that behaviours which have been learned are capable of being extinguished, thus implying reversibility. However, this crude categorisation does not in fact distinguish the psychology of learning from the rest; those who understand dependence as a learned behaviour may occupy either category depending upon whether there is a belief that dependence, like other learned behaviours, is capable of extinction or that, due to the strength of the reinforcement potential of addictive substances, the behaviour once learned cannot be extinguished. It is the aim of this thesis to examine the question of whether dependence diminishes and, if so, to elucidate the nature of the change that occurs.

In this first chapter, an outline of the background to the hypotheses for the present study and an examination of the history of theorising about dependence in order to explain this background are presented. In the second chapter, studies which have examined the development of dependence, its maintenance and decline are described. In Chapter 3, the literature on self-report as the dominant method of collecting data on substance use and related physical, social and psychological phenomena in the field is explored; self-report methods of measuring dependence based in different perspectives and theories of dependence are then presented and discussed. Not all descriptions of dependence and methods of measuring dependence appear to be theory based but an attempt is made to give them a theoretical context. In the fourth chapter, the studies I conducted for the present thesis and the samples used in these studies are outlined. Further work on the Leeds

Dependence Questionnaire which I conducted in preparation for the main study is then described. The fifth chapter addresses the subject of impaired control, its measurement and its relationship with dependence. The validation study of the Impaired Control Scale as it was adapted to measure impaired control in heroin users in the present study is reported. The sixth chapter addresses the subject of coping behaviours and their measurement, their relationship with substance use and dependence, and the reasons for the inclusion of a measure of coping in the present study. Again, the validation study of the Coping Behaviours Inventory adapted for use with heroin users for the purpose of the present main study is reported.

Chapter 7 sets out the methodology for the main study designed to test the study hypotheses. Chapter 8 reports on the sample characteristics of the entire cohort recruited to the study, compares the characteristics of those seen at follow-up with those not seen and describes the changes that occurred during the follow-up period in those participants who were followed up at each of the data collection points. Chapter 9 contains the main analysis of the findings regarding the nature and course of decline in dependence. Discussion of the methodology and findings is the focus of Chapter 10.

1.1 The background to the focus of the thesis

Much theorising about dependence has focused upon the nature of the dependent state and its development. Few theorists have dealt with its decline and few empirical studies exist that have attempted to chart this decline. The purpose in the present study of pursuing the question of the nature of decline in dependence is one of clinical utility. While it is broadly accepted in the alcohol field that degree of dependence is an important criterion for deciding drinking goal, and this is based primarily in conclusions derived from the treatment outcome literature, there is less understanding of the processes which underlie this empirical finding. Less explicitly applied in the treatment of other substance dependencies, an understanding of the nature of decline in dependence has potential utility in substitute prescribing decisions and relapse prevention. To the extent that treatment is deemed to enhance the natural processes of recovery, it is important to understand what these processes are. It is for this reason that an understanding of the course of decline in dependence in a clinic population is the subject of this study.

It is proposed that elucidation of the nature of change in dependence will further understanding of the requirements for treatments of substance dependence, will be a criterion for making treatment goal choices, will enable predictions of likely success of different goals and will

also serve as an outcome measure for evaluating the efficacy of treatment. It is perhaps more usual for studies to use consumption rates as measures of outcome; however, since it is notoriously difficult, not least because of the amount of time required, accurately to measure consumption for the purposes of routine evaluation, it has been proposed that the measurement of dependence, having been shown to be brief, would constitute a useful proxy measure. Level of substance dependence has been shown to correlate highly with consumption of alcohol and heroin in patients at the start of treatment, in a general practice sample and in a college sample (Raistrick *et al.* 1994). Consumption also correlates highly with harm to the individual and in the population (Holder and Edwards 1995). Measures of consumption shed no light on underlying psychological processes particularly once consumption has ceased, hence the proposed greater utility of charting the nature of decline in dependence over time and during abstinence.

One of the cornerstones of the philosophical and theoretical debates on the nature of dependence is the role of volition. In the simply stated dichotomy described at the beginning of the chapter, dependence is a state that is broadly seen as being beyond the volition of the individual in disease theories while volition plays a different role in social learning theories. Crudely put, is dependence something one *has* or something one *does*? And what, therefore, is the relationship between dependence and other behaviours? For example, does one cope less well with temptations to drink or take drugs because one is dependent, or is one dependent because one copes less well with temptations to drink or take drugs; or is one simply not so tempted if one is not dependent or less dependent? Definitive answers to these questions are beyond the scope of this study, but the decision regarding the behaviours which would be examined in the process of elucidating the nature of change in dependence was guided by them.

The origins of the broadly dichotomous positions regarding the nature of dependence described above are clinical observation and personal account, discussed later in this chapter. Diverse clinical populations and accounts of the nature of dependence have resulted in polarised positions that may well be reconciled in the identification of a continuum of severity of dependence which accounts for different experiences and different outcomes in different individuals. While this approach is not new - it informed the development of the syndrome approach to the understanding of dependence also described later in this chapter - elucidation of the course of change, if change occurs, with reference to degrees of severity, has not previously been the subject of studies in dependence and informed the formulation of the hypotheses in the present study.

1.2 Study hypotheses

A number of small scale studies were conducted in preparation for the main investigation and these are reported in Chapters 4, 5 and 6. Hypotheses for the main study, presented as null hypotheses, are:-

- ☐ Dependence, once established, does not diminish over time.
- ☐ Change in dependence cannot be predicted by pre-treatment demographic characteristics or psychological and social functioning.
- ☐ Individuals with high dependence who change (in level of dependence or of use of the substance) use the same coping strategies (cognitive/behavioural) and in the same degree as individuals with low dependence who change.
- ☐ The measurement of impaired control, one component of dependence, has equal predictive validity to the measurement of dependence.

1.3 Development of the concept of dependence

It is not the purpose of this section to replicate the histories of dependence theorising that have been written (for example see Jellinek 1960; Edwards 1992; Heather and Robertson 1983, 1997) but rather to examine the distinct conceptualisations in current thinking about the nature of dependence by way of explaining the background to the central concerns of the study. A number of classification systems for categorising the numerous and diverse explanatory frameworks are possible and it is difficult to find one that is comprehensive due to the cross-disciplinary nature of the field. For present purposes, the chosen classification system allows examination of major contributing theory and research wherein dependence is seen as:-

- a) a disease state
- b) a bio-psycho-social phenomenon and
- c) a psychological phenomenon, whether substance specific or a general behavioural phenomenon.

Disease theories of addiction and dependence are normally but not exclusively based in a biological understanding, whether the relevant biology is that of the person using the substance (as in those theories based in the idea that there is a physical predisposition to the development of dependence) or the pharmacological properties of the substance (as in those theories which suggest that some substances have certain properties which invariably and inevitably lead to their addictive

use). Learning theories are often based in an understanding of the interaction of these with the psychological attributes of the individuals.

During the eighteenth, nineteenth and twentieth centuries reference is made to both the ‘disease’ and the ‘habit’ (Rush 1785; Trotter 1804; De Quincey 1822; Macnish 1859; Jellinek 1960) when describing the nature of the condition, thus establishing both a biological and a behavioural understanding of dependence. The observation that alcohol or opiate use could be driven both by a physical state (withdrawal symptoms) and a state of mind (usually referred to as craving but observed to occur also in the absence of overt withdrawal symptoms and at a time when these would be unlikely to be present) provided the background for the study of psychological as well as physical processes.

1.4 Dependence as a disease state

The disease concept of alcoholism was most famously described by Jellinek (1960) in his book of that name. In his typology he identified different ‘species’ of alcoholism, some of which were disease states, namely ‘gamma’ and ‘delta’, and some of which were not, namely ‘alpha’, ‘beta’ and one of which he was unsure, namely ‘epsilon’. The disease states were characterised by loss of control and inability to abstain, while the non-disease species of alcoholism were characterised by drinking with problems but without loss of control or inability to abstain. Definitive of the disease state in Jellinek’s view were:-

“the adaptation of cell metabolism, and acquired increased tissue tolerance and withdrawal symptoms, which bring about ‘craving’ and loss of control or inability to abstain” (Jellinek 1960 p. 40)

He described these as physiopathological changes which are analogous to those changes which occur when drug addiction is present. He listed other species of alcoholism which may constitute problems but did not constitute a disease and that, in the state of knowledge of the time, it was not possible to decide whether a third species, namely ‘epsilon’ alcoholism, or episodic or binge drinking could also be classified as a disease. ‘Gamma’ alcoholism was characterised by loss of control, or ‘the inability to stop after one or two glasses’, a pattern found more often in North America and the Anglo-Saxon countries; his description is elaborated in Chapter 5 of the present study. ‘Delta’ alcoholism was characterised by an inability to abstain resulting in continuous

drinking over days but not to the levels of intoxication witnessed in loss of control. This condition was thought to be characteristic of drinking in France and Mediterranean countries. He further hypothesised that loss of control drinking may be a consequence of acquired increased tissue tolerance resulting in the need for greater amounts of alcohol in order to achieve the desired effect, while inability to abstain was maintained by the avoidance or relief of withdrawal symptoms. Later, Jellinek proposed that the term craving was not a sufficiently specific one as it was used to denote both the circumstances of continuing drinking to avoid or relieve withdrawal symptoms as well as the psychological need to drink after a period of abstinence. He proposed, in line with the World Health Organisation's Committee on Alcohol and Alcoholism (World Health Organisation 1955), that these different phenomena be referred to as physical and psychological dependence respectively (Jellinek 1960 pp.143-144).

Here then was described a condition where the presence of a physical, or 'physiopathological' state results in specific sorts of behaviour. Jellinek referred to the manifestations of these behaviours as being variable but characteristic; his claim was that the origin of the state was the result of a long history of excessive alcohol consumption, a behaviour that could have many causes. He referred to the progression from the non-disease forms of alcoholism to the disease states but also asserted that such progression was by no means inevitable. Heavy drinking was manifest without the resultant development of alcoholism. He equated the disease forms of alcoholism with drug addiction, specifically heroin, morphine and barbiturate addiction, highlighting differences in the course of development of addiction compared to alcoholism which he attributed to the pharmacological properties and hence the different addiction forming potential of the drugs. The development of addiction to heroin, for example, was inevitable due to the pharmacological properties of the drug, whereas alcohol had much lower addiction forming potential and the role of predisposing behavioural, cultural, psychological and a host of other factors in the individual played an important role.

Jellinek stated the World Health Organisation's position of the time (World Health Organisation 1955) wherein the term alcoholism embraced both physical and psychological dependence; physical dependence referred to the neuroadapted state and the consequent withdrawal symptoms that result from cessation or reduction in consumption and psychological dependence referred to the 'pathological desire' for alcohol (Jellinek 1960 p. 144), both resulting in drink seeking behaviour. This pathological desire, it was claimed, could also pre-date the onset of the disease and be the cause of its development. On the question of the permanence or otherwise of the disease, he proposed that the underlying acquired tissue tolerance may be extinguished by a

prolonged period of abstinence (p. 148) but the implications of this are not at all clear.

Many other disease models and psychological formulations of alcoholism were in existence at the time of Jellinek's writing during the nineteen-forties, fifties and sixties and Jellinek provided an extensive summary and critique of these. His own formulations were based in a reading of this international literature, of current research and in "a sample of slightly over 2,000 members of Alcoholics Anonymous" (Jellinek 1960 p. 38) and probably represent the most comprehensive description of the variety of manifestations of the condition, with hypotheses about the underlying mechanisms and etiology, but little on the natural history and outcome.

Characteristic of disease formulations was the centrality of the biological state, referred to as the neuroadapted state (Edwards *et al.* 1982) wherein repeated administrations of a drug result in the development of tolerance and withdrawal symptoms may follow abrupt cessation or marked reduction in the use of the drug once tolerance is established. In this framework of understanding, dependence on a specific drug constitutes a different, if similar phenomenon to dependence on another specific drug as tolerance develops in different ways and withdrawal symptoms vary with the pharmacological properties of the drug. By definition, if biological factors are understood to be components of dependence itself, then dependence must be substance specific and have different manifestations for different drugs. Dependence is seen as a categorical condition whether its source is understood to be in the characteristics of certain people or the properties of certain drugs. Although biological approaches have been criticised for their inability to explain or even describe the phenomena of repeated, compulsive use of drugs where no neuroadapted state has occurred, the term dependence is sometimes used as a simple shorthand for tolerance and withdrawal.

1.4.1 The debate about disease theories of dependence

The twentieth century has seen considerable discussion of the nature of disease, most particularly in the mental health field (Sedgwick 1982; Kendell 1975). Questions of definition revolve around whether the idea of disease denotes an objective state, whether it is a culturally specified construct, a statistical or a diagnostic phenomenon, what is the role of the individual: victim or active agent, does it imply inevitable deterioration, a predictable natural history, the requirement of treatment? It is not the purpose here to enter this debate, nor to suggest or justify one definition or another. In the addiction literature the term has been loosely applied to characterise theories of addiction and dependence which share particular features. Writing in 1994, Miller and Kurtz (1994) summarised four core assumptions of what they described as "a classic dispositional

disease model” of alcoholism. These were i) the unitary nature of the disease, qualitatively distinct and discontinuous from normality, ii) having biological origins rooted in physiology and heredity, iii) the definitive symptom is inability to control consumption after the first drink and iv) the condition is irreversible. However, as we have seen in the previous discussion, only one of these assumptions was contained in the writing of Jellinek. Many disease formulations of dependence have tended to see the condition as a categorical state that follows a predictable pattern in the light of which the individual is a passive agent able only to decide that abstinence will arrest further deterioration rather than cure the condition because once acquired, the disease is irreversible.

With reference to etiology, views differ. Embraced under the general heading of disease theories are those theories claiming the etiology of the condition to be attributable to the pharmacological properties of the substance, the condition therefore resulting from the ingestion of the substance and those attributing the cause to the predisposing genetic make-up of the individual suggesting that certain metabolic abnormalities or allergic reactions pre-determine a pathological response to ingestion of the substance. Genetic studies contain compelling evidence for a genetic contribution which may account for a small amount of the variance in drinking patterns (Marshall and Murray 1991) and to a far lesser extent in some sorts of drug use; a short review of the evidence for genetic factors in opiate, caffeine and nicotine use is presented by Cook and Gurling (1990). More accessible and of possibly greater relevance to the concerns of the present study is the contribution of the pharmacological properties of the substance, but rather than seeing these as predetermining drinking and drug taking outcomes, their possible contribution to these outcomes will be addressed.

While characteristic of disease formulations, the suggestion of the permanence of the condition is not supported solely in these formulations, but, as will be discussed below, is also supported in some of the behavioural research including animal studies. One might be tempted to ask at this point why it is the case that the question of permanence or reversibility is not resolved; perhaps it is the quest for categorical answers which is the problem. In other words, it is the question itself which should be changed. People with problems of dependence and those who study them report both sorts of outcomes: for some the condition or state is experienced as permanent and, in the experience of others, decline in dependence is possible. One of the aims of the present study is to elucidate the nature and conditions for such decline and to explore the question of whether or not it is the case that dependence, where it does decline, does so in the same way in all individuals.

1.5 Dependence as a bio-psycho-social phenomenon

In spite of the exhortation by Edwards *et al.* (1982) to separate what was previously referred to as physical dependence from psychological dependence by giving it the name neuroadaptation and seeing it as a consequence of the repeated use of a substance rather than part of the phenomenon of dependence itself, nonetheless this neuroadapted state was retained as an element of the dependence syndrome. Probably the most prevalent view currently in the scientific literature is that dependence is a 'bio-psycho-social' condition with, as the name suggests, biological, social and psychological features coexisting as essential components. In this formulation, the dependence syndrome concept was first described with reference to alcohol (Edwards and Gross 1976). The authors of this provisional description were keen to emphasise the need to progress the debate on the nature of the condition from the circular theorising which characterised the previously held disease concept (Jellinek 1960). The central tenets of the disease formulations of alcohol dependence, namely loss of control and craving, the categorical nature of the condition and the inevitability of deterioration in the event of continued drinking were being called into question by a growing body of empirical evidence. There was, however, some question of whether the syndrome idea was not yet another disease based formulation of dependence as in many of its descriptions the centrality of tolerance and withdrawal is retained, the pathological nature of the state is referred to and the question of whether or not there is a decline in dependence once established is implicit in the 'reinstatement' marker. Rapid reinstatement of the syndrome following a period of abstinence was one of the markers of dependence listed in the World Health Organisation (WHO) formulation (Edwards *et al.* 1982).

While the disease concept could be said to be holding sway up to the middle of the twentieth century, a landmark study which caused heated debate in the field was reported by Davies (1962). He and a colleague at the Maudsley Hospital followed up 93 patients who had been suffering from alcohol addiction and found that seven of them reported "having been able to drink normally for periods of seven to eleven years after discharge from hospital". Addiction was defined according to the WHO (1955) criteria as a categorical condition with the characteristics noted above. Normal drinking was defined as "their use of alcohol has never gone beyond the limits regarded as permissible in the cultural groups from which they are drawn" (Davies 1962). The criteria used in the assessment of these patients for alcohol addiction included pattern of use, withdrawal symptoms and maximum recent recorded intake. It is not clear how consistently this diagnosis was applied. Certainly they all experienced serious alcohol related problems, but on the question of symptoms of

addiction their responses suggested marked variation with no information available for some subjects and only third party report on the 'likely' withdrawal symptoms of one subject. Yet another described inability to sleep as the only withdrawal symptom reported. A second methodological problem is one of the nature of the follow-up. Follow-up data appear to have been obtained from relatives' reports in all but one case.

The study, while containing methodological problems serious enough to cast doubt on the accuracy of its findings, did throw into question the received wisdom of the day on the nature of alcoholism and opened up research questions that had not been pursued to any great extent. In a report of a further twenty-five year follow-up of these patients, Edwards (1985) has questioned the validity of the follow-up data of the time for all but one of the subjects. He does, however, stress that in spite of its methodological weaknesses the study gave the much needed impetus to open up the debate on the nature of alcoholism.

Laboratory experiments with alcoholics conducted by Mello and Mendelson questioned the tenet of loss of control by showing that even severely dependent drinkers' levels of consumption were not determined by the amount of alcohol available. Using operant methods, these researchers showed that levels of consumption were a function of the amount of work required to obtain alcohol and by the achievement and maintenance of a particular blood alcohol level (Mello and Mendelson 1965; Mello *et al.* 1968). Further research on the nature of loss of control is discussed in Chapter 5. With the central tenets of loss of control and the inevitability of deterioration called in to question, clearly new theorising was required to account for the emerging findings. This theorising centred on the 'alcohol dependence syndrome' and later the 'drug dependence syndrome' (Edwards *et al.* 1982).

The alcohol dependence syndrome was distinguished from the concept of alcoholism which preceded it in that it was based in the disaggregation of the former concept into separate domains of dependence and alcohol related disabilities, the latter referring to adverse consequences in the physical, psychological and social spheres (Edwards *et al.* 1977a; Edwards *et al.* 1982). This bi-axial distinction was further elaborated into a multi-axial model of problem drinking in the light of studies which identified that heavy consumption formed a separate dimension. Notable amongst these was the study conducted by the Rand Corporation (Polich *et al.* 1981) in which consequences of drinking were found to be only weakly related to dependence and patterns of consumption. Polich and his colleagues followed up over four years 85% of an original sample of 922 males who contacted treatment agencies in the US during 1973. Limitations of this sample were that, being an exclusively male sample, it is difficult to say whether the relationship between dependence and

consequences generalises to the female population. With reference to the criteria for alcohol dependence in this study, the authors used “symptoms that are commonly found in alcoholic samples and frequently used for the diagnosis of alcoholism” (Polich *et al.* 1981 p. 46). These commonly agreed symptoms are tremors, morning drinking, loss of control, blackouts, missing meals and continuous drinking. Something of the circularity mentioned earlier therefore seems to have been retained in this study. They noted that the symptom of loss of control was controversial, and did not include it at admission or 18 month follow-up. However they did retain the symptom of ‘continuous drinking’ and it is not entirely clear in what way this is *not* a loss of control item. Remaining items have much to do with tolerance and withdrawal and little to do with the psychological aspects of dependence that were beginning to be discussed at the time and are included in the introduction to the study. The authors did claim that the extent to which individual symptoms change over time was the subject of continuing empirical investigation and this question will be dealt with at a later stage of this report.

The Polich *et al.* (1981) study was a landmark study in several ways. This was an empirical endeavour to separate dependence from adverse consequences and to establish the separate dimensions of problem drinking (or ‘alcoholism’ as it was then known to be). It has been claimed that the multi-axial model not only allows a more realistic account of the spectrum of drinkers and their problems (Skinner 1990) but that it also has greater clinical utility in that problems can be more accurately targeted when the different dimensions are used both to determine treatment goal as well as provide criteria for choice of intervention.

This study was of further importance in its time in that it demonstrated that the condition previously known as ‘alcoholism’ was not an inevitably progressive one, that people drinking in a dependent way at first contact could be drinking in a harm-free way at four year follow-up. In spite of the enduring limitations in the study definition of dependence, this finding nonetheless constituted a complete departure from the previously held view that ‘alcoholism’, a hallmark sign of which was the manifestation of tolerance and withdrawal, was arrestable but incurable (Jellinek 1960). The alcohol dependence syndrome came into being as an official diagnosis included in the ninth revision of the International Classification of Diseases after being approved by the WHO in January 1979. The syndrome description was subsequently incorporated into DSM-III-R (American Psychiatric Association 1987).

The nature of the dependence syndrome as it was originally described consisted of seven markers, namely: narrowing of drinking repertoire, salience of drink related behaviour, increased tolerance to alcohol, repeated withdrawal symptoms, relief or avoidance of withdrawal symptoms

by further drinking, a subjective awareness of a compulsion to drink and rapid reinstatement after a period of abstinence (Edwards and Gross 1976). In the subsequent WHO formulation, dependence was described as consisting of the following:-

- an altered behavioural state, referring primarily to diminished variability in the individual's drinking behaviour, to continued drinking in the face of negative consequences such as illness or social sanction and to the salience of drink seeking behaviour over other important activities;
 - an altered subjective state, referring primarily to impaired control or its subjective concomitant, to the experience of craving and the drink centredness of thoughts;
 - an altered psycho-biological state, referring primarily to the development of tolerance and withdrawal with relief drinking to avoid or ameliorate the symptoms of withdrawal.
- (Edwards *et al.* 1977a).

The dependence syndrome formulation departed in significant ways from the condition described as alcoholism which preceded it. The previously held components of loss of control and craving were reformulated into subjective experiences rather than inevitable, biologically based and universally observed phenomena. As the term syndrome suggests, there is a clustering of certain elements not all of which need be present or present in the same degree, but with greater severity of the condition more of the symptoms are likely to be manifest in growing intensity. An attempt to show whether specific symptoms were associated with lower and with higher degrees of dependence revealed that the symptom of 'loss of control' tended to appear early in the development of the syndrome but this was not the case for all subjects (Chick and Duffy 1979).

Stockwell and colleagues (1994) collected data on the Severity of Alcohol Dependence Questionnaire in a general population sample in Western Australia and showed that dependence could be detected on a continuum in the whole population. A qualification of the finding of Stockwell and colleagues stems from the fact that they used primarily symptoms of physical and affective withdrawal to measure dependence. When subjects were asked whether they drank in order to relieve these symptoms, a far smaller proportion of the general population sample than the clinical samples said that they did. Critiques of the syndrome idea have suggested that retaining tolerance and withdrawal as part of dependence rather than a closely related phenomenon results in confusion between the effects of consumption and the nature of dependence.

Using a modified concept of dependence Raistrick and his colleagues showed a different distribution of dependence in the general population to that of a clinical population during the

validation of the Leeds Dependence Questionnaire (Raistrick *et al.* 1994 see Appendix 1). The dimensionality of alcohol dependence was demonstrated by Skinner and Horn (1984) who showed that, for patients meeting the DSM-III criteria for alcohol abuse and dependence (American Psychiatric Association 1980), scores on the Alcohol Dependence Scale conform to a normal distribution demonstrating that there is, in this group, a broad range in the severity of dependence symptoms reported. The dependence scores of subjects not meeting the criteria for alcohol abuse and dependence showed a more skewed distribution.

Inclusion of the drug dependence syndrome in the two major classification systems (World Health Organisation 1981; American Psychiatric Association 1987) has resulted in several investigations of the nature, distinctness and validity of the concept. Hasin *et al.* (1988) examined the relationship between dependence syndrome symptoms and drug related disabilities to determine whether or not they constituted distinct dimensions as described in the original dependence syndrome formulation (World Health Organisation 1981). The participants in this study were patients receiving treatment for alcohol dependence and related problems who admitted to six or more lifetime incidents of use of any of a list of specific drugs: cannabis, stimulants, barbiturates, benzodiazepines, cocaine, opiates and hallucinogens. Dependence items were measured using a structured interview schedule, the Diagnostic Interview Schedule (Robins *et al.* 1981) comprising five dependence syndrome symptoms namely: i) feeling dependent on the drug, ii) unsuccessful attempts to cut down (impaired control), iii) tolerance, iv) withdrawal and v) daily use for two weeks or more (narrowing of the drug taking repertoire). While they found a high clustering of dependence items with each other, Hasin and her colleagues also found a high clustering with health, social and emotional problems related to substance misuse. This led them to propose that:

"All seven symptoms of the dependence syndrome as originally defined may be interpreted as stemming from the physiological process of withdrawal and from learning related to withdrawal avoidance. However, these physiological and learning processes may manifest themselves in all sorts of social, psychological, occupational and health symptoms and signs. The provisional formulation of the dependence syndrome leaves out the other

types of manifestations of these learning and biological processes, providing for a somewhat limited concept of the disorder" (Hasin *et al.* 1988 p. 54)

Hasin *et al.* (1994) repeated this finding with reference in an investigation of the relationship between the alcohol dependence syndrome and related disabilities in a US general population sample, where she found that :

"one general factor appeared to explain the structure of the data better than two-factor solutions or solutions with more than two factors." (Hasin *et al.* 1994 p. 578.)

These authors acknowledge that their results are at odds with other studies using different methodologies. Feingold and Rounsaville (1995) found that the distinction between abuse and dependence was more robust when based in a quantitative model than in a qualitative model and explored the proposal that abuse and dependence are located on a continuum of severity, with abuse being a mild form of dependence. They did, however, conclude that there is a unidimensional construct of drug dependence which is valid within and across different drug groups.

1.5.1 Implications of the bio-psycho-social model

The conceptual and empirical shift from the idea of a discrete entity to a continuum, the questioning of progressive inevitability and the precise nature of the components of the condition opened up new directions in the study of dependence and in the implications for its treatment. Treatment goals other than total abstinence were able to be explored. A landmark study based firmly in this conceptual and empirical shift, focusing on the possibility of a range of treatment goals, was conducted by the Sobells in the late sixties and early seventies (Sobell and Sobell 1973). These researchers, recognising the emerging evidence of the possibility of controlled drinking following a diagnosis of alcoholism, developed and administered an individualised behavioural programme with a controlled drinking goal. In a methodologically rigorous investigation, they followed their treatment and control subjects up over a period of twelve months and twenty-four months (Sobell and Sobell 1976). They reported that subjects who had received individualised behaviour therapy with controlled drinking training were functioning well on twice as many days

during the follow-up period as those subjects who had received a conventional abstinence oriented treatment programme. Information at follow-up was collected from the subjects themselves, from at least two friends or relatives and from hospital and prison records.

The findings of the Polich study cited earlier (Polich *et al.* 1981) produced evidence that people with a previous diagnosis of alcoholism were able, in some cases, to drink in a harm free manner at a subsequent time. Their data demonstrated that, of those subjects who showed improvement at follow-up, subjects with a low severity of dependence at first contact were more likely to be successful at controlling their drinking at follow-up (they had fewer relapses if they pursued a moderation goal than if they pursued an abstinence goal), and those with high severity were more likely to be successful with an abstinence goal (they had more relapses if they tried to drink in a controlled manner).

Two studies which are suggestive of the relationship between dependence and drinking outcomes were reported in 1984 with one follow-up reported in 1987. Sanchez-Craig and her colleagues (Sanchez-Craig *et al.* 1984) recruited 70 “early stage problem drinkers” with short histories of problem drinking and an absence of physical or cognitive impairment and randomly assigned them to a short term out-patient treatment which involved either a controlled drinking or an abstinence goal. Two year follow-up of drinking showed the two groups to be indistinguishable and the majority of successful outcomes in each group involved moderate drinking. Conversely, Foy and his colleagues (Foy *et al.* 1984) randomly assigned “veterans who are chronic alcoholics” to a behavioural treatment that had either an abstinence or a controlled drinking goal. At 5-6 years follow-up, outcomes for the two groups were virtually the same. The majority of good outcomes for both groups involved abstinence (Rychtarik *et al.* 1987). As Sanchez-Craig and her colleagues used different measures of dependence (namely the Alcohol Dependence Scale described in Chapter 3) to those used by Foy and his colleagues (who used an unspecified symptom checklist), it is not possible to draw firm conclusions about the relationship between levels of dependence and drinking outcomes, but these studies are suggestive of the ability of low dependence individuals to drink in moderation regardless of treatment goal and the ability of high dependence individuals more successfully to achieve total abstinence regardless of treatment goal. Thus, not only do these studies establish that treatment goals other than total abstinence are possible, but further they suggest that the degree of severity of dependence may predict the success of different drinking goals. Further evidence on the predictive validity of the dependence syndrome construct is discussed below.

Questionnaires measuring the syndrome (discussed in Chapter 3) have either been substance specific or required a change in wording, as in the case of the Severity of Dependence Scale (SDS)

discussed below, in order to measure dependence on different substances (for opiate users see Sutherland *et al.* 1986, specifically for heroin users see Strang *et al.* 1999 and Gossop *et al.* 1992, for cannabis users see Swift *et al.* 1998, for amphetamine users see Topp and Darke 1997; Topp and Mattick 1997a and Churchill *et al.* 1993, for benzodiazepine users see Ross *et al.* 1996, for cocaine users see Gossop *et al.* 1994). To date such measures have not been used to compare severity of dependence between substances, though the SDS has been used to compare severity across different methods of use of a substance (Strang *et al.* 1998, Gossop *et al.* 1994). The question of how dependence itself changes, though alluded to by Polich and his colleagues with reference to change in the severity of symptoms (Polich *et al.* 1981), does not appear to have been the focus of investigation.

1.6 A psychological explanation

At the time of the description of the drug dependence syndrome (Edwards *et al.* 1982), which was an adaptation of the idea of alcohol dependence syndrome to other drugs, tolerance and withdrawal symptoms were seen to be essential components of the syndrome, but as dependence on cocaine and amphetamine with their withdrawal like effects, sometimes referred to as rebound effects, were increasingly recognised, greater emphasis in research was placed upon the pursuit of relief or avoidance of these effects rather than the occurrence of the withdrawal phenomena themselves (Topp and Mattick 1997b).

During the eighties, the question of whether alcohol dependence and other drug dependence were the same, similar or separate phenomena was addressed. In many respects the phenomena had come to be seen as essentially the same (Edwards *et al.* 1982). However, difficulties arise if the features of tolerance and withdrawal are to be retained as part of the essence of dependence in that clearly these phenomena would vary with different drugs and with some drugs there seemed little evidence for their existence (Bryant *et al.* 1991). In order to resolve the difficulty with reference, for example, to cocaine, where objectively identifiable withdrawal symptoms were not manifest and yet cocaine seeking behaviour could be observed to have compulsive characteristics in the face of adverse consequences, a distinction was drawn between ‘psychological’ and ‘physical’ dependence. Edwards and his colleagues (1982) argued that this distinction caused unnecessary confusion and proposed the idea that tolerance and withdrawal might usefully be seen as separate phenomena from dependence referring to them instead as neuroadaptation.

It was as a result of clinical observations of the commonalities in dependent behaviour with

a variety of mood altering drugs that Raistrick *et al.* (1994) have argued, as did Chick (1980b), for a modified description of the condition of dependence. Raistrick and his colleagues have developed the idea of substance dependence as a psychological phenomenon departing from the bio-psycho-social description in that the features of tolerance and withdrawal are understood to be the *consequences* of prolonged heavy use regardless of the psychological state of the individual. They will be highly correlated with dependence in the same way that consumption itself tends to increase, though less reliably so (see Polich *et al.* 1981) with increasing dependence. For the purpose of elucidating the nature of a phenomenon though, the support of statistical analysis should not be confused with the definition of the phenomenon which is based in a broader theory of human behaviour. If a phenomenon is either a trigger for, or a consequence of a particular behaviour then it is not a surprise to find significant correlations between them. Chick (1980b) referred to “the snare of logical dependence between items” in the process of validating a scale, a problem that occurs between items in a scale but could equally apply to different measures of construct validity. Where simple and similar correlational analyses are used, on what grounds other than theoretical ones are we able to say that something is part of something else, is similar to something else or predicts something else?

Making the distinction between dependence and neuroadaptation is the basis for the development of the concept of substance dependence as a psychological phenomenon (Tober 1992). Tabakoff (1990) has described the preoccupation of researchers with withdrawal symptoms, perhaps because they are readily observable and measurable, to the detriment of acknowledging the continued importance of the drug effect through all stages of neuroadaptive change. The phenomena of tolerance and withdrawal are understood to be the consequence of the regular and heavy use of a substance albeit that they have powerful reinforcement potential as do the psychoactive effects of the drugs and are likely to cue the dependent behaviour. In other words, it is not the presence of tolerance and withdrawal which is a part of dependence but rather it is the behaviour, thoughts and feelings that are conditioned by them. Miller (1980) has referred to this as the cognitive interpretation of physiological events; Leventhal and Cleary (1980) have proposed a learning mechanism where certain emotional states are conditioned to the pharmacological effects and physiological consequences of substance use and it is the regulation of these emotional states which drives the drug seeking or drug taking behaviour. Solomon (1980) described a theory of addiction based upon his work with Corbit (Solomon and Corbit 1974) in which they developed the opponent process theory of acquired motivation. In this theory drug use recurs in an attempt to counteract the opponent process, the inevitable consequence of taking the drug which has the opposite hedonic

quality to the effects of the drug. These are some of a number of operant explanations of drug dependence which support the observation that the pursuit of the effect and the maintenance of the effect of the drug may be as important, if not more important in driving the drug seeking and drug using behaviour as is the avoidance of the negative consequences of not using or stopping using (the experience of withdrawal symptoms).

Raistrick *et al.* (1994) developed their understanding of substance dependence on the basis of in-depth interviews conducted with patients who were asked for their descriptions of dependence phenomena. As a result of this, they incorporated into their formulation of substance dependence the pursuit of the effect, the maximisation of the effect and the maintenance of a constant state as being of equal importance as the avoidance of withdrawal symptoms.

Increasingly investigators of dependence have shown that pursuit of the effect - the positive reinforcement potential of the behaviour, or positive incentive motivation - is as important, if not more important than drive reduction, the negative reinforcement potential of the behaviour. Jaffe (1989) argues that, contrary to the traditional view that dependence is primarily driven by the need to avoid or attenuate withdrawal symptoms, the pursuit of the drug effect is more strongly associated with drug seeking behaviour than is the fear or avoidance of withdrawal. To support this point he cites the distinction between those hypnotic or sedative drugs which produce neuroadaptation and a withdrawal syndrome on cessation of use, but are not associated with self administration. Characteristics of such drugs are that they are long acting and are not intensely euphorogenic. Similarly with the benzodiazepines, he demonstrates that, while all of these drugs are capable of inducing neuroadaptation and a withdrawal syndrome, the only ones that are of concern as drugs of abuse are those which are rapidly absorbed, in other words that have a rapidly positively reinforcing effect. Equally he shows that the phenomenon of craving, defined as a strong urge to repeat the use of a drug (though no universally accepted definition of the term exists) is reported by patients and observed in animals where no evidence of neuroadaptation and a physical withdrawal syndrome exists. Contrary to the traditional view that craving is linked to the phenomenon of tolerance and withdrawal exclusively, there is increasing evidence that it can equally occur as a result of the memory of positive reinforcement and that this memory of positive reinforcement accounts for the observation that craving persists long after the end of the withdrawal syndrome or indeed where no withdrawal syndrome has developed. Craving may be better understood as a response to previously conditioned cues which may be physical, psychological or social in nature (Rankin *et al.* 1979).

Positive reinforcement plays an important role in the maintenance of dependence through

the mechanism of classical conditioning. Childress and her colleagues found that methadone dependent subjects experienced a variety of conditioned responses to stimuli that had previously been associated with drug use, including craving in the absence of withdrawal symptoms, withdrawal symptoms with no accompanying craving and a combination of both withdrawal symptoms and the experience of craving (Childress *et al.* 1986).

Meyer and Mirin (1979) showed that cognitive mediating factors play an important role: heroin users experienced increased craving during periods when heroin was available for self administration; those who were aware of the blocking effects of the opiate antagonist, naltrexone, did not experience increased craving in the presence of heroin related stimuli when they were pre-treated with naltrexone, presumably because they knew they would not be able to experience the euphorogenic effects. These authors described the way in which naltrexone changed the perception of the environment into one where heroin was unavailable.

An understanding of the cognitive and conditioning mechanisms involved in the development and maintenance of dependent behaviour may be relevant to an understanding the nature of change in substance dependence and will be discussed in the next chapter.

The idea of substance dependence, dependence which crosses substance boundaries, departs from the dependence syndrome by replacing physiological markers (of tolerance and withdrawal) with behavioural markers (of pursuit and avoidance) and thus is referred to as a psychological formulation of the concept; however it departs also from the broader psychological view of dependence stated by Russell (1976) and Orford (1985) which embraces such objects of dependence as people and activities. Russell's definition focused upon the presence of negative affect in the absence of the object of dependence and upon the degree of difficulty experienced in doing without that object (Russell 1971). Thus he described dependence as existing in degrees from the normal to the pathological, and his view was that the question of when dependence becomes a problem is one of culture specific definition; often dependence will only become apparent through its consequences. Pharmacological rewards were just one class of reinforcer alongside other equally potentially important sources of reinforcement. Orford (1985) added to this idea of dependence the crucial feature of conflict which is the result of the development of a strong attachment to the behaviour: the result of its repeated reinforcement in the face of longer term negative consequences. Marks (1990), using the term addiction rather than dependence and developing a yet more embracing definition, referred to the commonalities between behavioural addictions in which he included obsessive-compulsive disorder alongside kleptomania, compulsive gambling, hypersexuality and overeating. He does however refer to separate syndromes in order

to account for their differences and Bradley (1990) has criticised this all inclusive position as being essentially a restatement of learning theory with little clinical utility.

In the substance dependence formulation, dependence on alcohol, cocaine, heroin or any other psychoactive substance is seen to be essentially the same phenomenon where dependence may transfer from one substance to another (Kosten *et al.* 1987). What distinguishes substance dependence from other behavioural dependencies like gambling and excessive sexual appetites is the way in which the substance alters the physiological substrate upon which it acts and thus its reinforcement potential is modified. Orford (1985) however, has argued that any arousal state can produce the subjective experience of craving and that the degree of arousal (the frequency and duration of arousal) experienced for example by gamblers may well result in such changes to the autonomic nervous system which are similar to the neuroadaptive state and have similar reinforcement potential. Since it is the reinforcement potential which is important in the present formulation of substance dependence, these commonalities may merit inclusion of a wider range of dependence conditions. Orford has further claimed that what distinguishes dependence from other behaviour is its functional autonomy: the action has become independent of whatever originally motivated it and 'taken on a life of its own'. In the words of Logan, it has set up its own motivational system (Logan 1993 p. 299).

Chick (1980b) has argued that the nature of dependence needs further research for the purpose of clearly identifying whether there is a unidimensional syndrome and, if so, what its components might be. Empirical support for the connected ideas of a unidimensional condition that crosses substance boundaries and of a definition of dependence that does not require tolerance and withdrawal is suggested in a series of studies which examine the criteria for dependence and related disorders in the revised version of DSM-III (American Psychiatric Association 1987). When the ten items contained in these newly revised criteria were factor analysed for a group of 83 subjects abusing alcohol, sedatives, hallucinogens, stimulants, cannabis, cocaine and opiates, the dependence syndrome items were found to form a single factor for alcohol, opiates and cocaine, but not for the other substances (Kosten *et al.* 1987). It is predicted that removal of the items relating to tolerance and withdrawal will produce a set of dependence criteria which will form a unidimensional syndrome across substance boundaries.

A study of this question was part of a survey evaluating proposed options for DSM-IV (Carroll *et al.* 1994), when the investigators reported that their data provided little support for requiring tolerance and withdrawal for dependence and confirmed the view previously stated by Edwards *et al.* (1982) that tolerance could occur following a single administration of a drug and was

better understood as part of the learning process, the consequences of drug use which in turn shape future use. Withdrawal can usefully be seen in the same way, and Carroll and her colleagues report that requiring tolerance and withdrawal as symptoms of dependence in a cohort of 521 subjects recruited from clinical and community sources had little effect on rates of dependence. Eighty-five per cent of subjects who met the criteria for a dependence diagnosis also reported tolerance to that drug. Cocaine and marijuana were the exceptions.

The authors of this study then subjected their data to further analysis in order to examine the concurrent validity of these criteria with severity of substance abuse, family history and psycho-social functioning. They found that, while tolerance and withdrawal items tend to cluster at higher levels of severity, they

“do not emerge as pre-eminent indicators of severity relative to the other criteria” (Carroll et al. 1994 p.19)

It is perhaps worth noting that the phenomenon of clustering of items on tolerance and withdrawal at the severe end of dependence may be the result of the choice of the questions asked. There is a whole range of severity to choose from and the likelihood is that items associated with high levels may have been selected in the first place.

While the field remains divided on the question of the inclusion or not of tolerance and withdrawal in the criteria for dependence, the above study is one of the few empirical evaluations of their role relative to non-physical criteria. Previously, their inclusion has been taken for granted both in definitions of dependence and in scale construction, resulting in controversy over the way in which definitions are derived (Chick 1980b).

In the present study it is hypothesised that there is a unidimensional phenomenon of substance dependence which crosses substance boundaries and is measurable using the Leeds Dependence Questionnaire. This questionnaire does not include items on tolerance and withdrawal per se, but on behaviour that results from their presence as well as behaviour which is reinforced by the drug effect itself.

1.6.1 Implications of the psychological formulation of substance dependence

As a development of the dependence syndrome idea, the major implication of the psychological formulation of dependence is that, as a learned behaviour, dependence is at least

theoretically capable of being unlearned. It may exist independently of the physiological and other consequences of substance use and therefore might be extinguished, to the extent that it can be extinguished, independently of the removal of some of the cues that trigger the behaviour. Both clinical and non-clinical observation has supported the idea that dependence, once established in a certain degree of severity, is incapable of extinction. This approach, as discussed earlier, has come to be associated with disease formulations of the condition which, in turn have been associated with folklore rather than science. However, as discussed above, both animal and human studies have highlighted the persistence of dependent behaviour following substantial periods of abstinence suggesting that some learned behaviour may be difficult, even impossible to extinguish. This finding does not detract from the ability of learning theory to explain the phenomenon of dependence as Logan has demonstrated in his review of animal and human motivation and drug use (Logan 1993). It does, however, highlight the need to understand the mechanisms of change if the conditions in which change can occur are to be enhanced.

The psychological formulation of dependence has implications for measurement. Instruments measuring the dependence syndrome are discussed in detail in Chapter 3. The Leeds Dependence Questionnaire was, as described above, based upon the need for an instrument that measured the psychological phenomenon of substance dependence, in other words that measured behavioural and cognitive elements of dependence and would be capable of measuring dependence in abstinence. Instruments that measure the neuroadapted state, or rely heavily on it for measurement purposes, will not be able to measure dependence once a process of withdrawal or detoxification has occurred, whereas an instrument measuring the nature of a person's relationship with the substance should be able to detect the dependent state that exists during periods of abstinence as well as periods of use. A small scale study to test the Leeds Dependence Questionnaire for use with abstinent respondents, reported in Chapter 4, confirmed its suitability for this purpose. Furthermore, it is proposed that the concept and measurement of substance dependence allows dependence on different substances to be compared for degrees of severity; using the same questionnaire for this purpose implies measuring the same phenomenon regardless of the specific substance being used.

1.7 Formal classification systems

The description and diagnostic criteria of substance dependence and misuse disorders are contained in two major classification systems, the International Statistical Classification of Diseases

and Related Health Problems (ICD) and the Diagnostic and Statistical Manual of Mental Disorders (DSM).

In the current version, ICD-10, the tenth revision of the “standard international coding tool for diseases, injuries and related health problems” (World Health Organisation 1992a) categories of mental and behavioural disorders due to psychoactive substance use in the classification of mental and behavioural disorders are listed. Categories are distinguished in some cases by single drug and in some cases by groups of drugs and in one case by the vehicle which carries the drug (namely tobacco). Further categories of clinical conditions are specified and these are common to any of the mental and behavioural disorders that are described above. The disaggregated approach which distinguishes dependence from harmful use, intoxication and withdrawal as well as from the psychiatric conditions which are related either as cause or effect of substance use, is adopted in the classification of these clinical conditions. Dependence is described as a syndrome, defined as “A cluster of physiological, behavioural and cognitive phenomena in which the use of a substance or a class of substances takes on a much higher priority for a given individual than other behaviours that once had greater value.” Two further descriptive characteristics included in the definition are the desire (strong or overpowering) to use the substance and the rapid reinstatement of the syndrome after a period of abstinence. The diagnostic guidelines (World Health Organisation 1992b) stipulate that “a definite diagnosis of dependence should usually be made only if three or more out of seven markers of the dependence syndrome have been experienced or exhibited during the previous year” but go on to say that an essential characteristic of the dependence syndrome is that either psychoactive substance taking or a desire to take a particular substance should be present. It is recommended that the diagnosis of the dependence syndrome be further specified by current use status, five categories that include three abstinent categories, one a simple ‘currently abstinent’, another defines abstinence in a protected environment suggesting the possibility of coercion and the third describes abstinence with pharmacotherapy (naltrexone or disulfiram). A further category describes controlled dependence as being the use of a substitute psychoactive substance by prescription and the three use categories distinguish use from continuous use and from episodic use.

The seven markers of the dependence syndrome described in the ICD include tolerance and withdrawal but the guidelines nonetheless caution against diagnosing the dependence syndrome in surgical patients who are given opioid drugs for pain control and experience a withdrawal syndrome “...but have no desire to continue taking the drugs”. This again supports the idea of a hierarchy in the diagnostic criteria, where tolerance and withdrawal can only be used when the desire to use the substance or actual substance use is also present. The feature of withdrawal is described as being

identifiable by evidence of the withdrawal syndrome itself or by use of the same or a similar substance to relieve or avoid withdrawal symptoms.

The guidelines also state that the subjective awareness of compulsion to use drugs, the ‘strong desire or sense of compulsion’ is most commonly seen during attempts to stop or control substance use. However, this becomes an essential feature for the diagnosis of dependence during times of abstinence, according to the guidelines.

The remaining three of the seven features described are ‘difficulties in controlling use’, ‘continued use in the face of harmful consequences’ and ‘progressive neglect of other activities in favour of the substance use’. The guidelines go on to say that ‘narrowing of the repertoire of patterns of use’ has also been described as a characteristic feature but it is unclear what is its status alongside the seven characteristic features of which at least three must be present for a diagnosis. Thus while tolerance and withdrawal are seen as diagnostic criteria, they are neither necessary (as they constitute two out of the seven features) nor sufficient for a diagnosis of the dependence syndrome. What distinguishes this from the psychological theories of dependence is that these phenomena do represent central features of the syndrome and are given greater importance than behavioural features like the narrowing of the repertoire or the planning of daily activities around the use of the substance.

Withdrawal is separately defined as “A group of symptoms of variable clustering and severity occurring after repeated and usually prolonged and/or high dose use of that substance” and no mention of dependence is made at all in this section.

The disaggregated approach wherein substance abuse is distinguished from substance dependence has an interesting history in the Diagnostic and Statistical Manual of Mental Disorders (DSM). In the second version (DSM-II), the term dependence included both psychological and physiological dependence. In DSM-III, dependence is used only in the physiological sense and “requires evidence of either tolerance or withdrawal” (American Psychiatric Association 1980 p. 381). In this version, the behavioural components of loss of control and salience of drug seeking behaviour fell under the heading of substance abuse. Moreover, this heading combined both the psychological descriptors of the condition with physical (with the exception of tolerance and withdrawal), psychological and social consequences. In the revised version of DSM-III, DSM-III-R, substance dependence was re-defined along the lines of the dependence syndrome (Edwards *et al.* 1982) and included impaired control, repeated attempts to cut down or stop, salience of drug seeking and using behaviours, frequent intoxication, withdrawal and continued use despite consequences, evidence of tolerance, withdrawal symptoms and relief use. It included the

requirement that three or more of these symptoms must have been present for at least a month. Since there are just three criteria that refer to tolerance, withdrawal and withdrawal relief, it was possible to make a diagnosis of dependence in the absence of these phenomena. Indeed this reflected the growing awareness, arising out of epidemiological studies and clinical observation, that drugs lacking clear symptoms of tolerance or withdrawal appeared to have substantial addiction forming potential if patterns of use and the remaining symptoms were anything to go by (see for example Carroll *et al.* 1994). The substance abuse classification in DSM-III-R was a default category which required the fulfilment of only one of the criteria of continued use despite knowledge of consequences or in conditions where use is physically hazardous and where the diagnosis of dependence could not be made.

In DSM-IV, tolerance is described as a need for more of the drug or the experience of a diminished effect, while withdrawal may be defined either as the experience of withdrawal symptoms characteristic of the particular drug, or as relief use. Again, diagnosis of dependence can occur without the fulfilment of either of these criteria and the specification of physiological dependence is separately made. The duration requirement is changed to “three or more of the following (criteria) occurring at any time during the same twelve month period”. Although the criteria for abuse appear to have been extended, the content of the previous criteria has merely been elaborated and this remains a default category for those with impaired control who do not fulfill the criteria for dependence. Widiger and Smith (1994) have commented that this version does not add clarity to the definition of dependence. Indeed, it appears to cover all possibilities by including the requirement to state whether the person has physiological dependence in addition to the three or more dependence criteria, one of which includes the possibility of manifest withdrawal symptoms. These authors suggest that the distinction between abuse and dependence has been made on the grounds of severity in the different versions of the DSM, it is a quantitative distinction that appears at once to be both quantitative and qualitative. A clear distinction between the behavioural, affective and cognitive components of dependence and the sequelae of persistent use has not been made in the DSM-IV. Retaining withdrawal symptoms as part of the condition of dependence precludes the possibility of measuring severity across different drug use.

In spite of the call made by Edwards *et al.* (1982) for the sake of clarity to distinguish dependence as a psychological construct from neuroadaptation as the consequence of the regular excessive use of some psychoactive substances, it seems likely that the terms physical and psychological dependence, or dependence meaning either the physical or the psychological, will remain in common use, supported as they are by definition in the major classification systems. In

the present thesis, however, the psychological concept of dependence was adopted in line with the description by Edwards and his colleagues in the WHO report cited above, as the one best able to explain the observed phenomena.

Chapter 2

The nature of change

2.0 Introduction

In the previous chapter, recent theorising about the nature of dependence and the uses to which different perspectives were put were described. In this chapter, studies exploring the development, maintenance and decline in dependence are described with a view to identifying the factors which may be relevant to the study of the course of decline in dependence. Evidence for the predictive utility of dependence is also discussed.

2.1 The development of dependence

The existence of mild to severe forms of dependence is implicit in the idea of the dependence syndrome. That there can be a development from the mild to the severe over time seems well established and is discussed below. Whether such development is inevitable has constituted one of the central arguments on the nature of dependence, as has the question of whether there can equally be a decline from the severe to the less severe or mild form of the syndrome.

From the tentative claims made by Edwards and Gross (1976) that “Very speculatively, we may suppose that here the abnormality involves both a biological process and aberrant learning..... the learning process is very incompletely understood...” (p. 1061) grew a much greater certainty that dependence is a learned behaviour subject to the same influences as any other learned behaviour. At the societal level this assertion is based upon the observation that the prevalence of alcohol and drug problems, including dependence, is determined substantially by availability and consequent consumption levels in the population and will vary with these (Edwards *et al.* 1995). At the behavioural level researchers have shown the way in which dependent drinking or drug taking is understood as a discriminated operant (Rankin and Hodgson 1976), discriminated because there are certain setting events or cues which have become associated with such behaviour and act as signals for it to occur.

Stockwell (1990) has described this learning process as resulting in an acquired motivational disposition in which he emphasises the way that the events or cues set up the expectation of the

reward which will follow the drinking or drug taking behaviour, thus stressing the importance of cognitive factors in dependence. He argues that only by the recognition of cognitive mediating variables are we able to explain the way that avoidance behaviour is not extinguished; having initially viewed tolerance and withdrawal as a component of dependence he has subsequently claimed that “neuroadaptation has no relevance to dependence unless it is motivational in some way” (Stockwell 1990 p.195). Drawing on the work of Siegel (1988) who showed that physiological changes, specifically tolerance to the repeated administration of morphine in rats can be environmentally influenced, Stockwell argues that the connection between the neuroadaptive state and the learning process is best understood as the organism’s anticipatory response to the effect of the drug. As described in the opponent process theory of Solomon and Corbit (1974), the action of a drug is opposed by compensatory adaptive responses which come to be classically conditioned to drug taking cues. These compensatory classically conditioned responses can then be triggered by any cue, either internal or environmental that leads the subject to anticipate that drug use is imminent. The drive experienced by the individual in such a situation, to take the drug or to take more of the drug, sometimes construed as craving, will enhance the learning process by the reward, in the form of positive or negative reinforcement, that follows. Equally the fact that tolerance may have been environmentally conditioned as well as having been a physiological consequence of previous use, will result in the individual desiring a greater dose of the drug in order to achieve the same effect. Siegel showed the role played by the environment in the conditioning process in a study in which tolerance to morphine, developed in rats in one environment, did not generalise to an unfamiliar environment thus demonstrating that the dose of the morphine alone did not account for the degree of tolerance developed.

Further in support of the cognitive components of conditioning is the evidence for the relativity of reinforcement; different drugs may have different reinforcement potential based upon their potency, speed of onset, pathoplasticity and elimination half-life (Raistrick *et al.* 1994) but their reinforcement potential is none the less mediated by the availability to the individual of other sources of reinforcement. This relativity of the reinforcement potential of different drugs is determined by the individual’s expectations of the rewards of drug taking relative to other activities. It may however be the case that what Logan has described as the uniquely potent reinforcement potential of addictive drugs (Logan 1993) is what lies behind the observation and inclusion in dependence definitions of the ‘narrowing of the drug taking repertoire’ or the ‘stereotyping of drug taking behaviour’; at higher levels of dependence the potency of pharmacological and physiological rewards is greater than the potency of other rewards, for example social rewards. Item scores for the

Leeds Dependence Questionnaire (see Appendix 1) related to this marker increased with increasing levels of dependence.

So, the learning of dependent behaviour can be seen as a continuation of the learning of drug using behaviour. Initially, though not invariably, a social behaviour with social cues and sources of reinforcement, drug use may develop into a routine behaviour which takes priority over other behaviours with its significant pharmacological reinforcement potential and the likely development of tolerance and withdrawal as further sources of reinforcement. The availability of alternative sources of reinforcement and perception of the importance of the other sources of reinforcement determine continuation and development into dependent patterns of use.

The development of dependence, as noted above, has been the subject of study for researchers across the spectrum of theories of dependence. The question of a sequence in the development of symptoms was addressed by Jellinek (1946) as part of his description of the “phases of alcoholism”. Based upon the accounts of a specific sample of problem drinkers, namely members of Alcoholics Anonymous, Jellinek described a hierarchy of symptoms of alcoholism which progressed from the mild to the severe and, like later writers, asserted that the progression was not an inevitable one but where the most severe symptoms emerged they tended to follow a pattern in their progression. He uses the term symptom to refer at once to cognitions, behaviours and their consequences, both physical, psychological and social but his description of the learning process follows the behavioural understanding outlined above.

“The very beginning of the use of alcoholic beverages is always socially motivated in the prospective addictive and nonaddictive alcoholic. In contrast to the average social drinker, however, the prospective alcoholic (together with the occasional symptomatic excessive drinker) soon experiences a rewarding relief in the drinking situation. The relief is strongly marked in his case because either his tensions are much greater than in other members of his social circle, or he has not learned to handle those tensions as others do....Sooner or later he becomes aware of the contingency between relief and drinking.” (Jellinek 1952 p. 676)

In an attempt to investigate further the question of a sequence in the development of dependence, Orford and Hawker (1974) examined the onset of symptoms in a sample of halfway house residents and noted the methodological difficulties in gaining a retrospective account of the development of a condition and particularly one which involves sometimes considerable cognitive impairment. These authors noted that their own sample contained a bias not dissimilar to Jellinek's in that residents in halfway houses are likely to be selectively socially disadvantaged in the spectrum of the problem drinking population. Difficulties with recall may play a significant role in a population likely to be quite damaged such as this. Orford and Hawker included a variety of symptoms that referred to patterns of consumption, resulting illness and immediate consequences of drinking thus making it difficult to draw conclusions on a sequence in the development of alcohol dependence symptoms alone. They concluded that it was not possible to identify a characteristic sequencing of all events relating to alcoholism because so many of these events will be determined by different social circumstances but that there appears to be "a number of more basic and relatively circumscribed processes which are related and require separate study" (p. 287). They proposed the narrowing of the target of investigation to the core dependence syndrome to see whether a more definite process might emerge.

Chick and Duffy (1979) addressed several of the methodological problems of the earlier research by Orford and Hawker (1974) and narrowed the target behaviour of their enquiry down to the sequencing of dependence syndrome symptoms alone "to determine whether there were systematic deviations from randomness in the orderings of items produced by alcoholics and to derive a typical sequence capable of describing those deviations" (p. 313). They did not show that there was a typical sequence followed by the majority of alcoholics, nor did they assert that later symptoms inevitably follow. Rather they established that, if particular symptoms develop then they will develop in a particular sequence. Their definition of dependence retained the items of tolerance and withdrawal, and they showed that these were late onset symptoms. The symptoms of impaired control on single drinking occasions, feeling the need for alcohol and increasing salience appeared early compared to the onset of the experience of withdrawal symptoms.

However, in contrasting their findings with earlier work, these authors make the point that it has been shown that the symptoms specified themselves exist in degrees and therefore recognition of the appearance of any symptom will depend to an extent upon how the symptom is described in the measure which is used to identify and quantify it. Some questions may refer to milder or more severe degrees of the same symptom.

Another way of looking at how the severity of dependence increases is to chart changing

sources of reinforcement. Russell (1971) and Russell *et al.* (1974) found that nicotine use was reinforced more often by social sources in the early stages of use, followed by pharmacological sources (the positive reinforcement potential of the drug effect and the negative reinforcement potential of avoiding the loss of the effect), followed by physiological sources (the negative reinforcement potential of avoiding or ameliorating withdrawal symptoms). While social rewards may change across the life span, pharmacological and physiological rewards, being internal in their source may account for the persistence and intensification of dependence and will be discussed further in the next section.

In the present study, the question of the sequencing of symptoms was examined and it was found that when individual item scores were plotted against severity, all item scores increased more or less consistently with increasing severity. No difference was found between users of the two study drugs, heroin and alcohol, pointing to the possibility that their different reinforcement potential results in varying rates in the development of dependence rather than in a different sequence in the development of specific components. Varying rates in the development of dependence are suggested by the finding of significantly shorter duration of use and of problem use prior to attendance at the treatment agency in the heroin group (see Chapter 7).

2.2 The maintenance of dependence

While there is no obvious temporal or qualitative distinction between the development of dependence and its maintenance, for the purpose of this discussion the question of how dependence is maintained in the face of sometimes adverse consequences is considered.

*“Dependence is not then seen as an all-or-none phenomenon: its severity is judged by the strength of a conditioning process”
(Edwards *et al.* 1972 p. 418)*

Edwards *et al.* (1972) used a simple scale to measure the presence and severity of alcohol dependence which consisted of two questions: “have you ever woken up with your hands very shaky as a result of the previous night’s drinking?” and “have you ever taken a morning drink to steady yourself after a hard night’s drinking?” Respondents were asked to reply in one of three categories: never, once or twice or more than once or twice. These simple questions carried three assumptions about the nature of alcohol dependence: one was that if you had ever had it you would

still have it; the second was that both morning shakes and their relief are diagnostic of alcohol dependence and the third that they were sufficient criteria to distinguish between moderate and severe dependence. While the first assumption has been demonstrated to be false in that dependence has been shown to be capable of change over time in all directions, the assumptions that withdrawal symptoms and their severity are diagnostic of dependence and the degree of its severity remain the subject of debate. What seems less controversial is that the severity of dependence is determined by the strength of a conditioning process: classical and operant conditioning processes provide an explanatory framework for the development and maintenance of dependent behaviour and a number of reviews of the conditioning literature in this field are available (Drummond *et al.* 1995; Siegel 1988, 1999). Drinking alcohol for example provides both positive reinforcement (the euphorogenic effects) and negative reinforcement (avoidance of the loss or absence of such effects and avoidance of withdrawal symptoms in those who experience these). Thus the effects of the drug are capable of reinforcing drug using behaviour in two sorts of ways. While these sources of reinforcement persist, they may be followed by the development of additional sources of reinforcement which further contribute to the maintenance of the behaviour. If regular use is established, tolerance and withdrawal are likely to follow and themselves come to form part of the conditioning process in becoming cues for use of the substance. The evidence for the role of withdrawal symptoms in conditioning alcohol and drug seeking behaviour by setting up a reaction described as craving has been demonstrated over a considerable period of time (Jellinek 1960 p.42; Isbell 1955) and Siegel (1999) has described eighteenth and nineteenth century writing on the subject.

Recognition of the possibility for craving to be occasioned by the experience of withdrawal symptoms following recent drinking or morphine use was coupled with a description of withdrawal symptoms initiating feelings of craving in the absence of such recent use. Macnish (1834) referred to these as “cravings of the body” and “cravings of the mind” (p. 243) respectively, while Isbell distinguished them as “nonsymbolic” and “symbolic” craving respectively. The recognition of a drive to consume alcohol (or morphine) in the event either of recent use or in the absence of recent use led to a dualism in thinking on the subject, where the two sorts of events were distinguished as being either physical or psychological in nature. Rankin *et al.* (1979) referred to this dualism as a gross oversimplification (p. 389). They described craving not as an automatic response but as a response to cues of either physiological, psychological or environmental origin, and went on to describe the physiological, subjective and behavioural components of this response.

The phenomenon of craving in the absence of recent use has been explained in a series of studies which have demonstrated the way in which withdrawal symptoms can be conditioned by the

environment and triggered in the absence of recent alcohol or drug use (Siegel 1999), suggesting that such conditioning may account for the ubiquity of relapse. Ludwig and Wikler (1974) described the commonly seen phenomenon of hospitalised alcoholics who experience no craving or desire for alcohol in the hospital setting and express confidence in the ability to remain abstinent, only to lose that confidence upon discharge when faced with previously conditioned drinking cues.

2.3 Decline in dependence

Although it has been argued (Glautier and Remington 1995) that conditioning processes are not able to account for all observed drug using responses and that the complexity of such processes makes prediction in the individual case difficult, some general principles can nonetheless be agreed. In a Pavlovian conditioning paradigm, the strength of the conditioned response will diminish when the conditioned stimulus is continually presented in the absence of the unconditioned stimulus. Simply put, drug or alcohol seeking behaviour (or the perceived need for the drug) will eventually diminish when drug taking or drinking itself ceases to occur in that environment, but this will be a function of the strength of the original conditioning process: the more powerful the reinforcement which occurs as a result of the drug use (whether this is positive or negative reinforcement) the longer the environment will continue to elicit drug seeking and drug taking behaviour (Siegel 1999). The process of extinction is an active one: if the environment which previously conditioned craving and the desire for use has not been experienced without the reinforcement of such use, then no extinction of the craving response will have occurred. It is the presence of what has been described as a memory of reinforcement, more commonly described as craving which has supported the view that dependence is not something which is exclusively attached to current drinking or drug taking behaviour, but endures through a period of abstinence only to be reinstated in its former strength with subsequent reinforcement.

In the previous section, a number of factors that contribute to a decline in dependence were suggested. With reference to smoking, Russell (1971) implied that such decline rarely occurred; rather that the nature of the reward changed from the pharmacological to the physiological - from smoking for the positive pharmacological reinforcement of nicotine to smoking for the negative reinforcement of avoiding withdrawal effects and that this system of reward remained all powerful until the balance was changed by the introduction of smoking related illness. Russell's figures were based upon prevalence in the earlier part of the 20th century, before

the current attitude change to this behaviour at the societal level resulted in higher levels of smoking cessation accounted for by the diminished expected utility of the behaviour (the greater expectation of resulting illness).

With reference to the drug dependence syndrome, Edwards (1986) emphasised that the alcohol dependence syndrome formulation “carried with it no assumptions as to whether the condition was progressive or irreversible” (p. 172) but the component of rapid reinstatement after a period of abstinence carries the suggestion of a condition which is permanent. Whether this marker of dependence refers to the permanence of a physiological state or to the reinstatement of previously learned behaviour which has been conditioned by this underlying physiological state and which has not been extinguished, observation of the behaviour pattern supported the popular idea that there was no such thing as controlled use following the development of dependence (see for example Heather and Robertson 1997).

A number of animal and human studies show the resilience of the conditioned responses to extinction over time (Childress *et al.* 1986; Siegel 1988; Logan 1993) while other studies suggest that levels of dependence fluctuate in both directions. For example community studies have shown that rates of dependence at one time do not predict rates of dependence at a subsequent time, leading to the assertion of spontaneous remission from alcoholism (Saunders and Kershaw 1979; Polich *et al.* 1981; Vaillant 1983). Robins (1978) demonstrated the effect of a change in the environment on rates of heroin use and dependence in her study of Vietnam war veterans returning to the United States. The relapse rate post detoxification in her sample was in the region of 7%, and long term follow-up identified the ability of respondents who had previously been addicted to heroin in Vietnam to use on an occasional, recreational basis without becoming re-addicted.

Laboratory experiments have shown the ability of patients diagnosed as alcoholics to exercise control over their consumption in the anticipation of relatively more highly valued rewards (Mello *et al.* 1968) thus suggesting that the behaviour of these individuals is subject to the same sorts of reinforcement as the general population and if this is the case then their behaviour should theoretically be able to be learned and extinguished by the same principles. The subjective experiences of craving and impaired control have been shown to be reduced in patients diagnosed as alcoholics following cue exposure procedures in the psychological laboratory (Rankin and Hodgson 1976).

Thus many findings refute assumptions of permanence and irreversibility, but studies have tended to focus on the question of whether dependence predicts future drug use rather than looking at whether and how the dependent state itself changes. It is one of the objectives of the present

study to examine the *way* in which dependence changes over time if indeed it does; the question of whether cognitive or behavioural control is acting on an essentially unchanged state of dependence (Logan 1993) or whether the state itself changes (Rankin and Hodgson 1976) will be addressed in the present study.

The cue exposure work of Rankin and Hodgson (1976) is based upon the assertion that the dependent state will be reduced when the conditioned response is weakened through the assertion of cognitive control. In an experiment designed “to break up the continuation of drinking rather than the initiation of drinking” (Rankin and Hodgson 1976 p. 623), the investigators sought to modify the expectation of withdrawal symptoms created by the consumption of a few drinks in an individual diagnosed as alcohol dependent and thus to extinguish the perceived compulsion to continue drinking. These researchers demonstrated the way in which the craving response to cues for drinking could be extinguished in a subsequent cue exposure trial involving actual and imagined exposure to alcoholic beverages (Rankin *et al.* 1983). O’Brien *et al.* (1992) have shown that cocaine use can be reduced by a passive extinction technique used in an eight week outpatient treatment programme. Patients were repeatedly exposed to “cocaine reminders” while in the safety of the hospital setting and without these conditioned cues being accompanied by the consumption of cocaine.

Childress and her colleagues (Childress *et al.* 1988a, 1988b), in a series of studies in Philadelphia showed that drug using behaviour could be extinguished by cue exposure but that different results would be obtained depending upon whether the behaviour was cued by craving (drug anticipation) or by subjective feelings of withdrawal. Withdrawal symptoms that had been environmentally conditioned were much harder to extinguish than feelings of craving that had been environmentally conditioned. These findings are suggestive of the work of Russell *et al.* (1974) when he showed that at higher levels of severity, smoking is more often conditioned by physiological cues than by social and pharmacological cues.

Belief in the possibility of reducing dependence on addictive substances is based in classical and operant conditioning theory combined with an understanding of cognitive mediating factors. Cue exposure work in clinical settings has yielded disappointing results to date but the reasons proposed are the difficulty in replicating real life conditions in the clinical situation with subsequent problems of generalisability, the sheer number of cues that have been conditioned by the time an individual reaches a treatment setting, the difficulty in identifying these and delivering effective treatment (Dawe and Powell 1995). This, however does not diminish the significance of repeated findings that there is a variety of ways in which dependence changes as well as cases where it does

not. The degree of severity of dependence may be one factor in such change; environmental factors and coping strategies (described above as changes in cognitive and behavioural responses to drug taking cues) have been shown to play an important role.

One of the factors associated with maintaining change in dependent behaviours has been shown to be a change in the environment, the most dramatic example being the experience of the returning Vietnam war veterans where rates of relapse into heroin use were shown to be a tiny fraction of the rates established in civilians following treatment for heroin dependence (Robins *et al.* 1975). Removal of the environment which presents conditioned cues for drug taking reduces the experience of craving by removing the opportunity for conditioned withdrawal to occur. Conditions of radical environmental change such as experienced by the returning Vietnam war veterans are difficult to contrive in the every day clinical situation and do not normally occur in many people's lives. The majority of treated alcohol and heroin addicts will increasingly need to effect behavioural changes in those very situations in which they previously consumed drugs and alcohol. Placed in an environment which formerly conditioned a craving response increases the likelihood of a return to a previous pattern of use. However, the likelihood of such a response is mediated by other factors such as availability of the substance as well as the availability of alternative coping responses. Since the alternative to environmental change would appear to be a change in responses to the environment, the role of coping and its relationship to dependence merits investigation. In Chapter 6, the relationship between coping and relapse is explored and the rationale for investigating the relationship between coping and dependence in a follow-up study of seekers of treatment for alcohol and heroin dependence is discussed.

The questions which the present study seeks to investigate in view of the above involve the nature of change in dependent behaviour: does dependence as measured by the Leeds Dependence Questionnaire (Raistrick *et al.* 1994) diminish over time? Is the course of such diminution different for people with different levels of dependence and are these different levels of dependence associated with different coping styles (cognitive or behavioural coping strategies)? People with high dependence may have less environmental support for change and therefore be using fewer coping strategies than people with low dependence.

2.4 Validity of the dependence construct

In 1986, Edwards reviewed the validity of the dependence construct in order to demonstrate its clinical, epidemiological and heuristic utility (Edwards 1986). While the concept had generated

some debate (for example see Shaw 1979) it was shown to have explanatory and predictive utility.

Describing dependence as the consequence of operant learning wherein morning after withdrawal symptoms are alleviated by further alcohol consumption, the two item scale with three possible response choices described above was used by Edwards *et al.* (1971) to demonstrate a relationship between dependence and drinking behaviour, offences of drunkenness, and violent offences in a sample of prisoners. The questions asked refer to lifetime experience of withdrawal tremor and relief drinking: ‘Have you ever woken up with your hands very shaky?’ and ‘Have you ever taken a morning drink to steady yourself after a hard night’s drinking?’ Responses were awarded one point for ‘once or twice’ and two points for ‘quite often’. Responses were divided into categories of no dependence (0), moderate dependence (1-2) and severe dependence (3-4). With this early attempt at measuring dependence (Edwards *et al.* 1971 p. 395), these authors asserted the importance of distinguishing degrees of dependence by demonstrating that relationships with other factors such as drinking behaviour and social consequences varied not only with the presence or the absence of dependence but also with the degree of the dependence.

Drummond (1990) demonstrated that while dependence as measured by the Severity of Alcohol Dependence Questionnaire (SADQ) (Stockwell *et al.* 1979) was shown to correlate highly with both measures of consumption and of alcohol related problems, a highly significant relationship between dependence and problems was also shown which was independent of the quantity of alcohol consumed. Due to the relative ease of measuring dependence compared to gaining an accurate measure of consumption Raistrick *et al.* (1994) argued that it may be preferable for use in the busy and routine clinical setting. An interesting question would be whether the measure of dependence would constitute a good proxy measure, as Raistrick *et al.* (1994 p.570) argued, or whether the measurement of dependence would in fact improve on the measurement of consumption in its ability to measure the presence and degree of a condition that is shown to persist during a period of abstinence and has been shown to predict relapse (see below, next section). Since the business of the addiction clinic is to target the problems caused by substance misuse and to minimise or to prevent relapse, it could be argued that it is expedient on both counts to have a measure of dependence in routine clinical evaluation.

2.5 Predictive validity of dependence

A series of studies conducted at the Maudsley Hospital during the nineteen-seventies provided evidence that degree of dependence could predict the speed of drinking and the quantity of

alcohol consumed when studied in the psychology laboratory. In these studies, dependence was rated by an independent psychiatrist described as an experienced clinician, as being moderate or severe, using the criteria of lifetime history of withdrawal symptoms and of withdrawal relief drinking. Moderate dependence is defined as “subject has at some time experienced withdrawal symptoms of mild or moderate severity a few times a week for some months...on occasion engaged in withdrawal drinking...his drinking pattern is beginning to show some impoverishment of repertoire”. Severe dependence is defined as “subject has at some time experienced withdrawal symptoms of moderate or severe intensity over a period of at least six months, occurring every day or nearly every day. His drinking repertoire is narrowed to a stereo type pattern”. (Hodgson *et al.* 1979 p. 382). No explanation is offered of the seemingly arbitrary figure of six months nor for the implications of the possibility that “at some time” could have referred to ten years ago; these ratings were validated in a study by Orford *et al.* (1976) in which they were shown to be predictive of abstinent or controlled drinking outcomes.

Using this method to rate dependence, Hodgson *et al.* (1979) found that high dependence respondents drank significantly more alcohol during behavioural tests, drank the first drink significantly more quickly and reported greater desire for a drink than respondents rated as moderately dependent. Moreover, the respondents rated with high dependence consumed the first drink significantly more quickly (as measured by number of sips and time taken to consume the drink) after a high priming dose than they did after no priming dose. This was found not to be the case for respondents rated as being of moderate dependence. Hodgson *et al.* (1979) also demonstrated that degree of dependence determined whether craving for alcohol was primed by a high dose of alcohol. Craving for alcohol, described as a “system of interrelated responses involving subjective, physiological, behavioural and biochemical components” (Hodgson *et al.* 1979 p. 380) was measured by a subjective rating of desire for a drink, pulse, blood alcohol level as calculated from a fuel cell breathalyser and time taken to consume one drink. In yet another study (Rankin *et al.* 1980) a behavioural measure of dependence based upon speed of drinking and amount consumed was shown to correlate with craving.

Using a balanced placebo design (Marlatt *et al.* 1973) to investigate the possible mediating role of cognitive factors, Stockwell *et al.* (1982) found that the priming effect described above was influenced by both cognitive and physiological factors in high dependence study participants whereas it was influenced only by cognitive factors in the moderately dependent participants. Study participants rated with severe dependence drank more quickly if they were given alcohol, regardless of whether they had been told that they were given alcohol or given a soft drink and they expressed

greater desire to drink if they were told they were given alcohol than if they were told they were given a soft drink. Moderately dependent participants drank more quickly if they were told they had been given alcohol regardless of the content of the drink. As the authors note in the discussion of their findings “the demonstrable importance of psychobiological aspects of alcohol dependence in no way undermines a learning model account of the syndrome” (Stockwell *et al.* 1982 p. 521), but does give support to the view that severity of dependence predicts responsiveness to alcohol related cues.

The studies noted above have important explanatory power in the predictive validity of degree of dependence with reference to abstinence or controlled drinking outcomes. Sanchez-Craig *et al.* (1984) and Foy *et al.* (1984) found that severity of dependence predicted abstinent or moderation drinking outcomes regardless of the goal of the treatment to which their subjects were assigned. Polich *et al.* (1981) found that severity of dependence distinguished respondents who had attained a moderation drinking goal at eighteen months and at four years from those who achieved an abstinence goal. Orford *et al.* (1976) also distinguished drinking outcomes by severity of dependence: moderate drinking outcomes were more often found for subjects with low dependence as measured by the two category rating of severity described above. When a ten year follow-up of this cohort was conducted (Edwards *et al.* 1983), eight subjects were found to be engaging in social drinking of whom seven scored below 30 on the SADQ (range of possible scores: 0-60) (Stockwell *et al.* 1979), while the eighth subject who was found to be engaging in ‘social drinking’ had a higher dependence score of 36. However, the problem with using this study in support of the predictive validity of dependence is that dependence was rated at follow-up using the SADQ, which was not available at the time these study participants were first assessed. The rationale is that the SADQ initially measured lifetime dependence with the implicit assumption that if one had once been dependent one must not only still be dependent but must still be experiencing the same degree of dependence. It is in the face of such evidence that the plea made by Rankin *et al.* (1980) for considering the degree of dependence in experiments on controlled drinking (and equally in clinical practice) was made.

In a further study (Rankin *et al.* 1982) demonstrating the effect of degree of dependence on the perception of cues for drinking, respondents were presented with a list of 33 situations that comprised social situations, positive mood states, negative mood states, high arousal situations, low arousal situations, drink-related situations, adverse physical states and withdrawal states and were asked how frequently they would drink if faced with these situations. They were asked to rate their responses on a four point scale ranging from ‘hardly ever’ to ‘nearly always’. When the results were

analysed by degree of dependence groups (moderate and severe), significant differences in responses were found for all but seven of the variables. The largest differences were found for those variables thought to be referring to withdrawal states, the priming effect of alcohol and physical symptoms. When the items were subjected to Principal Components Analysis for high dependence and low dependence subjects separately, the main factor to emerge for the high dependence group which accounted for 40.4 per cent of the variance was represented by the withdrawal state items while two main factors accounting for 32.7 and 14.5 per cent of the variance in the moderate dependence group and were made up of withdrawal effects and negative mood states respectively. The authors note that the high dependence group endorsed not only withdrawal states but also alcohol related cues “far more” than the moderately dependent group and while negative mood states were more frequent setting events than withdrawal for the moderately dependent group, the severely dependent group still endorsed them significantly more frequently. Again these authors stress that the findings do not lend weight to the idea that dependence *is* a physiological state:

“We would maintain that severe withdrawal symptoms are simply a sign of severe dependence, as well as a strong motivation for further drinking” (Rankin *et al.* 1982 p. 295)

The physiological state associated with severe dependence becomes an important source of motivation for drinking and potent reinforcer of the drinking behaviour.

On the question of the ability of dependence to predict relapse and outcomes other than drinking, a number of studies are relevant. Heather *et al.* (1983) found that dependence as measured by the SADQ (Stockwell *et al.* 1979), described as an objective measure of withdrawal and withdrawal relief drinking by the authors, did not predict drinking outcome at six month follow-up whereas a subjective measure of dependence, constructed from an adapted set of questions devised by Schaefer (1971) did show significant correlations with drinking outcomes.

Babor *et al.* (1987a) examined the ‘rapid reinstatement of the syndrome after a period of abstinence’ element of the drug and alcohol dependence syndrome (Edwards *et al.* 1982) because on the one hand this marker was suggestive of the possibility that, in its severe form, dependence may be irreversible, (Edwards and Gross 1976) but on the other hand, it may provide the basis for a theory of relapse (Babor *et al.* 1987a p. 393). Five hypothetical dependence syndrome items (withdrawal, tolerance, salience of alcohol seeking behaviour relative to other important activities, the subjective awareness of a compulsion to drink and the use of alcohol to relieve or avoid

withdrawal symptoms) were rated using a fifteen item subset of the 62 item Last Six Months of Drinking Questionnaire (Hesselbrock *et al.* 1983). The authors report their reliability analysis for this 15 item set which was used to measure recent dependence symptoms (last six months). A separate measure was used to measure lifetime dependence symptoms, namely the alcohol dependence / abuse section of the National Institute of Mental Health Diagnostic Interview Schedule (Robins *et al.* 1981). Three measures of reinstatement of the syndrome were used to test their hypothesis that degree of dependence at admission to treatment predicted reinstatement of the syndrome at twelve month follow-up where alcoholic patients had attempted to drink following a period of abstinence. Among these was a repeat of the measure of dependence described above, a measure of the amount of time between first drink and daily drinking and the number of hospital treatment episodes for alcohol problems since the index treatment in alcoholics but not in opiate addicts. Rapidity of reinstatement as measured by dependence at follow-up was predicted by lifetime and recent dependence at intake for both males and females, but when reinstatement was measured using time between first and daily drinking and number of hospital treatments, a gender difference emerged. These measures did predict rapidity of reinstatement for the male group but not for the female group. They also found that severity of recent dependence at intake predicted intensity of craving for abstinent males and females at follow-up.

Different measures of dependence and of reinstatement were used to examine the hypothesis in opiate users. Drug and alcohol severity composites of the Addiction Severity Index (McLellan *et al.* 1980) were used as “provisional surrogates of dependence syndrome measures” (Babor *et al.* 1987a p. 401) and reinstatement was measured by a dichotomous measure of return to daily heroin use and by the amount of time between first use of heroin following a period of abstinence and daily heroin use. Drug severity at intake predicted severity at follow-up for only one of the three samples investigated but none of the indicators of prior dependence at intake predicted reinstatement of the syndrome following a period of abstinence.

The sheer diversity of the instruments used to measure dependence and other behaviours and outcomes with which it is compared render the drawing of conclusions difficult. This appears as much the case now as it was in the mid-eighties when Duckitt *et al.* (1985) proposed that there was emerging evidence that dependence was an important mediating variable between different outcome measures (level of consumption, social adjustment, mental health) but that “imperfect and post hoc measures of dependence would be insufficient for establishing these relationships with any certainty” (Duckitt *et al.* 1985 p. 161).

Noting the variety of instruments used to measure dependence, Edwards (1986 p. 181)

claimed that accumulating evidence for internal validity demonstrating coherence for the structure of the syndrome was derived across the range of the instruments. None of the instruments mentioned in his review claimed to measure all elements of the syndrome and in many, the difficulty in operationalising some of those elements was offered by way of an explanation for this. With the benefit of hindsight one might question whether some of these are measures of dependence at all, and if they are, whether sufficient validation research commends their use. Furthermore, a retrospectively established correlation between dependence and other measures which lacks any analysis regarding the sequence of the factors being correlated provides insufficient evidence for predictive validity. In spite of these considerations there appears to be sufficient evidence for the predictive validity of the dependence construct and questionnaires designed to measure the construct are examined in the next chapter.

Chapter 3

The measurement of dependence

3.0 Introduction

In this chapter a number of methods of measuring dependence, based primarily upon self-report are described; in the first section of the chapter, the use of self-report in the measurement of dependence is discussed. Methods for the enhancement of validity and reliability are examined. In the second part of the chapter, scales developed for the measurement of dependence are described and compared. The principle that dependence “may be seen as being distributed along a dimension rather than being a categorical state” (Gossop *et al.* 1995 p. 608) is now well established and therefore underlies the selection of scales discussed. Scales measuring the categorical state are not described, nor are scales measuring a unitary concept of alcoholism or drug addiction. The scales discussed below measure dependence as it is understood in the disaggregation of dependence and problems or consequences of use. Most, but not all scales designed to measure the dependence syndrome are substance specific due to retention of the neuroadapted state as an element of the syndrome.

3.1 Self-report is the most usual method of measuring substance use

Self-report procedures have become the dominant form of obtaining clinical data on alcohol problems, between 81% and 90% of studies reviewed by Babor *et al.* (1987b) and, due to greater problems with other procedures, “are likely to remain an essential research method” (Hammersley 1994). This is also the case for drug misuse research (Maisto *et al.* 1990) and practice (Sobell *et al.* 1995). As all measures used in the present study are based upon self-report, there follows a review of the literature on the efficacy of this method.

The accuracy of self-report in individuals with alcohol and drug problems both in treatment and not in treatment has been questioned, possibly due in part to the view that a component of the addicted state is to deny the existence or the severity of the problem. Some of the research on the validity of self-report suffers from methodological problems (and these are discussed below) but the sum of the evidence is positive. A consensus amongst researchers is that, rather than ask whether or

not self-report is accurate (likely to be an unanswerable question), it may be of greater value to investigate the validity and reliability of self-report in help seekers and other groups of substance users. In the following sections the factors affecting self-report are described, the evidence for its reliability and validity is reviewed and some methods for enhancing these are presented.

3.2 The reliability of responses

Recall and social desirability were found by Embree and Whitehead (1993) to be salient factors in the reliability and validity of self-reported drinking behaviour; they proposed that questions designed to aid recall and mitigate the effects of social desirability would enhance the reliability and validity of responses.

3.2.1 Recall

Self-report relies heavily on recall. Hammersley (1994) has examined the psychological and social factors influencing recall and made specific proposals for the handling of self-report data whether this is for current events, attitudes or beliefs or based upon recall of past events. He describes the general phenomena affecting self-report: the storage and retrieval of information are active processes subject to the influence of current social, cognitive and affective demands; the result is that there is no such thing as storage of information in a pure form. Information is encoded and stored differently according to what is going on at the time. The same is the case for recall. The memory of events will be influenced by the circumstances in which they are recalled, the emotional value or meaning of the events and the influence of events that have subsequently occurred. In other words there is a process of interpretation going on which shapes the way events, feelings and thoughts are both stored and retrieved.

Several findings reviewed by Hammersley (1994) have particular relevance for drug and alcohol research. Memory is in general poor for numerical data, timing, dates and age. The routine is less well remembered than vivid or unusual events. A memory may be changed by the thoughts about the event that the person has each time they recall that event. The requirements of the recall situation can shape the way the memory is presented and therefore the way that it is perceived by the person presenting it. In addition to this, a number of drugs are known to impair attention and concentration, performance and recall. Alcohol (Ron 1983, Tarter and Schneider 1976), benzodiazepines (Curran 1986), and cannabis (Solowij 1998) have been shown to impair memory in both the short and the long term. Both benzodiazepine (Rubin and Morrison 1992) and cannabis

(McBride 1995) use have been found to be high amongst people attending agencies for treatment of alcohol dependence and misuse. The influence of the substance is shaped by current state of intoxication or withdrawal, both at the time the event occurred or at the time of retrieval. Transient cognitive deficits relating to memory and resulting from a bout of heavy drinking can be measured in patients with alcohol dependence up to ten days after cessation of alcohol consumption (Ron 1983). The history of substance use, most specifically drinking, where it has resulted in brain tissue damage, may also be relevant.

Ptacek *et al.* (1994) found limited correspondence between daily assessment of current coping and retrospective coping recall where there was only a five day time lag between current recording of coping strategies and retrospective report for the same activities. These authors felt that they had maximised the conditions for accurate recall by requiring study participants to record and therefore be fully conscious of methods of coping at the time they occurred. A number of methodological difficulties are identified in the study: the use of different instruments to assess coping at the two different times, the specific nature of the identified stressor (an upcoming examination) and the highly specific nature of the study group (namely undergraduate students). However, this study does emphasise some of the problems of the influence of concurrent events, thoughts and feelings and the interpretation of events during storage and recall identified by Hammersley (1994) and others discussed below.

Grant *et al.* (1997), on the other hand, found that self-reports of alcohol consumption, collected on average 231 days (range 53 to 570) after the drinking had occurred were reasonably accurate when compared to self-report immediately following the drinking period in question. The authors found that:

“Particularly for global drinking measures such as percentage of drinking days and volume of consumption, the correlation coefficients from our study approach the test re-test reliability of alcohol measures over short spans of time.” (Grant *et al.* 1997 p. 604)

Furthermore, this study found no systematic bias in over-reporting or under-reporting at the point of remote reconstruction.

3.2.2 *Social desirability*

The embarrassment experienced in reporting the behaviour, whether this is associated with

recent events or the perceived stigma attached to the condition or its consequences, the actual or potential illicit nature of the behaviour or its consequences are sources of social desirability bias in self-report (Oppenheim 1992). The setting and the type of information sought may compound these sources of potential bias. In the clinical setting, a similar source of bias may stem from the perceived utility of giving a particular report. Thus for heroin, over-report may be accounted for by fear of the medical practitioner underestimating the severity of withdrawal distress and prescribing insufficient doses of a drug to relieve this, while for alcohol, under-reporting may be due to reluctance to pursue an abstinence goal of treatment. On the other hand, Maisto *et al.* (1990) point out that, depending on the situation in which self-report is requested, patients in treatment may not wish to disclose heroin use at all for fear of being removed from the treatment programme. The same principle would hold for patients in abstinence oriented treatment of alcohol problems. Such bias may be relevant at the follow-up and would not operate at intake in a clinical sample.

3.2.3 *Other sources of bias*

Embree and Whitehead (1993) point out two further sources of bias in the reliability of self-report data: random error in data collection and recording and misinterpretation of interviewer questions or respondents' replies. Babor *et al.* (1987b) classify the factors affecting the validity of self-report as either task variables or respondent variables. Task variables refer to the situation or the procedures used to elicit the information. Situational factors include the manner of the interviewer, the extent to which the nature and purpose of the task are explained, confidentiality and the belief that anonymity will be protected, the question of whether the purpose of information gathering is to decide a suitable treatment or to assess outcome. Procedural factors are the duration and complexity of the task including the criterion interval and the conceptual level of the questions, the clarity of the instructions and the sensitivity of the questions. Respondent variables include the ability to understand, modified by language and conceptual ability, drug or alcohol related cognitive impairment, state of intoxication, anxiety and general physical condition, self esteem and perceived social desirability of responses.

Hesselbrock *et al.* (1983) refer to the demand characteristics of the situation as being important in enhancing or reducing the accuracy of self-report. In a study of the validity of self-report measures, they were able to demonstrate that in the hospital situation, using volunteer patients in a research setting where a "scientific aura" (p. 607) was established, where patients had been admitted because of their alcohol problems, the giving of an inaccurate report would be neither functional nor credible, unlike in the home, employment or similar situation.

Problems of bias are addressed in the design of self completion instruments used to obtain clinical data. Often measures are validated for a specific population and may need further validation in different populations. Cultural neutrality can be relevant to different age groups as well as to those more commonly applied criteria for cultural diversity. For example, MacEwan (personal communication) found that a questionnaire measuring readiness to change in problem drinkers (Rollnick *et al.* 1992) that had been validated in Australia could not be understood by a population of Maori in New Zealand due to the wording of the questions.

3.2.4 Retest reliability of self-report

Babor *et al.* (1987b) described 17 studies which evaluated the test-retest reliability of self-report using a variety of measures of self-reported drinking and consequences in different population groups including inpatients, pregnant women, college students, homeless people and adolescents. Acceptable levels of reliability were reported and these varied between the different populations and for different measures targeting different behaviours. In general in the studies reviewed, reports of frequency of drinking were more reliable than reports of quantity, it being easier to recall on how many days alcohol was consumed as opposed to how much alcohol was consumed. In the present main study, quantity of alcohol or heroin consumed on the heaviest day in the past week was asked about as a day that may have stood out above the rest. Number of drinking or drug taking days out of the past seven constituted the frequency question.

The conclusion offered by Maisto *et al.* (1990) for the accuracy of the self-report of drug users is rather less enthusiastic. In a review of fourteen studies of the reliability and accuracy of drug users' self-report of their drug use, the authors concluded that while their analysis of the data provided "some evidence for self-report accuracy...the degree of accuracy is not high" (Maisto *et al.* 1990 p. 120). Nonetheless these authors conclude that the way forward is to enhance the reliability and validity of self-report rather than simply dismiss the method as being too inaccurate.

Reliability and validity are affected by the same variables, classified below as task variables and respondent variables. With reference to task variables, the reliability and validity of the instruments chosen for assessment is an essential prerequisite.

3.3 The validity of self-report

Chermack *et al.* (1998) tested the validity of self-report in the context of screening for alcoholism in medical settings. They compared self-report with collateral report in 581 pairs of medical patient and collateral responses. Patient and collateral reports of alcohol consumption and

consequences showed marginal concordance with no significant difference between the two sets of reports for alcohol consumption. Collaterals reported fewer consequences than patients. Collateral reports only marginally improved the identification of alcohol dependence and the authors concluded that self-report was a valid method for detecting and assessing alcohol problems.

One might have predicted that the elderly would have more problems with recall or that social desirability might work differently for the elderly than it would for the young. However, Tucker *et al.* (1991) found “excellent agreement” for a group of adults aged over 60 years and their collaterals on self monitoring reports of number of drinking days and quantity of alcohol consumed per day, including temporal patterning of intake. No comparative data with young people were reported in this study.

In the review of 17 studies of self-reported drinking and related behaviour by Babor *et al.* (1987b) mentioned above, collateral reports were used as the criterion measure. Although correlations varied for measures used, moderate to good, statistically significant correlations were found in all of them. A further five studies were reviewed where self-reported alcohol related behaviour was compared with official records. Moderate to good agreement was consistently found and in the majority of disagreements, self-reports over-reported compared to official reports. The authors conclude that this is likely to reflect the inadequacy of official reports. Eleven further studies were reviewed where self-report was compared with a variety of other objective and subjective criteria, for example breath alcohol tests, blood alcohol tests, mental health professionals’ judgment and a variety of monitoring instruments. In these studies the finding of a positive correlation was much more likely to be affected by the situation, the state of intoxication in the respondent and the quality of judgments that professionals are able to make given the amount of contact and the effects, for example, of tolerance on the behaviour of the intoxicated individual.

In summary, studies of self-reported drinking appear to have shown that, in the great majority of cases, collateral report is consistent with self-report; where there is disagreement there appears to be no systematic direction to the disagreement (Babor *et al.* 1987b) and thus it cannot be compensated for.

3.3.1 Methodology of validating of self-report: collaterals

A number of the problems of using collateral report to validate self-report are due to the fact that collateral report is usually not itself validated, but presumed (possibly due to prejudice described above) to be the more accurate. Collateral report is likely to be impaired by problems of frequency of contact and by problems of assessment of the drinking level and consequences based

upon observation. With reference to opiate users, Maisto *et al.* (1990) raise the question of what a collateral source can know about an individual's drug use.

On the question of methods of validating the self-report of alcoholics, Watson *et al.* (1984) suggest that when self-report has been compared to collateral report the assumption that, of the two, collateral report is the more accurate may be a false one to make. Collaterals, whether they are family members, friends or colleagues may well overestimate the extent of drinking for many reasons, for example the fear that their report will not be taken sufficiently seriously, or they may simply be making guesses. They found that 74% of alcoholics' self-report did coincide with collaterals' reports, but that in three quarters of the remaining cases, self-descriptions underated collateral reports. The systematic way in which the reporting varied in those cases where there was no concurrence of reports led the authors to the conclusion that alcoholics framed their drinking in a more favourable light than collaterals. They do, however, admit that they used the collateral ratings of consumption as their criterion without having any validation data for so doing. Moreover, they found that the differences in reporting varied according to whether high consumption or low consumption and abstinence were being reported. Self-report and collateral report were more consistent in cases of the latter. Their conclusion that the lack of concurrence between self-report and collateral report is sufficient ground to doubt the utility of self-report in follow up studies rather flies in the face of the critique they presented of their own work. They have though highlighted some important methodological questions in the validation of self-report.

Midanik (1988), in her review and assessment of the literature on the validity of self-reported alcohol use, criticises the way that correlations between two measures or two reports have been used as measures of validity, assuming that one of the measures is the criterion measure when it may well not have been validated as such. The example she gives in alcohol research is the commonly held assumption that the source reporting higher alcohol consumption is necessarily the more accurate one where validation of the criterion measure may not have been reported. She then identifies those factors which either enhance or diminish accuracy and makes the case for ensuring they are addressed with the aim of maximising the validity of self-report rather than settling a dispute about whether or not it can be accurate.

In an earlier review of the literature on agreement between self and collateral report, Midanik found no consistent direction of error in reporting (Midanik 1982). She cited the work of Polich (1982) who found disagreements between self and collateral report to be in both directions with "little or no net bias in self-reports" (p. 124). He concluded that, in view of the many instances of discrepant reports, random errors may attenuate correlations. Midanik reported the finding that

correlation between reports varies depending on the nature of the information sought, for example, hospitalisations or imprisonments due to alcohol consumption, total days drinking or abstinent, quantity of alcohol consumed (for example O'Farrell *et al.* 1984; Maisto *et al.* 1983; Hesselbrock *et al.* 1983). With reference to specific information, both Hesselbrock *et al.* (1983) and Polich (1982) reported high correspondence between subject and collateral reports on any drinking and when errors did occur, they were in the direction of the respondent reporting higher consumption of alcohol than the collateral, further lending support to the caution that collaterals are less likely to have regular access to information about drinking, nor is their report usually validated in its own right.

In their review of studies of self-report in drug users, Maisto *et al.* (1990) also found that the inconsistency between collateral and self-report was in both directions and could not necessarily be determined by the nature of the collateral. In one study, probation officers reported less use than the drug using clients and in another, treatment staff reported drug use highly consistently with their clients. Their findings emphasise the way that no single factor contributing to potential bias should be taken into account in isolation but each addressed in the context of the others.

Sobell *et al.* (1979) compared the accuracy of mental health professionals' judgement of patient intoxication with breath alcohol level and found agreement in 40-78% of cases; false negatives were more common than false positives. Babor and colleagues (1987b) suggest one source of such discrepancy may be the presence of tolerance which masks common signs of intoxication in regular heavy users. It could be argued that a positive breath or blood alcohol level in tolerant respondents may affect the accuracy of their report to a lesser degree than in non-tolerant respondents but there would be considerable variation between individuals. Blood and breath tests are the objective measures most commonly used for assessing current state and methods for immediate reading are available. In the present main study such tests were deemed to be excessively intrusive on first or subsequent contact and were therefore ruled inappropriate for use. Judgement by the person administering the questions and questionnaires was relied upon, recognising the potential difficulties outlined above.

3.3.2 Other measures used in the validation of self-report

Babor *et al.* (1987b) cite several studies in which consistency was found when self-report was tested by using multiple measures for alcohol related behaviour. Different methods of obtaining information, for example a retrospective or prospective diary method and an estimate of quantity and frequency (Redman *et al.* 1987), a time-line interview method (Sobell *et al.* 1982; Sobell *et al.*

1988) yield information which is different in inconsistent ways from that given by criterion measures or collateral report. Biochemical markers of alcohol consumption have been found to add little to self-report in alcohol patients as they lack sensitivity (Cushman *et al.* 1984) or specificity (Monteiro and Masur 1986); Limin *et al.* (1999) additionally found that sensitivity and specificity for both gamma-glutamyl-transferase (GGT) and carbohydrate-deficient transferrin (CDT) were considerably lower in their study than previous reports. In an investigation of the relative utility of these biological markers of alcohol consumption, Mitchell *et al.* (1997) found that sensitivity was greater for CDT than for GGT while specificity was greater for GGT than for CDT. Drummond and Ghodse (1999) have recommended combining biochemical tests with interview methods to enhance precision in both clinical and research settings.

Problems with concurrent urinalysis in drug users include difficulties in interpretation when the presence of some drugs is suggested by the presence of their metabolite only, the different time lags between use and appearance and disappearance of the drug from the urine, the need to repeat tests and the different ability of tests to detect different drugs. In the case of their use for the purpose of validation of self or collateral report, it has been pointed out by Maisto *et al.* (1990) that pharmacy preparations may contain compounds of which the user is unaware.

In a recent study, Babor *et al.* (2000) examined the correspondence between self-reported drinking, biological markers (liver function tests) and reports of collateral informants in a large scale clinical trial of treatment for alcohol problems (Project MATCH Research Group 1997) and concluded that self-report provided the most accurate source of data showing only moderate correlations with collateral report and even lower correlations with biological measures. These authors demonstrated that correlations varied with the timing (pre- or post-treatment) of the data collection and that the feasibility of collecting the different data varied at each data collection point. Therefore these measures could not be used as substitutes for each other, nor could it be concluded that each measure provided information on a unique aspect of drinking because of the possibility that the collateral and biological measures were simply less sensitive to drinking. Their concluding recommendations were to enhance the accuracy of self-report by providing recall cues and emphasising the importance of accurate information.

Midanik reviews other methods which include computer based questionnaires and interviewing, personal interviewing in a variety of techniques and laboratory tests of breath, sweat, urine and blood (hair testing for drugs has been developed subsequently). Given that the laboratory tests, though useful for specific diagnostic and confirmatory purposes can give information with only low specificity and low sensitivity on quantity and frequency of use, Midanik concludes that

the way forward is to enhance the accuracy of self-report by examining the interactions of the four main factors which affect it. These are: the interview situation, how the information is elicited, what is going on with the respondent at the time and the context of the interview.

3.3.3 Enhancing the validity of self-report

Citing Lessler and Sirken (1985), in a (US) National Center for Health Statistics study, Midanik (1988) proposed the following key questions needed to be addressed in consideration of the validation of information gathering methods. Some of these questions have been addressed in the present study: i) the effects of bounded and unbounded reference periods on the temporal judgements of survey respondents. This question is addressed with reference to each of the measurement instruments used in the present study; ii) the effects of complex concepts on the comprehension of survey questions. This issue is discussed with reference to the Leeds Dependence Questionnaire, the testing of its readability and participants' responses to it in Chapter 4. Questions relating to the complexity of the instruction given for completion of the Impaired Control Scale are discussed in Chapter 5. iii) The effects of conditioning on responses to survey questions. Differences between questionnaires and time lag between responses would not allow for conditioning of the response to occur, though problems of response set relating to one of the instruments used (namely the Impaired Control Scale) are discussed in Chapter 5.

3.3.4. Maximising the reliability and validity of self-report

In conclusion, verbal report procedures have become the dominant form of obtaining clinical data on alcohol and drug problems. The question of whether or not they are reliable is less easy to address than the question to what extent do the instruments used and the circumstances of their administration enhance their reliability. There is evidence that reliability and validity vary depending upon the context and timing of information gathering, the characteristics of the person gathering the information, the state, both physical and motivational, of the respondent and the sensitivity of the information sought. Rather than pursue categorical answers about reliability and validity, the question of when bias does occur and what might be the best ways for minimising it are the key issues to be addressed.

Table 3.1 summarises the sources of bias and the proposed remedial action to minimise their effect which have been discussed above.

Table 3.1 *Sources of bias in self-report and proposed solutions*
(adapted from Babor et al. 1987b)

Source of bias	Proposed solution
Ambiguous role requirements or task definition	Guarantee anonymity / confidentiality Give clear instructions / examples Emphasise scientific role and separation from the clinical process
Specificity of desired responses	Word questions accurately Ask multiple questions and probe questions
Interviewer bias and unreliability	Train interviewers in appropriate interview techniques Standardise and check protocols
Forgetting, telescoping	Increase question length Give good instructions Assist with recall, using memory aids and bounded recall
Response distortion	Alert subject to problem Include recognition questions Use diaries / calendars / time line
Motivation	Get agreement of commitment Explain purpose and value Give clear instructions re the procedures, times and other expectations Give prompts / encouragement / reinforcement and session feedback

Each of these sources of bias was addressed in preparation for the collection of data in the present studies. The procedures put in place for doing so in the validation study are described in Chapters 5 and 6. The extent to which they were addressed in the measures and procedures of the main study is described in Chapter 7.

3.4 Self-report measures of dependence

There are several methods for measuring dependence, some based upon a particular theory of the nature of dependence and some based in factor analysis of an aggregate view of substance related problems. Those chosen for the present discussion are based in the disaggregation of dependence and problems, measure dependence as a continuum and are self-report measures. The first four instruments described measure the alcohol dependence syndrome, one of these includes the adapted version of the scale. Thereafter, a scale designed to measure the drug dependence

syndrome with specific reference to opiates is described. There follows a description of two instruments designed to measure substance dependence as a psychological phenomenon, the first requiring adaptation of the wording for use with different drug using groups; the second requires no such adaptation.

3.4.1 The Severity of Alcohol Dependence Questionnaire (SADQ) and the community version, the SADQ-C

The Severity of Alcohol Dependence Questionnaire was first reported in 1979 (Stockwell *et al.* 1979) as a thirty-three item self-completion scale consisting of five sections measuring physical withdrawal, affective withdrawal, withdrawal relief, typical daily consumption and a section entitled “The morning after two days heavy drinking following at least four weeks abstinence” (p. 87). Its validation is based upon the scores of 104 respondents who were in-patients and out-patients at two alcohol treatment units, 91 of whom were breathalysed and given a structured interview about their drinking habits. A rating of alcohol dependence was made on the basis of the case notes of 72 of the respondents by a single experienced clinician. Eighty-two per cent of these were matched concordantly with severity ratings by the SADQ.

After extracting items which yielded the lowest loadings on the principal component as analysed for each section separately, factor analysis of the pooled items of sections 1, 2, 3 and 5 (excluding the section on consumption) yielded a single main factor which accounted for 53% of the variance. The scores for the five subscales correlated between 0.69 and 0.80 with the total SADQ scores. The authors maintained that “the correlations are sufficiently high and uniform to justify summing the scores from all *five* sections to yield the final measure” (p. 84). This seems to assume that heavy consumption of alcohol is an element of dependence rather than one that is strongly correlated with it.

Furthermore, since there were no items testing the salience of drink seeking behaviour, the narrowing of drinking repertoire or some of the subjective awareness of the compulsion to drink elements such as impaired control and difficulty in abstaining, the scale cannot be said to measure the dependence syndrome as described by Edwards and Gross (1976) nor can it be used as evidence of the unitary nature of this syndrome. Having claimed that the SADQ “was designed to cover central features of the alcohol dependence syndrome most amenable to measurement...” (Stockwell *et al.* 1979 p. 80), the authors then go on to say that:

"There are few items which directly correspond to a 'drive to consume alcohol' as indicated by, for example 'the salience of drink seeking behaviour' or 'narrowing of drinking repertoire' since it was felt that such variables were too subtle for a simple inventory to cope with." (p. 80)

It is not clear then, what is the basis of the earlier claim. Factor analysis of the SADQ can neither be claimed as evidence of the unidimensionality of the core construct of alcohol dependence nor can it be said to measure this core construct on the basis of the statement made by the authors of the questionnaire that some of the elements of the syndrome were not addressed in the questionnaire at all.

It has been argued that the factorial structure of a particular scale may ultimately tell us more about the scale items than the syndrome (Davidson *et al.* 1989) and the application of factor analysis alone cannot tell us about source constructs; it needs to be applied within a rigorous and comprehensive programme of scientific work. Further validation of the SADQ was reported in 1983 (Stockwell *et al.* 1983) when the authors again claimed:

"support for the existence of a cluster of related phenomena, arranged upon a continuum of severity and corresponding to the essential elements of the 'alcohol dependence syndrome'." (p. 146)

By this time the SADQ had been reduced to a 20 item scale in five sections with four items in each section. The respondent is asked about a previous month "typical of their heavy drinking" and this instruction could be varied according to the needs of the study in which the scale was being used. Test re-test reliability is reported as well as the ability of the scale to discriminate between patient populations being treated for problems of alcohol dependence compared to patients being treated at a liver unit.

SADQ scores were compared with a measure of 'narrowing of drinking repertoire' which was ascertained by the Drinking Pattern Interview, an interview schedule designed as a variability index with which it was hypothesised that SADQ scores would show negative correlation. This was shown to be the case. Again it is not entirely clear how the authors can claim that the SADQ measures the core elements of the alcohol dependence syndrome, of which narrowing of the

drinking repertoire is said to be one, and then to use this as a criterion measure against which to validate the scale.

Nevertheless, the SADQ is a widely used scale. Criticisms of the SADQ, some of which are summarised by Davidson (1987), are that it does not measure all elements of the dependence syndrome and in fact only covers physical withdrawal and relief drinking, that it fails to measure the element described as “a leading symptom”, namely “impaired control over intake of the drug ethyl alcohol” (Edwards *et al.* 1977a p. 17), and that it has been validated in specialist clinical samples and not in the general population when claims for it are that it measures a phenomenon which is continuous and must therefore be detectable in the general population. Responding to these criticisms, Stockwell *et al.* (1994) adapted the SADQ for use in a community sample. They made a number of changes to the instructions and response choices and, without changing the item wording at all, administered the original and the adapted questionnaires to a general population sample and attenders at a controlled drinking clinic. Scores for the adapted scale, the SADQ-C correlated very highly with scores for the SADQ in the clinic sample. Correlations for the sections of the SADQ-C and the five item Impaired Control Questionnaire (ICQ) (discussed below in Chapter 5) were also high and Principal Components Analysis revealed a single factor accounting for 71.7% of the variance.

In the community sample, both SADQ-C items and ICQ were frequently positively endorsed. However, in Principal Components Analysis and correlational analyses, the reinstatement section items loaded on a different factor to the main factor on which all other SADQ-C scores loaded and which accounted for 50.8% of the variance. In the previous discussion, the inclusion of reinstatement as one of the elements of dependence was questioned.

In summary the authors conclude that, again, alcohol dependence has been shown to be a uni-dimensional construct whether applied to problem drinkers or to all people who drink regularly. Furthermore, they assert that:

“the failure of the ‘Reinstatement’ of dependence items in the SADQ-C for the community sample should not be interpreted as indicating a lack of coherence of the Alcohol Dependence Syndrome concept. The high frequency of positive responses to these items in the absence of positive responses to other dependence items indicates that they only measure beliefs about

a hypothetical situation rather than an actual experience of dependence being reinstated.” (p. 173)

The changed instruction in the SADQ-C was the request to focus on the past three months, rather than on a recent heavy drinking episode as in the original version of the SADQ and the authors suggest on this basis that the SADQ-C may be better suited for use as a treatment outcome measure. Additionally they refer to the possible ability of the scale, with and without the Impaired Control Questionnaire, to predict controlled drinking outcomes in the way that other researchers (for example Heather *et al.* 1998) have been able to do with the measurement of impaired control alone.

3.4.2 The Alcohol Dependence Scale (ADS)

Described by the authors (Skinner and Allen 1982) as a brief, 29 item self-completion scale that measures the Alcohol Dependence Syndrome, this scale was derived from factor analysis of the Alcohol Use Inventory (Horn *et al.* 1974) which predated description of the alcohol dependence syndrome. It was validated in a sample of 225 individuals seeking treatment for alcohol problems at a large clinical institution in Canada for very specific purposes namely:

“(a) to examine item characteristics, reliability, and influence of response styles on the Alcohol Dependence Scale; (b) to determine concurrent validity with respect to drinking patterns and consequences of alcohol abuse; (c) to evaluate predictive validity for client show at treatment; and (d) to explore relationships between alcohol dependence and physical symptoms, demographic variables, intellectual functioning and psychopathology.”

(Skinner and Allen 1982 p. 200)

As a result of the validation study, the number of items was reduced to 25 covering quantity consumed, hangovers, effects of intoxication, withdrawal symptoms, preoccupation of thoughts with drinking, probable impaired control items which refer to continuous drinking, attempts to cut down and reinstatement after abstinence. Response choices are either dichotomous items, three or four forced choice items (Skinner and Horn 1984). Although validation was carried out with the 29

item version, the authors report high correlation between the 29 and the 25 item versions, suggesting that findings for the former apply equally to the latter (Skinner and Horn 1984). Reported internal consistency of items was high and “the majority of items had a moderate to substantial correlation to the total score.” (p. 202). Principal component analysis revealed a first factor which accounted for 31.0% of the variance. Tests of concurrent validity demonstrated that higher alcohol dependence scores correlated positively with greater daily consumption of alcohol, social consequences of drinking and with scores on the Michigan Alcoholism Screening Test (Selzer 1971). Predictive validity for the attendance rate for out-patient treatment was demonstrated by a statistically significant declining rate of attendance with increasing levels of alcohol dependence. In their clinical sample, Alcohol Dependence scores “conformed quite closely to a normal distribution providing empirical support for a quantitative interpretation of the syndrome as existing in degrees of severity” (p. 206).

The development of this scale highlights differences in approaches to the measurement of a construct. The Alcohol Use Inventory was developed in 1974 (Horn *et al.* 1974) with 16 primary scales covering symptoms and consequences of excessive drinking, drinking styles and perceived benefits from drinking. Skinner described that, having heard about the Alcohol Dependence Syndrome in 1979, he then examined a factor analysis of the Alcohol Use Inventory and found that the first factor “definitely resembled the concept of alcohol dependence syndrome” (Skinner 1986 p. 193). This may be the reason why the scale includes items like consumption levels and the consequences of extreme intoxication which, by no stretch of the imagination were ever described as elements of the syndrome. It may also explain the response bias imputed in the validation study when individuals scoring high on the Social Desirability Scale taken from the Personality Research Form (Jackson 1974, reported by Skinner and Allen 1982). When an instrument enquires about socially deviant and undesirable (by most standards) behaviour it is more likely to be fraught with response bias than is a questionnaire testing beliefs about other behaviours. Skinner and Allen (1982 p. 205) claim that their scale is “more closely linked to an underlying theoretical concept” than, for example the MAST (Selzer 1971) but the way Skinner (1986) tells it, the sequence of events sounded more like a pre-existing ‘everything you wanted to know about a person’s drinking’ scale – looking for theories to determine what its various sub-scales might be or mean.

3.4.3 The Short-form Alcohol Dependence Data (SADD)

In their development of this scale, Raistrick *et al.* (1983) aimed to measure the presence of the alcohol dependence syndrome and its severity and in order to do so, they operationalised each of

the elements of the alcohol dependence syndrome as described by Edwards and Gross (1976). Each element was operationalised into a minimum of one item in their scale. One of the items in the scale refers to amnesias, described after Chick (1980a) as being “not conceptually part of dependence” but included because it was thought it “might be a useful marker of tolerance and good at spreading the responses of the populations tested” (Raistrick *et al.* 1983 p. 93). Small samples were initially used to generate the correct language and terms for the scale which was taken through seven pilot stages (Raistrick *et al.* 1983 p. 90). The result is described as the scale which tests all elements of the alcohol dependence syndrome in self completion format (Stockwell *et al.* 1994; Davidson 1987). Following its development using three samples: a sample of hospital workers described as “regular drinkers” (Raistrick *et al.* 1983 p. 90), a psychiatric patients sample and a specialist clinical sample, and concurrent clinical ratings by three experienced practitioners, it was further validated in three separate studies. Concurrent validity was examined by comparison with other measures of related problems in one study, by comparison with the SADQ (Stockwell *et al.* 1979) in a second study and by comparison with an interview schedule, the Edinburgh Alcohol Dependence Scale (EADS) (Chick 1980a) in a third study (Davidson and Raistrick 1986). Factorial analysis of responses to the scale in three groups of patients at geographically separate locations (Leeds, Omagh and Derry) supported the view that the SADD was a unidimensional scale. One main factor accounting for 44% of the variance was found which represented all the items but one, that which referred to attempts to control drinking by complete abstinence (Davidson *et al.* 1989).

The value of the SADD was tested with reference to five properties stated at the outset as being desirable for scales to be used in a clinical population: i) that it was usable in such a population, ii) that it measured present state dependence, iii) that it was sensitive to the full range of dependence iv) that it was sensitive to change over time and v) that it was culturally neutral. Its construct validity suggested it was suitable for use in a help seeking population as did its brevity and the ease of its use. Tests of concurrent validity showed it capable of measuring present state dependence, a criterion useful for making clinical decisions. The authors pointed to increasing evidence for the ability of the dependence construct to predict moderation drinking at low levels of severity across a variety of measurement methods (Saunders and Kershaw 1979; Polich *et al.* 1981) and the introduction of the suitability of briefer methods of treatments for this population (Edwards *et al.* 1977b) as the basis for developing a scale which would discriminate well between all levels of severity. The SADD was developed for the purpose of assessing the whole range of dependence severity with greater emphasis than in other available scales on the lower levels of severity. Its sensitivity across the whole range of dependence was demonstrated in the reported validation

studies.

In order to examine the question of whether the scale was relatively free of socio-cultural influence, it was tested in English and Irish samples giving initial support to the claim for its neutrality. It has since been used in Brazil, thus lending further support to its cross cultural applicability. Follow-up studies demonstrating its sensitivity to change over time are not reported; for such a purpose to be pursued it could be argued that it would be necessary to alter the instruction “Think about your most recent drinking habits...” (Raistrick *et al.* 1983 p. 94) to one that referred to a specific period of time.

3.4.4 The Ethanol Dependence Syndrome Scale (EDS)

Another scale which purports to measure some, but not all of the elements of the alcohol dependence syndrome, referred to as the “provisional” elements of the syndrome (Babor 1996 p. 98), the EDS is a 16 item scale tapping five major alcohol dependence syndrome elements, namely salience, impaired control, tolerance, withdrawal and withdrawal relief. Narrowing of drinking repertoire and reinstatement elements were not included because they were deemed to be too difficult to operationalise. Items are rated on a scale measuring frequency of occurrence during the past three months. Babor (1996) cites studies evaluating the internal consistency, factor structure and cross cultural applicability of the scale, its use as a measure to define alcoholic sub-types and in studies of predictors of relapse. Babor (1996) also reported a study of its test-retest reliability using both a structural method proposed by Nunnally (1967) and some features of a dynamic approach proposed by Del Boca *et al.* (1994), in a sample of participants in Project MATCH (Project MATCH Research Group 1993). Nunnally’s method consists of internal consistency evaluation, correlation with other measures and repeated administrations with the same respondents, whereas the approach of Del Boca and her colleagues is to focus upon the conditions of responding and the reporting requirements. Respondent variables including demographic data, measures of sociopathy, assessments of social desirability response set and cognitive status were proposed as were interviewer ratings of motivation and other psychological states known to affect the reliability of responding. Del Boca further proposed the collection of interviewer demographic data but in the event, Babor (1996) reported on the way in which discrepancy scores between test and re-test results correlated with respondent characteristics only. Interviewer ratings and characteristics were not included.

3.4.5 *Drug dependence and the Severity of Opiate Dependence Scale (SODQ)*

Writing in 1981 for the World Health Organisation, Edwards *et al.* proposed a convergence between theorising on the nature of alcohol dependence and drug dependence which, until that point had been conducted by separate expert committees albeit that they were beginning to reach similar conclusions (World Health Organisation 1981). Theorising on the nature of drug dependence had focused on the addiction forming properties of drugs to a much greater extent than had theorising on the nature of alcohol dependence (where deliberations had been centred to a greater degree on questions of whether it was the person who drinks rather than the properties of alcohol, which determines the patterns of use). This was implicit in the very names the ‘WHO Expert Committee on Drugs Liable to Produce Addiction’ (World Health Organisation 1952) and the ‘Expert Committee on Addiction Producing Drugs’ (World Health Organisation 1957). In 1964 this Expert Committee proposed that the term ‘drug dependence’ replace the previously proposed terms ‘drug addiction’ and ‘drug habituation’ which had been based in a recognition of the different patterns of use that might be produced by the drug itself (World Health Organisation 1964). While the term dependence substituted the idea of discrete categories with the idea of a continuum, the idea that drug dependence was substance specific was retained in the definition of dependence and in the description of it which made a distinction between ‘psychic dependence’ and ‘physical dependence’. Psychic dependence referred to the reinforcing potential of the drug which resulted in a drive to use the drug in order to be rewarded by the pleasurable effects and the avoidance of pain. Physical dependence referred to the adaptive state that resulted from continual or episodic use. Early definition of the psychological components of alcohol dependence (for example Jellinek 1964) contained this recognition of the reinforcement potential of the drug ethyl alcohol in their focus on use for the purpose of reducing anxiety and producing relaxation.

From this background, Edwards *et al.* (1982) proposed a generic term ‘dependence’ that was a psychological phenomenon separated from the physical phenomena which, the authors proposed were renamed under the heading ‘neuroadaptation’. In spite of this proposal, the dualism of physical and psychological dependence has been retained in much research and in the measurement of dependence.

Arguing that an instrument equivalent to the SADQ or other measures of alcohol dependence syndrome had not been developed and that this was impeding research into the nature of drug dependence, its career and natural history and implications for treatment planning, Sutherland and her colleagues developed an instrument that:

“was designed to be comparable with the Severity of Alcohol Dependence Questionnaire (SADQ) (Stockwell *et al.* 1979), and bears a close resemblance to that instrument”
(Sutherland *et al.* 1986 p. 486)

Like the SADQ but appearing in a different order, the SODQ consists of five sections containing items which are said to correspond to i) quantity and pattern of opiate use, ii) physical symptoms of withdrawal, iii) affective symptoms of withdrawal, iv) withdrawal-relief drug taking and v) rapidity of reinstatement of withdrawal symptoms after a period of abstinence. Like the authors of the SADQ (Stockwell *et al.* 1979), Sutherland *et al.* reported that they had found the subjective elements of dependence too difficult to measure: “Similar problems were experienced in trying to tap these rather subtle aspects in relation to opiate dependence.” (Sutherland *et al.* 1986 p. 486).

After going through a series of pilot stages the final version of the SODQ was administered to 98 out-patients attending an addiction treatment clinic in New York. In addition to demographic data and questions about drug use milestones, researchers also asked two questions which they described as tapping the narrowing of the drug taking repertoire and the presence of tolerance and five supplementary questions describing as tapping a subjective sense of being “hooked” to which they referred as the “Opiate Subjective Dependence Questionnaire” (OSDQ). These questions appear to tap those very items to which they referred as being too subtle to include in the main inventory and which themselves came to be the constituent items of the Severity of Dependence Scale (SDS) described below. It is not clear why these questions were not included in the main scale.

The majority of the respondents (91 out of 98) in the New York clinic sample used heroin, while the remaining seven used a variety of synthetic and semi-synthetic opioids as their main drug of choice. In preliminary factor analysis two items with the lowest loadings, one from the withdrawal relief section and one from the reinstatement section, were excluded from further analysis which was conducted with scores from four of the five sections (excluding the quantity and pattern of use section). Subsequently the three sections testing physical and affective withdrawal and withdrawal relief were each found to be dominated by a single main factor but the reinstatement section was found not to be unidimensional; only 70 respondents were able to complete it as the rest had not had the two week period of abstinence at any time required by the questions in this section. However, internal consistency of each of the sections as measured by Cronbach’s alpha was found

to be satisfactory and factor analysis of all four sections yielded a single major factor which accounted for 39% of the variance with a second factor accounting for only 10% of the variance. Principal components analysis yielded a first factor which accounted for 43% of the variance.

The relationship between the dependence items and the quantity of heroin used in milligrams per day was examined and, with the exception of withdrawal-relief items, correlations were small and non-significant. A small non-significant negative correlation was found between the narrowing of drug taking repertoire question and the total SODQ score but a positive correlation was found between total SODQ score and responses to the question on tolerance and also number of times used in a day. No relationship was found with duration or milestones of use.

In view of the discussion of dependence in the first chapter of the present study, there must be some question as to whether the SODQ measures dependence or whether in fact it mainly measures the consequences of regular use, namely the presence of withdrawal phenomena and the behaviour which is triggered by it. Questions regarding the appropriateness of reinstatement being an element of dependence or a more straightforward learning phenomenon have been raised and it does not therefore seem surprising that the section on reinstatement yielded the findings it did. On the other hand, the proposal that dependence is a psychological phenomenon with physiological sequelae would produce the prediction that higher correlations would be found with number of times per day using (a possible impaired control / perceived inability to abstain item) than with the quantity used and this is what was found in the present study. However, the authors of the SODQ conclude that this was a failure to validate the instrument. In the light of their findings, the authors question whether the construct which they are examining is in fact related to dependence or whether their concept of the nature of dependence “may stand in need of review” (Sutherland *et al.* 1986 p. 491).

In a subsequent validation study of the SODQ, Phillips *et al.* (1987) administered the questionnaire and the same additional questions as were administered by Sutherland *et al.* (1986) to a UK sample of 107 opiate addicts seeking treatment at three treatment units. On this occasion a significant positive correlation was found between total SODQ score and the number of times used per day only with those respondents who were injecting their main drug. No relationship was found with duration of use and only a weak relationship was found with dose. Again no correlation was found with the “narrowing of the drug taking repertoire” item and on this occasion the authors questioned whether this dependence marker, taken directly from the originally described markers of alcohol dependence (Edwards *et al.* 1977), is as applicable to opiate addicts whose use would not, at one time be so varied as would the use of alcohol by a ‘social drinker’. Simply put, the repertoire of

opiate using behaviour is narrow to begin with and possibly not likely to show much variation across different levels of severity. On the other hand, it may be that the question as posed was unable to tap this element of the syndrome. This question will be addressed in the present study with the differently worded question designed to measure this element in the Leeds Dependence Questionnaire.

Of particular interest in the debate on the nature of dependence is the fact that, in analysis of the internal structure of the questionnaire, two almost unrelated factors emerged, one accounted for 21% of the variance and the other for 17% while the next factor accounted for only 4%.

"All the items relating to withdrawal symptoms, both physical and affective, load on one factor; all the cognitive-behavioural items relating to withdrawal relief drug taking load on the other."
(Phillips *et al.* 1987 p. 693)

The authors offer three possible explanations: close examination of the relationship between the average scores on each of the three withdrawal symptoms and withdrawal relief sections revealed that though physical and affective withdrawal items correlate highly (as one would expect), a weaker relationship existed between physical withdrawal and withdrawal relief, and no relationship at all between affective withdrawal and withdrawal relief. Consistently high scoring on two of the withdrawal relief items may have accounted for the lack of a correlation as those withdrawal relief items showing more variability in the responses had a slightly higher correlation with physical withdrawal. Other possible explanations explored were to do with cultural differences and different interpretations of items in different cultural contexts. What about the possibility that withdrawal symptoms are withdrawal symptoms and cognitive-behavioural items are dependence?

A further validation study was conducted with another U.S. sample of 126 opiate addicts (Sutherland *et al.* 1988) and results found in the first validation study, conducted with a similar US sample, were, by and large, replicated. The relationship found between the overall SODQ score and the overall OSDQ (the five subjective items scale) score was found to be weaker, leading the authors on this occasion to wonder whether there was a separate dimension of withdrawal phenomena that were closely related to the behaviours triggered by them but might not be so closely related to cognitions and behaviours described as altered behavioural and altered subjective states in the syndrome formulation (Edwards *et al.* 1977 pp. 12-13) and later distinguished more explicitly (Edwards *et al.* 1982). Additionally the authors pointed out that, since British addicts had

significantly higher levels of heroin consumption than their New York counterparts, a ceiling effect on the consumption responses included in the SODQ might account for the different findings in the two countries.

Burgess *et al.* (1989) reported on further validation of the SODQ in an Australian sample. On this occasion the criterion measure used in the validation was a clinical rating of dependence based upon the Psychoactive Substance Dependence and Abuse section of the Structured Clinical Interview (SCID-R) (Spitzer *et al.* 1986) for the Diagnostic and Statistical Manual for Mental Disorders, Third Edition, Revised (DSM-III-R) (American Psychiatric Association, 1987). On this occasion the SODQ is described as consisting of eight sections (Burgess *et al.* 1989, p. 1451), having included the original ‘additional questions’ (Sutherland *et al.* 1986), namely those referring to demographic features and history of opiate use, narrowing of repertoire and tolerance in the main body of the scale. The findings in this study were consistent with previous validation studies leading the authors to question whether the rapid reinstatement element could be considered as part of the dependence syndrome or not. They further noted that some of the discrepancies found in examining correlation between SODQ scores and other measures of opiate dependence, notably those derived from the SCID-R (Spitzer *et al.* 1986) may be attributable to the way in which syndrome elements are operationalised in different scales. They dispute whether the items purporting to measure salience in the SCID-R are operationalised in line with their theoretical formulation, thus implying that they may be measuring something else. They apply the same criticism to items measuring re-addiction liability, although it would seem that such items have constituted a problem in other scales. Further criticism relates to the fact that neither scale covers all elements of the syndrome and there remains the question of whether therefore they can be said to test it and, as noted in an earlier context, they criticise their own study for using instruments for validation which are themselves not validated. These points raise concerns about the problem of attempting to define a phenomenon through its measurement and factor analysis.

3.4.6 *Measuring substance dependence: the Severity of Dependence Scale (SDS)*

In the following sections, two instruments designed to measure dependence on substances in general, the Severity of Dependence Scale (SDS) and the Leeds Dependence Questionnaire (LDQ), are described. The question of validation with reference to specific substances is addressed. Greater attention is paid to the LDQ as it is the main instrument used for measuring dependence in the present study. Finally some criteria for comparing scales and assessing their utility are proposed.

Recognition of the centrality of compulsive use as being the defining feature of dependence (American Psychiatric Association 1994) made possible the argument that dependence was a common phenomenon across different psychoactive substance use and indeed beyond. This in turn resulted in the development of scales that were able to measure the severity of dependence regardless of substance used and to make comparisons regarding severity between the different substances. One such attempt was the development of the Severity of Dependence Scale (Gossop *et al.* 1995). Derived from the Severity of Opiate Dependence Scale (Sutherland *et al.* 1986), the Severity of Dependence Scale, like the Leeds Dependence Questionnaire described below, was based upon the observation that people can demonstrate high levels of dependent behaviour (a strong desire to use in the face of harmful consequences and difficulty in refraining from use) even where a withdrawal syndrome is absent. Prolonged, regular and heavy use of some drugs (for example amphetamine) does not produce a withdrawal syndrome in the way that the use of opiates and alcohol reliably does. The authors of the Severity of Dependence Scale appear to stop short of examining the question of the nature of dependence directly, but refer to “the psychological components of dependence” as though the scale measured only some components of dependence; the authors of the SADQ made a similar claim to measuring only some of the components of dependence some twenty years earlier when they stated that subjective components of dependence were too difficult to measure (Stockwell *et al.* 1983). It is uncertain from these introductory remarks just what is the theoretical underpinning of the scale; what is the relationship between the physiological and the psychological components of dependence, if they are both part of the same phenomenon? If there are no physiological features based upon a withdrawal syndrome, is it the case that dependence cannot reach such degrees of severity as where there are? What are the implications, if this is not the case, of comparing severity of dependence across different types of substance use, or of poly substance use where some of the drugs used result in withdrawal syndromes and some do not?

The authors of the SDS state that the scale is “primarily a measure of compulsive use” which may not be all there is to dependence but is “a centrally important” component of it (Gossop *et al.* 1995 p. 612) and therefore the basis for selection of the scale items. They state that the psychological components with which the scale is concerned are “the individual’s feelings of impaired control over their own drug taking and with their preoccupation and anxieties about drug taking”. Specifically these are i) perceived impaired control over use ‘Did you think your use of (named drug) was out of control?’ ii) anxiety caused by the possible inability to use ‘Did the prospect of missing a fix (or dose) or not chasing make you anxious or worried?’ Items (iii) and (iv)

relate to conflict over the use of the drug: ‘Did you worry about your use of (named drug)?’ and ‘Did you wish you could stop?’ Item (v) refers to a perceived difficulty to stop use once started or to refrain from use, another impaired control item: ‘How difficult did you find it to stop, or go without (named drug)?’ The component they refer to as preoccupation is implicit, presumably in item (iii). Leaving out items that refer to tolerance, withdrawal and reinstatement (though why this last component is identified as being excluded is not clear), the authors claim, makes possible comparison across drug use that does and does not produce withdrawal.

This questionnaire has good psychometric properties when tested in five different samples of clinic attenders and community participants using heroin, cocaine or amphetamine (Gossop *et al.* 1995). Test-retest reliability was carried out on a different, single sample of heroin users attending the Maudsley Hospital for treatment of opiate dependence (Gossop *et al.* 1997). However, it has no face validity for alcohol dependence in its current form and indeed has not been used with this group. In addition to the concerns expressed above there are further concerns about the understanding of dependence which underpins the questionnaire in that respondents are instructed to respond “for the past year”. Is there an assumption that dependence is a lifetime phenomenon or at least that it would not change during the course of twelve months? If so, it is not clear over what period it is thought to change or whether change is less important than its ever having occurred? The rationale offered for questioning about the past year is “Since severity of dependence can be expected to vary over time...” (Gossop *et al.* 1992). It will be argued later, and shown in the results of the present study, that dependence is capable of changing over a three month period. If this is the case, it is unclear to what questioning about the past year refers.

The SDS has been used in a variety of clinical and community settings (Swift *et al.* 1998 for cannabis users; Topp and Darke 1997, Topp and Mattick 1997a for amphetamine users; De las Cuevas *et al.* 2000 and Ross *et al.* 1996 for benzodiazepine users; Gossop *et al.* 1994 for cocaine users; Strang *et al.* 1999 and Gossop *et al.* 1992 for heroin users). Being short and very simple to use, the SDS is an unintrusive measure. It has been used to compare severity of dependence with route of administration in heroin users (Strang *et al.* 1999) but no data on predictive validity have been published. Its diagnostic utility has been demonstrated for amphetamine users (Topp and Mattick 1997b) and for cannabis users (Swift *et al.* 1998) supporting its use in place of a more detailed screening interview. De las Cuevas *et al.* (2000) recommend its use as a screening tool for the identification of benzodiazepine dependence in primary care rather than as a replacement for the more detailed assessment in the specialist setting. For the reasons stated above, coupled with the fact that it has not been adapted to or validated with an alcohol using population, it was not used in

the present study where comparisons in dependence on alcohol and heroin were made.

3.4.7. *The Leeds Dependence Questionnaire (LDQ)*

The Leeds Dependence Questionnaire was developed in a clinical setting for the purpose of measuring dependence as part of a package of outcome measures that would be suitable for routine use (Raistrick *et al.* 1994). It is based in the purely psychological view of dependence as a set of behaviours and thoughts. The authors listed ten markers of dependence covering each of the elements of the phenomenon which were derived from interviews with users of a variety of drugs who were attending an addiction agency for treatment of drug and alcohol related problems. These markers were: i) a preoccupation of thoughts about the substance; ii) the salience of drinking or drug seeking; iii) a subjective awareness of the need to use the substance; iv) planning of daily activities around the procurement and use of the substance; v) maximisation of the effect of the substance; vi) stereotyping of the substance using behaviour, or narrowing of the drug or alcohol using repertoire; vii) perceived compulsion to continue use once started; viii) pursuit of the effect of the substance; ix) the maintenance of a constant state; x) a global belief in the need for drugs. From the interviews, operational definitions were given to the markers and these were then construed in question form (see Appendix 1). The order of the questions in the scale corresponds with the order of the markers described above.

A number of questions derived from the SADD (Raistrick *et al.* 1983), an instrument designed to measure alcohol dependence and described in section 3.4.1 of this chapter, were retained with slight modifications to allow for drugs other than alcohol and these were the ones measuring preoccupation of thoughts with the substance, planning of daily activities, impaired control and difficulty in abstaining. The inclusion of the behavioural items which referred to pursuit of the effect, maximisation of the effect and maintenance of a constant state was based upon the observation that positive reinforcement plays as central a role as negative reinforcement in the development and maintenance of dependent behaviour.

The ten items formed a Likert scale (described in McIver and Carmines 1981) with four frequency response choices which were scored 0-1-2-3 in the same direction with higher scores indicating a greater degree of dependence. Instructions given to respondents described the scale as being designed to assess the importance of alcohol and other drugs in their life; they were then asked to think about the main substance that they used, to think about the past week and to tick the response closest to the way that they felt.

The Leeds Dependence Questionnaire was validated for use in clinical samples of primary

alcohol and heroin users. Furthermore, it was found to measure dependence in a student sample and in a small general practice sample. Principal components analysis produced a single factor solution which accounted for 58.3% of the variance and all of the ten items had loadings of 0.67 or more on this factor. The lowest loadings were for items 5 and 8 (0.67 and 0.68 respectively). The remainder of the item loadings were 0.75 and above. Cronbach's alpha coefficient of reliability was reported to be 0.94. High positive correlations were reported for total score and for individual items in test re-test reliability in a sample of 33 individuals who completed the questionnaire twice over an interval of 2-5 days.

Content validity was refined through the eight pilot versions of the scale; respondents were reported to have found the items emotionally neutral and easy to understand, with the exception of three individuals who reported difficulty in understanding items 5 and 8. This was considered an insufficient number to justify changing the wording of these items.

In order to examine the concurrent validity of the LDQ, scores were compared with two separate instruments, the SADQ and the SODQ, both described in previous sections of this chapter. Though these scales do not measure an identical construct but rather measure the alcohol and the drug dependence syndromes respectively, they were thought by the authors to have been "sufficiently close to be useful" (Raistrick *et al.* 1994 p. 566). Significant positive correlations were found between mean scores on the LDQ and the SADQ for the alcohol sub-sample and between mean scores for the LDQ and the SODQ for the opiate sub-sample.

The scale was shown to discriminate a clinic population from a student population and a general practice population with significantly different mean dependence scores for the three samples. No significant differences were found in the mean dependence scores for the two substance groups, though the mean dependence score for the opiate sub-sample was higher at 20.1 (SD = 6.8) than for the alcohol sub-sample which was 16.3 (SD = 8.9).

The authors concluded that there was evidence to support the use of the LDQ as a valid and reliable instrument capable of measuring dependence as a unitary construct.

Further validation study of the LDQ was reported by Heather *et al.* (submitted) following its administration to a total of 1681 clients attending two agencies (Leeds and Newcastle) for treatment of substance dependence and misuse. Data were collected over an 18 month period from 1994 to 1996. The LDQ was administered at first appointment at the agency as part of an evaluation package which contained the 12-item General Health Questionnaire (GHQ) (Goldberg 1972) and a Social Satisfaction Questionnaire, designed specifically for this evaluation package. Both these questionnaires are discussed in Chapter 7. Respondents were classified into three drug groups,

alcohol, opiates (which included all opiates, mainly heroin) and “other”; the latter category was so called as a result of insufficient numbers to differentiate further substance specific groups.

Differences between the samples at each site gave a broader base for the validation of the LDQ than was achieved at a single site, and these differences related to age and main substance. Respondents at the Leeds centre were slightly younger with a mean age of 33.2, (SD = 10.9) than the Newcastle centre where the mean age was 34.9 (SD = 10.5). A higher proportion of respondents at the Newcastle Centre attended for problems of alcohol misuse, 60.0% compared with 46.6% at the Leeds centre ($p < 0.001$), while a higher proportion of respondents at the Leeds centre attended for problems of heroin misuse, 43.1% compared to 29.9% at the Newcastle centre ($p < 0.001$). For the purpose of the study analysis, samples from the two sites were treated as one.

Principal components analysis of the LDQ item scores for the whole sample yielded a first component which accounted for 53.9% of the variance with loadings greater than 0.5 for all items. As was found in the earlier validation study, loadings were lowest for items 5 and 8, (both at 0.59). When Principal Components Analysis was carried out separately for the substance specific sub-samples, similar component structures were found, though in the opiate sub-sample, the proportion of the variance accounted for by the first component was lower at 47.3% than for the alcohol sub-sample (58.7%) and the “other drug” sample (51.8%). These findings were deemed by the authors to lend support to the suggestion that a unitary construct of substance dependence was identified across the substance domains.

In order to examine the internal consistency of the LDQ, Cronbach’s alpha coefficient was computed for separate substance groups and found to be highest in the alcohol sub-sample at 0.92, with 0.89 for other drugs and 0.86 for opiates. These findings are again similar to the earlier validation study in which Cronbach’s alpha was computed at 0.94 for the whole sample (Raistrick *et al.* 1994 p. 568). The deletion of single items was not found to raise the value of alpha in the alcohol and the other drugs sub-samples, but in the opiate sub-sample the deletion of item 5 resulted in a slight increase in the value of alpha.

Item total correlation coefficients were found to be satisfactorily high with the relatively lowest loadings on items 5, 7 and 8; in the earlier validation study (Raistrick *et al.* 1994), item total correlation coefficients were also found to be high with relatively lower coefficients for items 5 and 8 only.

The difference in dependence scores between the substance samples in this study reached statistical significance. As in the earlier study, the mean LDQ score for the alcohol sub-sample was lowest at 18.41 (SD = 7.9, range 0-30, $n = 821$) while the mean LDQ score for the opiate group was

21.19 (SD = 6.8, range 0-30, n = 528). Different distributions of LDQ scores are shown for the two substances, with the alcohol group showing a flatter distribution of scores and the opiate group scores being more clearly skewed towards the higher scores. Heather *et al.* suggested that, due to the fact that the score most often achieved, i.e. the mode, was 30, there may have been a ceiling effect in the measurement of dependence by this instrument.

Heather *et al.* (submitted) found a significant negative relationship between LDQ score and age in the total sample and in the alcohol sub-sample. No relationship with age was found in the opiate or the 'other drugs' group. A significant relationship was found between gender and LDQ score in the total sample and in the alcohol sub-sample. This was not found in either of the other drug groups. These findings are at odds with those of the earlier study of Raistrick *et al.* (1994) who found no significant relationships between age or gender in either of their substance sub-samples. Although age and gender were proposed in that study to be used as criterion variables for discriminant validity analysis, there may be a case for hypothesising that age would be associated with alcohol dependence which is thought to have a much longer lead-in time than does opiate dependence. This may account for the finding of a significant correlation with age in the larger alcohol sub-sample. In the present main study a significant difference is found in the mean age of the two substance groups and in the duration of use and of problem use prior to attending for treatment (see below, Chapter 8).

Heather *et al.* (submitted) found a significant difference in mean GHQ scores between their substance sub-samples. They also found a positive, significant correlation between GHQ scores and LDQ scores for the whole sample and for each of the drug group sub-samples. In a multiple regression analysis used to predict LDQ score from other variables they found that age, gender, GHQ score and substance were independently predictive of LDQ score in the whole sample. Younger, male clients with more psychological disturbance (i.e. higher scores on the GHQ) and whose main substance problem was with drugs other than alcohol gained higher LDQ scores. However, while in the alcohol sub-sample all three background variables, namely age, gender and GHQ score were independent predictors of LDQ score, in the opiate group only GHQ and gender were significant predictors and age was not. In the "other drugs" sub-sample GHQ score alone remained as a significant predictor. Where predictors were found in the sub-samples they worked in the same direction as in the total sample.

In the Heather *et al.* study further support was given to the earlier conclusion that the LDQ was an instrument with good psychometric properties capable of measuring a unitary construct of dependence in clinic attenders using different psychoactive substances. In order to examine its

claim to be free of the influence of different socio-economic groups, it was tested in New Zealand populations of white people of European descent, Pacific Islanders and Maori (personal communication with Grant Paton-Simpson), where it was found to be acceptable for use by these various ethnic and cultural groups. It has been adopted for routine use in New Zealand government funded agencies as a result.

3.5 Criteria for the comparison and evaluation of scales designed to measure dependence

Not all of the available scales designed for the measurement of dependence have been described in this chapter; those that are described were selected on the grounds that they were presented in self completion format, were developed for use and validated in clinical or help-seeking populations and measured one or both of the main study substances, alcohol and heroin. This selection was based upon the requirements of the present study: self completion questionnaire format is not only the most widely used but is arguably the most appropriate for routine clinical use. The purpose in attempting to elucidate the nature of change in dependence was one of clinical utility and the chosen context is one that combines alcohol and heroin dependence. Five criteria for the development of a scale appropriate for use in such a context were identified by Raistrick *et al.* (1983) in their development of the SADD and subsequently by Raistrick *et al.* (1994) in their development of the LDQ. These criteria are elaborated below for the purpose of offering a critical comparison of the utility of the scales described in this chapter.

The proposed criteria can be organised under a number of headings: suitability for *routine* clinical use would include brevity, readability, neutrality; suitability for routine *clinical* use would include the ability to measure *substance* (not specified) dependence (though this might not be a universally agreed criterion as many services remain substance specific, it is nonetheless an advantage for comparing severity of dependence across substances), to measure the entire *range* of dependence and to measure *change*. This refers both to the question about whether the time frame allows for change or refers to lifetime dependence, as well as the ability of the scale to measure dependence in abstinence. Finally, although it might be considered to be part of the validation of a scale, the question of whether the scale is theory-based and the items theory-derived merits further attention.

All these criteria were addressed in the development of the LDQ and subsequent validation studies would suggest that the criteria have been met, though there remains a question about the adequacy of the response choices and whether the items measuring the maximisation of the effect of

the substance (item 5) and the pursuit of the effect (item 8) could be improved. Comparison between the different scales described in this chapter in their demonstrated ability to meet these criteria is presented in Table 3.2 below.

Table 3.2 *Criteria for assessing the relative suitability of scales to measure substance dependence and a proposed application; numbers in brackets in the text describe the meaning of numbers in the table.*

Scale	brevity	readability	neutrality	substance	range	change	theory based	theory derived
SADQ							✓	
SADQ-C							✓	
ADS								
SADD	✓	✓	✓				✓	✓
EDS								
SODQ							✓	
SDS	✓	✓	✓	✓				
LDQ	✓	✓	✓	✓	✓	✓	✓	✓

As the LDQ was found to meet the criteria (albeit that the criteria were described by the authors in the development of the scale and the LDQ was therefore most likely to meet them), this was the scale chosen as the instrument most appropriate for use in the present study.

Chapter 4

Preliminary work - Studies and Samples - the Leeds Dependence Questionnaire

4.0 Introduction

In this chapter, the studies which I conducted for the purpose of investigating the nature of change in substance dependence, the measurement of such change and exploration of the study hypotheses are described.

In the previous chapter, a number of scales for the measurement of dependence were compared and the rationale for selection of the Leeds Dependence Questionnaire (LDQ) was described; the same rationale informed the development and routine use of the scale at the Leeds Addiction Unit, the agency in which the studies in this thesis were conducted. The four response choices in the scale were selected in line with the recommendation of Oppenheim (1992) who suggested avoiding the use of five response choices as this number tends to provide the opportunity for a mid-point to act as a ‘don’t know’ option. I conducted a small scale study at the outset to re-visit the question of the four response choices, their meaning and whether they can be said equally to represent the range of dependence severity. Furthermore, it was my view that for the scale adequately to measure change in dependence, and to measure dependence as a psychological phenomenon, related to but different from use of the substance, it needed to be shown to be capable of measurement of dependence during abstinence. Further work which I conducted to investigate the performance of the scale with abstinent respondents is reported in this chapter.

In the first part of this chapter, the preliminary studies that I conducted for the purpose of investigating further the psychometric properties both of the LDQ and of some of the other main study instruments are listed (see section 4.1 below). The samples which I recruited for these studies are then described and the samples used in each of the studies are presented in Table 4.1. The second part of the chapter, sections 4.2, 4.3 and 4.4, contains descriptions of the further work which I carried out on the LDQ in preparation for the main study.

4.1 An overview of the studies conducted and samples recruited for the purpose of the present thesis

A test of the readability of the LDQ was conducted and is reported in section 4.2 of the present chapter. Three studies were conducted in preparation for the main study, two for the purpose of further investigating the psychometric properties of the LDQ and one for the adaptation and validation of main study instruments. These preliminary studies and the samples used in them are outlined below and reference made to the chapters in which they are fully described.

i) Response choices in self completion instruments were explored and a small scale study was conducted into the meaning and appropriateness of the response choices in the LDQ. This study is referred to as Study 1 (LDQ response choices) and is described in section 4.3 below.

ii) A further small scale study was conducted to examine the ability of the LDQ to measure dependence in abstinent respondents. Referred to as Study 2 (LDQ abstinence), it is described in section 4.4 below.

iii) Study 3 (adaptation and validation) was the adaptation and validation of two instruments used in the main study. The Impaired Control Scale (ICS) and the Coping Behaviours Inventory (CBI) were originally developed and validated for use with clinic populations of problem drinkers. Versions suitable for use with clinic populations of heroin users were required for the present main study. Study 3 consisted of four parts using four different samples: one for the generation of items to be used in the adapted version of the CBI (the CBI_{drg}), one for the checking of adapted items in the adapted version of the ICS (the ICS_{drg}) the third was for validation of both the adapted scales and the fourth was for the purpose of examining the reliability of the instruments. In the fourth part of Study 3, the reliability of an additional instrument, the Social Satisfaction Questionnaire (SSQ), used in the main study was also tested. The development and validation of the original ICS, adaptation, validation and reliability of versions for use in the heroin group in the present main study are described in Chapter 5. Development and validation of the original CBI, adaptation, validation and reliability of versions for use in the heroin group in the present main study are described in Chapter 6. Reliability of the SSQ is reported in Chapter 7.

iv) Study 4 (main study) is reported in Chapters 7, 8 and 9.

Unless otherwise stated, samples were recruited to the studies at the Leeds Addiction Unit, a National Health Service specialist addiction clinic offering treatment of substance dependence and related problems on an out-patient and community basis. The majority of patients referred to the agency report problems with alcohol (37.4% during the study period) and heroin (53.3% of all

referrals during the study period) with stimulants and other substances making up the remaining 9.3%. The base unit provides the venue for out-patient appointments and clinic room attendances for the dispensing of pharmacological treatments; total attendances have ranged from 12 to 17 thousand per year over the five years during which these studies were conducted (Leeds Addiction Unit 1997) with the result that the site is suitable for recruitment due to the large number of potential recruits but difficult due to the pressure of work and busy-ness of the place. The study site is described in greater depth with detail relevant to recruitment to the main study (Study 4) in Chapter 7.

There follows a short description of the samples used in each of the preliminary studies. The principle guiding the collection of data from each sample was one of parsimony; data not required for a specific purpose in the study were not collected, hence the paucity of demographic and drug use data in the smaller scale studies. The sample used in the main study is described at length in Chapter 7.

4.1.1 Sample 1

This sample consisted of 51 patients attending the Leeds Addiction Unit at various stages of their treatment. They were 37 males whose ages ranged from 20 to 57 and 14 females whose ages ranged from 18 to 47. Of the men, 21 were alcohol dependent, 15 were opiate dependent and one was a benzodiazepine user; of the women, 3 were alcohol dependent and 11 were opiate dependent. No further drug use or demographic data were collected for this sample. This sample was used in:

Study 1 (LDQ response choices) - further investigation of the response choices in the Leeds Dependence Questionnaire.

4.1.2 Sample 2

This sample consisted of 45 individuals recruited through a variety of sources: the Leeds Addiction Unit outpatient clinics, the Leeds Addiction Unit training department, two residential treatment facilities in London, whose treatment was described as being based upon the Twelve Step approach, and Alcoholics Anonymous. Respondents were recruited on the basis of their reported abstinence from a drug (including alcohol and tobacco) to which they felt they had once been addicted. No confirmatory data of their abstinent state were collected, but main drug from which they reported abstinence was recorded. Twenty five individuals reported abstinence from heroin, these were receiving methadone substitution or withdrawal treatment, 2 people reported abstinence from opioid drugs other than heroin, 13 people reported abstinence from alcohol, 2 people reported

abstinence from amphetamine, 1 person reported abstinence from cocaine and 2 from smoking tobacco. No demographic data were collected. This sample was used in:

Study 2 (LDQ abstinence) - investigation of the ability of the LDQ to measure dependence in abstinence.

Study 3 (adaptation and validation) - the heroin using group in this sample was used in the first part of Study 3 to generate the content for the version of the Coping Behaviours Inventory (CBI_{drg}) for heroin users.

4.1.3 Sample 3

This sample consisted of 30 individuals attending for clinic room and out-patient appointments at the Leeds Addiction Unit with problems related to their heroin use, who were requested to participate after they had attended their appointment. They were given an assurance that no personal information was being recorded nor was any of the information they gave or views they expressed communicated to the clinical staff responsible for their treatment. This sample was used in:

Study 3 (adaptation and validation) - the sample was used in the first part of Study 3 to check the items in the adapted version of the Impaired Control Scale (ICS_{drg}) for heroin users.

4.1.4 Sample 4

Sample 4 consisted of 118 individuals, 89 male and 29 female, attending the Leeds Addiction Unit at various stages of their treatment for heroin addiction. Their mean age was 27.7 years (SD = 6.3) with a range of 16 to 50 years. These respondents were asked for their consent to complete a set of questionnaires while waiting for their appointment for initial assessment, for heroin detoxification or for out-patient treatment of dependence. This sample was used in:

Study 3 (adaptation and validation) - the second part of Study 3 was the validation of the two adapted instruments, the ICS_{drg} and the CBI_{drg}.

4.1.5 Sample 5

Sample 5 consisted of 61 individuals, 40 male and 21 female, attending the Leeds Addiction Unit on a regular basis for treatment of their heroin dependence. Their mean age was 25.7 years (SD = 4.9) and a range of 17 to 37. Again, these respondents were asked for their consent to complete a set of questionnaires while waiting for their appointment for detoxification or for

out-patient treatment. This sample was used in:

Study 3 (adaptation and validation), to test the reliability of the adapted instruments and of the SSQ.

4.1.6 Sample 6

This was the sample recruited for the purpose of testing the main study hypotheses. It is described in detail in Chapter 7. It is the sample used in:

Study 4 (the main study).

Table 4.1 *Studies, their main purpose and the samples used in each*

Studies Samples used	Study 1 (LDQ response choices)	Study 2 (LDQ abstinence)	Study 3 (adaptation & validation)	Study 4 (main study)
Sample 1 (n=51)	✓			
Sample 2 (n=45)		✓	✓	
Sample 3 (n=30)			✓	
Sample 4 (n=118)			✓	
Sample 5 (n=61)			✓	
Sample 6 (n=230)				✓

With the exception of Sample 6, all samples were recruited by the author. Sample 6 was recruited by the author, Addiction Unit clinical staff and a research assistant. Protocols for recruitment and supervision of the recruitment procedure were provided by the author. A summary of the studies and the way the samples were used in these studies are presented in Table 4.1. The data collected and instruments administered in each sample are reported in the methods and procedures sections of each of the studies.

The origin of the research was in the routine audit and evaluation of clinical services at the Leeds Addiction Unit and the programme of follow-up has ethical approval. Written consent for follow-up was given at the outset specifically by participants in these studies and the two consent forms used are shown in Appendix 17 and Appendix 18.

4.2 Further investigation of the Leeds Dependence Questionnaire (LDQ) in the present study: Readability of the scale

The LDQ was subjected to a test of readability and to two small scale studies, i) to examine the adequacy of the response choices (Study 1) and ii) to examine the ability of the scale to measure dependence in abstinence (Study 2).

The ten items in the LDQ were subjected to a test of readability (Microsoft Word User's Manual based upon Flesch 1986). Indices in this test examine the number of words per sentence and the number of syllables per word and compare these with norms for standard writing. It also reports on the presence of passive sentences, advised against by writing experts (Microsoft Word User's Guide p. 290). Results of the test are presented in Table 4.2. The mean Reading Ease score for the scale was 83 which falls within the category 'easy'; categories range from 'very easy' to 'very difficult', and no item score fell below the range 60-70 which is the range for 'standard writing'. No items contained negative sentences.

4.3 Study 1: Response choices in the LDQ

As part of the preliminary work for the main thesis, I conducted a small investigation into the question of whether the response choices provided in the LDQ were the optimal number and type. Contrasting findings in the literature on response choices suggested that the response choices used in the LDQ, namely Never, Sometimes, Often and Nearly Always were evenly distributed and where this was not the case, that there was a greater distance between the responses Often and Sometimes than between the responses Sometimes and Never. It was hypothesised that if this were generally the case, the scale would not be equally sensitive to differences or to changes in dependence at the lower end and at the higher end of the dependence spectrum. In a study of response choices, Spector (1976) suggested that, rather than test response choices in the abstract it was more effective to test them with reference to the study population and the subject matter being explored.

Table 4.2 *Readability scores for the ten items of the LDQ*

LDQ item	Flesch reading ease ¹	Flesch grade level ²	Flesch - Kincaid ³	Gunning Fog Index ⁴
1	76.6	7.3	7.5	10.0
2	69	8.1	7.6	11.4
3	101.4	0.0	2.8	6.0
4	88.9	6.1	3.8	4.8
5	76.2	7.4	7.3	9.7
6	64.9	8.5	6.9	11.7
7	90.1	6.0	4.7	6.4
8	69.0	8.1	7.6	11.4
9	100.7	0.0	3.2	6.4
10	89.5	6.0	4.0	8.3
All items	83	6.7	5.5	8.5

1 & 2 indices based upon the average number of words per sentence and the average number of syllables per word. Standard writing averages approximately 17 words per sentence and 147 syllables per 100 words.

3 index assigns a grade level where 7 or 8 are roughly within the range for standard writing. A higher score denotes more difficult material.

4 index based upon sentence length and the number of words per sentence with more than one syllable. The higher the score the more difficult to read.

In a series of studies examining response choices, Newstead and Collis (1987) found that “the rank orderings of the quantifiers are remarkably consistent across all experiments....did not differ by more than one place...indicating a high level of consistency.....hence although context and content can influence the frequency estimates given for each quantifier, the rank order of quantifiers is virtually immutable.” (Newstead and Collis 1987 p. 1460). Combining the findings from 3 experiments, the following order of quantifiers, with mean percentages given in brackets, was found:

Never (5%) < Rarely (13%) = Seldom (15%) = Infrequently (19%) < Occasionally (28%) < Sometimes(37%) < Often (66%) = Frequently (69%) = Usually (73%) < Always (95%) (Newstead and Collis 1987 p. 1460).

In these figures the difference between Never and Seldom is 10%, between Seldom and Occasionally is 13%, between Occasionally and Sometimes is 11%, between Sometimes and Often is 29% and between Often and Always is 29%. These figures suggest therefore that the spacing between the four response choices in the existing LDQ, Never, Sometimes, Often, Nearly Always is 33%, 29% and 29% respectively, in other words that they are quite evenly spaced. Spector's (1976) data, on the other hand suggest a much larger space between the responses Rarely and Sometimes but more or less equal spacing between Rarely, Infrequently, Sometimes, Often and Most of the Time.

Given these different findings, a small scale study was conducted to look at the rank ordering and meanings of six possible response choices to the ten items in the Leeds Dependence Questionnaire, to explore the meanings attributed to these response choices and to investigate the question of whether the inclusion of an additional response choice, namely Rarely, between Never and Sometimes in the original four response choices in the scale, was likely to enhance the spread of responses.

4.3.1 Study 1: Sample and Procedures

The sample used in this study was Sample 1, described in section 4.1.1 above. Recruitment, interviews and scale administration were all conducted by the author. The study consisted of two procedures; in the first, the sample of 51 patients attending the Leeds Addiction Unit at various stages of their treatment were asked to rank order the following response choices:- Never, Rarely, Infrequently, Sometimes, Often and Nearly Always from 1 to 6, with 1 meaning the most often and 6 meaning the least often. In the second procedure, two additional response choices, Rarely and Infrequently, were added to the four existing response choices in the Leeds Dependence Questionnaire which was then administered to the participants; they were asked to complete the questionnaire and then to quantify the six response choices. Respondents were requested to give their answer as frequency expressed as once in a number of weeks, days, hours or minutes. Replies were recorded as time frames suggested by respondents. There was some prompting as study participants found the question difficult to understand.

4.3.2 Study 1: Results

Respondents' rank ordering of the response choices, where they were asked to rank the words from one to six, with one meaning the most often and six meaning the least often, are presented in Table 4.3.

Table 4.3: Rank ordering of the six response choices: Sample 1 (n=51)

Rank	6	5	4	3	2	1
<i>Response choice</i>						
Never	50	0	1	0	0	0
Rarely	1	37	7	5	1	0
Infrequently	0	8	13	3	2	0
Sometimes	0	2	3	41	2	3
Often	0	1	0	2	37	11
Nearly Always	0	1	1	1	8	40

Generally people found the first task of rank ordering the response choices to be a difficult one to understand and to carry out in the abstract without relating the words to anything in particular. Respondents were able, though, to rank order all of the response choices with the exception of Infrequently. Only 26 out of 51 respondents were able to rank order this term. Even given the relatively fewer responses to this item, respondents were consistent in their rank ordering of the choices, as shown by the diagonal line in Table 4.3.

For the second procedure, participants appeared to find the first part of the task, namely questionnaire completion, to be straightforward and it took, on average, approximately four minutes to complete the Leeds Dependence Questionnaire. Some found the second part of this procedure, when they were asked to quantify the response choices, to be difficult. The word Infrequently elicited only 40 out of a possible 51 responses with 11 people responding “I don’t know what it means” or “I don’t use it”. Common time categories were identified from participants’ responses and are presented as the meanings given to the six response choices in Table 4.4.

Table 4.4: Meanings of the response choices: Sample 1 (n=51)

	Never	Rarely	Infrequently	Sometimes	Often	Nearly Always
0	49	1				
1 x 5 yrs	2		1			
1 x 3 yrs		1				
1 x p.a.		5				
2 x p.a.		3	6	1		
6 x p.a.		1		1		
1 x p.m.		17	10	2	1	
2 x p.m.		8	7	7		1
1 x p.w.		6	7	8	6	
2 x p.w.		4	7	12	4	2
3 x p.w.			1	6	5	2
4 x p.w.				6	7	
5 x p.w.				1	6	1
6 x p.w.						1
7 x p.w.		1	1	4	16	24
2 x per day				1	1	
4 x per day					2	1
5 x per day						2
few/several				1	1	2
all the time						13
don't know		4	11	1	2	2

p.a.= per annum; p.m.= per month; p.w.= per week.

The response choices Rarely and Infrequently were collapsed into one category called Rarely, and the time frames were broadened to be more inclusive; the meanings attributed to the remaining responses choices are shown in Table 4.5. When responses to Rarely and Infrequently were condensed into one category, the resulting percentage of the combined response given to each question was compared with the frequency of the response Often given to each question. These percentages are presented in Table 4.6.

Table 4.5 *Meanings attributed to the five response choices (condensed): Sample 1 (n==51)*

	Never	Rarely	Sometimes	Often	Nearly Always
all the time /more than once a day	0	0	2	4	18
every day / once a day	0	1	4	16	24
3 pw - 6 pw	0	0	13	18	4
1 pw - 2 pw	0	10	20	10	2
1 pm - 2 pm	0	25	9	1	1
2 pa - 6 pa	0	4	2	0	0
1 x3yr - 1 pa	0	6	0	0	0
0 - 1 x 5 yr	51	1	0	0	0

4.3.3 Study 1: Discussion

When respondents were asked to rank order the response choices, the majority ranked Infrequently in between Rarely and Sometimes (see Table 4.3). However, results of the question regarding the meaning of the each response choice suggest that, for this population, there is little difference between the meaning of the term Infrequently and the term Rarely. This conclusion is reached by looking at the modal value for each of the response choices, and the distribution of scores around the modal value (see Table 4.4). These findings suggest that there was greater clarity concerning the ordering of the responses than there was concerning their meaning. The difference may be accounted for by the fact that the tasks were perceived to be different; subjects were asked to do the rank ordering task in the abstract while they were asked for the meanings of the response choices after they had completed the questionnaire and gave their meanings with reference to their drinking or drug taking behaviour. It was noted above that subjects found the task too difficult to do

in the abstract, and Newstead and Collis (1987) state in their discussion that response choices should be chosen and will be understood differently according to the behaviour or attitudes being investigated.

Table 4.6 *Percentages of responses to each question which are accounted for by the combined responses Rarely and Infrequently and by the response Often*

% responses	Rarely / Infrequently	Often
<i>LDQ item</i>		
Q1	8	16
Q2	20	12
Q3	17	22
Q4	19	10
Q5	15	14
Q6	23	16
Q7	13	26
Q8	17	26
Q9	16	20
Q10	16	14

Newstead and Collis (1987) did not find a significant difference between Rarely and Infrequently, though Spector's data suggest a scale value for Infrequently which is twice the value of that for Rarely (1.7 & 3.8 respectively). One way to reconcile these findings is to follow their recommendation that each population will respond differently depending on the questions they are being asked and it is therefore legitimate to make population and context specific selections of the range of response choices. In the present study, some 20% of the sample said that they did not understand the word Infrequently or that they did not use it. This, therefore did not seem to be a useful response choice to add to this questionnaire. A further question is that regarding the possible inclusion of the response Rarely. Visual examination of responses to the extended LDQ suggested that respondents used either Rarely or Sometimes but not both, and in short interviews a number of respondents reported that they did not use the word Rarely in their everyday thoughts and speech. However, the response Rarely occupied the space between Never and Sometimes which was clear from the rank ordering of the responses shown in Table 4.3.

Another problem thrown up by this study is the question of the difference between the

meanings given to the responses Often and Nearly Always. The latter term appears to have an almost bi-modal distribution of values describing its meaning (see Table 4.4) though it could be argued that this is a mere artefact of the way in which the author has chosen to present the time categories. If every response greater than daily had been condensed into one, the modal response for Often would have been the same as that for Nearly Always. This is a potential problem, though another way of looking at the distribution of responses is suggested by the observation that distribution around the mode is skewed in different directions in each case.

The findings of this study were inconclusive and therefore, since the LDQ had been validated with four response choices, I concluded that it would be prudent to proceed with the study using the LDQ in its validated form. There were insufficient grounds for altering the response choices of the original scale for the purpose of the present study, though the question of the inclusion of 'Rarely' merits further investigation.

4.4 Study 2: ability of the LDQ to measure dependence in abstinence

The question of whether dependence endures during a period of abstinence from substance use is addressed in both psychological and physiological approaches to the understanding of the phenomenon. The "rapid reinstatement of previous patterns of use following a period of abstinence" described in the syndrome formulation (Edwards and Gross 1976) is the reported observation which lies at the heart of the belief that dependence is irreversible, a belief held firmly by adherents of a disease approach such as that of members of Alcoholics and Narcotics Anonymous. Expressed as: "the re-institution not just of tolerance and withdrawal but of the holistic clinical dependence syndrome" (Edwards 1990, p. 454), the observation of this phenomenon has been made in community, clinical and laboratory settings. Examining the evidence from both animal and human studies, Edwards (1990) poses the question of whether the phenomenon is the result of disturbances in biological systems or whether as learning theorists have suggested, it is the persistence of responses that have been conditioned to social, physical and psychological cues which remain in the environment. He suggests that the most fruitful line of enquiry may be in a combination of the two approaches: it may be that learned responses endure or that a permanently altered biological state continues to condition them. Whether the dependent behaviour is simply suppressed or extinction of these responses does occur remains unclear. If extinction does occur the likelihood is that it occurs at different rates in different individuals, which, if true, might account for different views about the nature and permanence of this aspect of dependence.

One of the hypotheses in the present study refers to the rate and course of the extinction of dependence if it is found to occur, the influence of severity of dependence and the role of coping behaviours. If it is the case that dependence, being different from the neuroadapted state, does not immediately disappear in the event of cessation of use, it should be possible to detect it during a period of abstinence. For the purpose of the present study it was necessary to measure dependence during abstinence in order to be able to examine the hypotheses. The LDQ was thought to be capable of such measurement and a small scale study was conducted in order to investigate this question.

4.4.1 Study 2: Method

A sample of 45 people who had been abstinent for lengths of time varying from two days to 34 years was recruited through a variety of sources (Sample 2, see section 4.1.2). Respondents were asked for their consent to be interviewed and to complete a questionnaire about dependence. They were then asked which was the primary drug of misuse from which they were abstinent, with the exception of the two abstinent ex-smokers who were specifically recruited on the grounds that they had given up smoking cigarettes. They were asked to give their responses in relation to cigarettes. Other respondents were asked to give responses with reference to the drug they had named. They were asked to complete the LDQ and then asked for any comments they had. Recruitment and interviews were conducted by the author.

4.4.2 Study 2: Results

The raw data are presented in Appendix 2 in order to illustrate the diversity of the responses in abstinent individuals. Item 7: ‘Do you feel you have to carry on drinking once you have started?’ is the most frequently endorsed response with the highest individual scores overall. Item 4: ‘Do you plan your day around getting and taking drink or drugs?’ could be said to be the item most sensitive to abstinence in that this item was endorsed with the lowest frequency scores. Nonetheless, 13 individuals responded positively (Sometimes or more) with 3 individuals responding with Nearly Always to this item.

Mean total LDQ score for this sample was 8.9 (SD = 7.6). In order to examine responses to the LDQ more closely, those respondents who had been abstinent for 30 days or more ($n = 22$) were separately identified; the reason for this is that on the occasion of this small study, respondents were instructed to think about the past month. Mean total LDQ score for those who had been abstinent for 30 days or more was 5.7. The highest individual item mean for this group was for items 7 and 8

(mean score 1.09) and the lowest individual item mean was for item 4 (0.14). The full range of items were used by this sample as well.

When asked about the appropriateness and relevance of the items, respondents stated that they had no problems with any of the items but a small number of people who had been abstinent for a significant length of time suggested the addition of an instruction “if you were to start using again, would you...” alongside some of the items. This suggested a potential difference in understanding among the respondents. This possibility was also suggested by the fact that, with reference to items 4, 5 and 6 those individuals responding positively to these items may have used the understanding “when I am using” whilst those who responded negatively may have been saying “I don’t use at all” or “I don’t drink at all”. As this finding emerged only when the data were collated, it was too late to check further the meanings given to individual items in this part of the study.

Of the 45 respondents, 17.7% scored zero. Of the smaller sample that had been abstinent for one month or more ($n = 22$), 31.8% obtained a total score of zero; of these, 3 had been abstinent for several years. One individual who had been abstinent for four years gave a positive response to item 1, ‘Do you find yourself thinking about when you will next be able to have another drink or take more drugs?’ thus demonstrating that this cognitive item in the scale could be found to persist over a considerable period of time. The full range of items was used by those respondents scoring above zero.

4.4.3 Study 2: Discussion

The Leeds Dependence Questionnaire was designed to be a measure of the psychological phenomenon of dependence as described above. Markers of dependence are operationalised into ten cognitive and behavioural items which refer to thoughts and beliefs about use of the substance. As with all behaviours, thoughts and beliefs about the behaviour endure in the absence of the behaviour itself and it has been argued that it is the endurance of beliefs about the nature of substance use and the relationship of the individual with the substance and its use which accounts for the persistence of dependence (and the frequency of relapse following a period of abstinence or controlled use). If the extent to which such thoughts and beliefs persist is predictive of relapse as has been suggested then their measurement must be of considerable clinical utility. In the present main study, the aim is to elucidate the nature and course of change in these thoughts and behaviours and the ability of the LDQ to measure them in the absence of the substance use itself was therefore of paramount importance.

On the basis of the verbal report of respondents and the spread of responses in this study, it was thought justifiable to conclude that the scale was sufficiently meaningful to abstinent respondents to be useful as a measure of dependence during abstinence as well as during periods of substance use and could therefore be used to track changes in dependence, including those which occur after the cessation of use.

4.5 Conclusions from further work on the Leeds Dependence Questionnaire

As a result of investigating the response choices in the LDQ in Study 1 reported above, the possibility emerged that the inclusion of 'Rarely' as a fifth response choice, to be inserted between 'Never' and 'Sometimes' might enhance the sensitivity of the LDQ at the lower end of dependence. It was borne in mind that the LDQ as it was validated might be more sensitive to different degrees of dependence at the higher end of the scale and that this might impede investigation of the question of differences between high and low dependence individuals. Time and resources available for the present entire study were not sufficient to embark upon further validation of a modified form of the LDQ and I therefore decided to proceed by using the LDQ with the original four response choices.

These same considerations may have been important in Study 2 whose aim was to examine the ability of the LDQ to measure dependence in abstinence. However, the LDQ in its existing form was shown to be able to detect dependence in abstinence and to measure it in different degrees. This lent further weight to the decision that the LDQ would be a suitable instrument for use in a study where the nature of change in dependence was the subject of investigation.

Chapter 5

Impaired control and dependence

5.0 Introduction

The focus of this thesis is an examination of the nature of change in dependence where dependence is understood as a psychological phenomenon. In addition to the Leeds Dependence Questionnaire (LDQ), a measure of dependence was sought for the purpose of cross validating the findings of the study, should such a requirement emerge. At the point of initial data collection, no scale other than the LDQ was available which fulfilled the criteria for the measurement of dependence in this study (as described in Chapter 3). The Impaired Control Scale (ICS) (see Appendix 3) was chosen because it measures one of the elements of dependence and is based in a psychological understanding of dependence. Background to the concept of impaired control, its relationship with dependence and the Impaired Control Scale are described in the first part of this chapter. In the second part of the chapter, the adaptation of the Impaired Control Scale for use with groups of help seeking heroin users is reported and this is followed by a report of the validation and reliability testing of the adapted version of the scale, the ICSdrg. Both form part of Study 3 (adaptation and validation), initially described in the previous chapter, Chapter 4.

5.1 Origins and definition: is it lost or is it impaired?

Edwards (1992) has argued that the origins of the psychological view of dependence are to be found in the writings of two eighteenth century medical writers, Rush (1785) and Trotter (1804) both of whom described drunkenness as a habit which was learned and could be unlearned, both of whom included ideas of loss of control over intake as an essential component of this habit. Their description of the condition included both the words disease and habit while later writers were to separate the two into distinct categories of severity.

The disease concept was further developed by Jellinek (1952, 1960) who, as a result of a survey of members of Alcoholics Anonymous, described developmental phases in the drinking history of alcoholics (Jellinek 1946). This survey was extended to the administration of some 2,000 questionnaires to male alcoholics, largely members of Alcoholics Anonymous. On the basis of the results of this larger survey, Jellinek distinguished the disease state of alcoholism - that drinking

behaviour which involves physical or psychological pathology, from excessive drinking which does not involve such pathology. Jellinek described a discrete group of people who, after several years of excessive drinking, may progress to the pathological or disease state of alcoholism characterised by loss of control over the intake of alcohol. These “alcohol addicts” were distinguished from “habitual symptomatic excessive drinkers” by virtue of this phenomenon of loss of control (see Jellinek 1952 for a summary of his lectures to the Yale Summer School of Alcohol Studies on the subject).

Jellinek described this phenomenon as:

“any drinking of alcohol (that) starts a chain reaction which is felt by the drinker as a physical demand for alcohol.....it lasts until the drinker is too intoxicated or too sick to ingest more alcohol. The physical discomfort following this drinking behaviour is contrary to the object of the drinker, which is merely to feel ‘different’....” (Jellinek 1952 p. 679)

This definition suggests that, once established, loss of control inevitably follows the ingestion of alcohol; nonetheless “felt by the drinker...” implies a subjective state. The loss of control phenomenon was described as definitive of the onset of the “crucial phase”, when the addictive phases replace the symptomatic phases. Although Jellinek claimed that only a proportion of people with drinking characteristic of each stage would progress to the next, there is nonetheless an implication of a predetermining factor which was yet to be established. No claim was made regarding the etiology of the condition and several possible sources were suggested; but a source there must be as, he claimed, people who reached the point of drinking with loss of control formed a distinct group; some people could drink excessively all their lives and never develop loss of control. Jellinek also recognised the way in which individual drinking patterns, determined by individual need, would be superimposed upon culturally formed drinking patterns which might put them at risk in different ways. He further acknowledged the fact that the development of loss of control drinking proceeded at a different pace in different individuals and was likely to develop faster in women (though since he described his survey as being administered to men it is probable that this observation, replicated as it has been, is based upon a smaller sample).

Having described the phases of alcohol addiction, Jellinek (1960) went on to propose a typology of alcoholics which distinguished disease states from non-disease states. In this typology

loss of control was the defining characteristic of “gamma alcoholics”, one of the two sub-types described as disease states. He contrasted these with “delta alcoholics” whose defining characteristic was the inability to abstain from drinking. Loss of control was then defined by Jellinek (1960) as the event where:

“the ingestion of one alcoholic drink sets up a chain reaction so that they are unable to adhere to their intention to have 'one or two drinks only' but continue to ingest more and more...”

(Jellinek 1960 p. 41)

In this later definition, Jellinek has introduced the idea that there is a discrepancy between behaviour and intention. While seeming to avoid attributing causation, Jellinek (1960) described loss of control as occurring in the context of acquired increased tolerance to alcohol and two aspects of this phenomenon are relevant here: withdrawal symptoms can occur within a drinking bout, causing discomfort and being relieved by further drinking; secondly he noted the empirical finding that impairment of psychological functioning diminished as a result of increased tolerance as did experience of a euphoric effect. Reduction in the euphoric effect is greater when the blood alcohol level is descending compared to the same level when it is ascending and this loss of effect is accompanied by feelings of dysphoria which again will be attempted to be alleviated by further drinking. Jellinek concluded:

“The drinking bout in the presence of loss of control differs greatly from one in which the drinker gets drunk deliberately”

(Jellinek 1960 p. 146)

The observed phenomenon of loss of control has remained central to discussions of the nature of alcohol and drug dependence as has the question of the loss or reduction of freedom described by Jellinek and, for many observers, implicit in the state. Debating this question of freedom of choice, Edwards and Gross (1976) alluded to a spectrum of situations in which the observed phenomenon of loss of control might occur. As a result, they questioned whether loss of control was the appropriate term:

“It is unclear, however, whether the experience is truly one of losing control rather than one of deciding not to exercise control.” (Edwards and Gross 1976 p. 1060)

suggesting that drinking behaviour might vary according to several factors other than the presence or absence of alcohol itself and that, even where people had experienced loss of control, they did not necessarily do so every time they drank.

“Control is probably best seen as variably and intermittently ‘impaired’ rather than ‘lost’.” (Edwards and Gross 1976 p. 1060)

Just as Jellinek had done before them, Edwards *et al.* (1977a) went on to describe “impaired control over the drug ethyl alcohol” as a “leading symptom” of the alcohol dependence syndrome (Edwards *et al.* 1977a p. 17), the concept of a syndrome being one where not all symptoms are required to co-exist in the same degree or at all for its diagnosis to be made.

Theorising about the nature of impaired control has mirrored theorising about the nature of dependence itself; thus the shift from the assumption that loss of control is invariable, inevitable and absolute accompanied the challenge to the view that dependence is a discrete, all or none condition which follows an invariable course of deterioration if not treated. The inevitability of loss of control in the face of alcohol consumption or the presence of alcohol in people diagnosed as alcoholic was challenged in a number of experiments and follow-up studies. For example, Mello and Mendelson (1965) showed that, rather than drink all the alcohol they had access to, diagnosed alcoholics drank to a particular blood alcohol level which could be observed across different drinking situations, or refrained from drinking when offered alternative rewards to do so and that they were able to adhere to drinking limits even at high blood alcohol levels. These and other researchers demonstrated that alcoholics were able to pace their drinking in response to the same kinds of cues and reinforcers as normal drinkers are able to, albeit that they may set their limits at much higher levels. Outside of the laboratory similar implications were being discussed in the light of long term follow-up studies. Polich *et al.* (1981) followed up a cohort of people treated for alcohol dependence and misuse and showed that some of their sample were able to drink in moderation at four years after treatment; in other words, though once they could have been said to be drinking with impaired control, this fact did not necessarily imply that they would inevitably and

only be able to drink with impaired control in the future.

At the same time, clinical experience and the accounts of members of Alcoholics Anonymous commonly contained reports of the ubiquity of the experience of loss of control. A number of suggestions were offered to deal with the difficulty of definition: based upon clinical observation that people who sometimes lost control did not always lose control, Keller (1972) described the inability of the alcoholic to be sure they could stop once started. He attributed this variability of response to the fact that cues for drinking and cues for drinking to excess are conditioned, very often without the awareness of the person who is being so conditioned. Without such awareness it would be difficult to predict in which situations control would, or would not be maintained. Moreover, when generalisation from a conditioned cue to an unconditioned cue occurs, the drinker will not always be aware which cues had been learnt by this process. Hence the unpredictability of loss of control.

Ludwig and Wikler (1974) also focused upon the variability in the occurrence of loss of control, stressing again the lack of inevitability:

"Loss of control is the behavioural statecharacterised by activities indicative of a relative inability to modulate alcohol consumption; it need not eventuate in gross intoxication or stupor" (Ludwig and Wikler 1974 p. 122)

In a study designed to test the ability of alcoholics to respond to interoceptive and exteroceptive cues for drinking and stopping drinking compared to controls who were social drinkers, both groups were offered doses of alcohol at pre-set intervals following feedback on their blood alcohol level (Ludwig *et al.* 1978). Both groups were asked to attempt to maintain a blood alcohol level within a given range and had been given prior training in recognising the interoceptive cues for doing so. Feedback given during the experimental sessions either under-reported or over-reported the true blood alcohol level, but regardless of which was the direction of the mis-report, alcoholics consistently took more drinks, gained higher blood alcohol levels and made progressively more errors of judgement regarding interoceptive cues throughout the drinking session than did controls. The authors thus were able to demonstrate that the experimental group were interpreting physiological cues differently, or in fact their physiological cues were different from those of the social drinker group. Whatever the nature of the difference, the result supports the idea that regulation of drinking in diagnosed alcoholics is different from regulation of drinking in

'normal' social drinkers and that this difference accounts for the phenomenon referred to as loss of control. As Ludwig and colleagues argue (Ludwig *et al.* 1978, Ludwig and Wikler 1974), their experimental research gives no support to an absolute and inevitable condition but rather supports the relativity of the phenomenon, unpredictability being one of the defining features as described by Keller (1972).

A different approach to defining loss of control was proposed by Glatt (1976) who attempted to assert that there was a critical blood alcohol level beyond which the alcoholic would lose control. Although this priming effect is demonstrated in the laboratory and reported in clinical experience for individuals, there are marked variations between individuals. These variations are the result of varying levels of tolerance and idiosyncrasy of desired effect which operate in addition to the normal factors influencing the experience of a given blood alcohol level such as recent eating, weight, height, altitude. It has, therefore, been found to be impossible to establish a universal level at which all individuals would begin to lose control.

5.2 Does impaired control necessarily imply initial intention?

As noted above, the role of volition was debated by Edwards and Gross (1976) when they suggested that there is a need to distinguish between a decision to drink without limits and the inability to drink within intended limits once drinking had commenced.

In a discussion paper published in 1975, Storm and Cutler unequivocally asserted that loss of control “is defined as drinking more, and becoming more intoxicated, than one intended” (Storm and Cutler 1975 p. 154) but also asserted that this was not a phenomenon found exclusively in alcoholics; “Many normal drinkers make such resolutions (to limit consumption to a particular quantity), sometimes keep them and sometimes do not” depending upon their perception of relative rewards and negative consequences that will ensue. Heavy drinkers will have to make and break the resolution more often than normal drinkers because they drink more and drink more often than normal drinkers.

The role of intention in impaired control was questioned by Chick who noted both the conceptual problem in including prior intention in the definition of this ubiquitous phenomenon and the difficulties in operationalising it for the purposes of measurement. He has warned of the dangers of confusing the artefacts of measurement with the phenomenon being measured. Indeed it may be that the inclusion of the idea of having a pre-planned limit when drinking resulted in his conclusion that impaired control was not part of the core dependence syndrome (Chick 1980a). He therefore

proposed replacing all reference to intention in loss of control items with:

“....a more direct item, such as, ‘Have you felt an irresistible compulsion to continue drinking once you start?’”
(Chick 1980a p. 185)

Many of the instruments designed to measure loss of control or impaired control have avoided the question of intention to drink to a limit by asking simply whether the subject is able to stop drinking when they want to or once they have started, for example the Alcohol Dependence Scale (ADS) (Skinner and Allen 1982), the Michigan Alcoholism Screening Test (MAST) (Selzer 1971), the Composite International Diagnostic Interview-Substance Abuse Module (CIDI-SAM) (Cottler *et al.* 1989). Some scales, like the Impaired Control Scale (Heather *et al.* 1993) described below, have included items referring to intention as well as items referring simply to an inability to stop once started. These authors have built into the scale questions regarding attempts to control in order to address the question of whether or not there was prior intention.

5.3 Source of the definition: Objective or subjective measure?

A further issue in the definition of loss of control refers to the source of such definition. Both Chick (1980b) and subsequently Kahler *et al.* (1995) distinguished public, or “objective” loss of control from “subjective loss of control” where public loss of control was deemed to be objective by virtue of being defined by some universal rules or social norms of behaviour (passing out in public) and subjective loss of control referred to the breaking of a self-imposed limit, namely drinking more than one intended to, without defining the parameters of that intention. Given the obvious difficulties with a measure that is defined by some external rules of behaviour and the cultural relativity that must be attached to such definition and given that the whole idea of alcohol dependence refers to an altered relationship between the individual and alcohol, there would appear to be no problem with confining items to the measurement of subjective loss of control.

5.4 The timing of impaired control: is 'inability to abstain' a separate construct?

Further questions on the definition of impaired control refer to the timing of the phenomenon. Some writers have used the term to refer to between session loss of control, more

akin to inability to abstain, whereas others have used it exclusively for within session loss of control, the inability to stop once started. This distinction was perceived by Jellinek (1960) to be so fundamental that it formed the basis of his typology of the disease of alcoholism: as described above, “gamma alcoholics” are those who cannot stop once started, but once they have stopped due to intoxication or illness, it is not loss of control which gets the drinking started again. “Delta alcoholics” are those who are unable to abstain from alcohol but are able to control their consumption once started. Edwards and Gross (1976) proposed that both impaired control and inability to abstain were better seen as components of a “subjective awareness of a compulsion to drink”, a more general marker of alcohol dependence syndrome. Again Heather *et al.* (1993) included both in the Impaired Control Scale, but found that items referring to each were not distinguished in factor analysis. Kahler *et al.* (1995) also found that impaired control and inability to abstain items were not distinguished in the factor analysis of a collection of scores derived from several scales measuring the two. They concluded that the results of their study of ninety-seven male alcoholics attending for treatment did not support the distinction between loss of control and inability to abstain given the considerable overlap they found in responses to these items and in the similarities of their correlations with related constructs. The question of whether impaired control is distinct from inability to abstain is revisited in the validation of the Impaired Control Scale for heroin users in the present study. Different patterns of use of different substances which may partially arise out of their psychopharmacology may account for variations for each substance if such variations are identified.

5.5 Is impaired control a component of dependence or just highly correlated with it?

Unable to demonstrate that impaired control and narrowing of drinking repertoire were part of the same dimension as other syndrome markers, (Chick 1980b) questioned the unidimensionality of the alcohol dependence syndrome. Factor analysis of the Edinburgh Alcohol Dependence Schedule revealed that items measuring subjective impaired control loaded on a different factor to the other components of the dependence syndrome, as did the measure of reinstatement after abstinence. Stockwell *et al.* (1979) initially decided not to include items measuring the altered subjective state in the measurement of the alcohol dependence syndrome on the grounds that:

“it was felt that such items were too subtle for a simple inventory to cope with” (*Stockwell et al. 1979 p. 80*)

However, a number of studies demonstrated such strong correlations between the core elements of the alcohol dependence syndrome as measured by the Severity of Alcohol Dependence Questionnaire (*Stockwell et al. 1979*) and measures of craving (*Hodgson et al. 1978*) and the priming effect of alcohol (*Hodgson et al. 1979*), thought to be proxy measures of impaired control, that they have been used in support of the inclusion of loss of control as part of the syndrome. *Stockwell et al. (1994)* measured the correlation between alcohol dependence and impaired control more directly in a later study and concluded that, due to the strength of the correlations found, there was evidence for a unidimensional alcohol dependence syndrome which included loss of control as one of its components.

Using a combination of measures, namely the MAST, ADS and the CIDI-SAM cited above, *Kahler et al. (1995)* found that impaired control forms a component of a unidimensional alcohol dependence syndrome. *Davidson et al. (1989)* reached the same conclusion using the Severity of Alcohol Dependence Data (SADD) (*Raistrick et al. 1983*).

5.6 The measurement of impaired control

In the studies hitherto cited, impaired control has been measured as part of the dependence syndrome (for example *Raistrick et al. 1983, 1994*; *Skinner and Allen 1982*; *Chick 1980a*), using either self completion questionnaires or structured interview format, as part of a measurement of alcoholism or alcohol related problems (for example *Cottler et al. 1989*; *Selzer 1971*), or by a proxy measure using a single question (*Hodgson et al. 1979*). Writing in 1993, *Heather et al.* noted that:

“ Impaired control over drinking has occupied a central place in explanations of alcohol dependence since the late 18th century. Despite this key theoretical role, no instrument has been developed to directly assess the construct” (*Heather et al. 1993 p. 700*)

The following year *Stockwell et al. (1994)* published the revised version of the Severity of Alcohol Dependence Questionnaire (SADQ-C) for use in community samples and with it a five item self completion impaired control scale, the Impaired Control Questionnaire (ICQ). Items refer

to the desire to continue drinking once started, the ability to stop if there were other things that had to be done, difficulty in stopping before getting drunk, planning to drink without control and planning to limit the amount consumed. Stockwell *et al.* developed this short instrument in order further to validate the unidimensional nature of the alcohol dependence syndrome as items referring to the altered subjective state had not been included in the earlier measurement of the alcohol dependence syndrome (the SADQ) and to examine the possibility that the scale might improve the predictive validity of degrees of syndrome severity.

In a review of the impaired control literature, Heather *et al.* (1993) concluded that the clinical evidence was tipped in favour of a continuous variable, “reflecting the frequency with which episodes of impaired control occur” (Heather *et al.* 1993 p. 701), as opposed to an all-or-none variable, in much the same way as dependence itself had been shown to be. The question of intention remains a problem in response to which the authors opted to follow Storm and Cutler (1975) who define loss of control as a breakdown of an intention to limit consumption in a particular situation. Heather *et al.* have included items which refer both to the ability to keep to a limit in a given situation as well as more general questions of not being able to stop once started. They further include items referring to the ability or difficulty in abstaining in given situations. Although previously referred to as a separate type of alcoholism (Jellinek 1960), Edwards and Gross (1976) combined impaired control and inability to abstain, referred to above as within session impaired control and between session impaired control respectively, into the broader component of a 'subjective awareness of a compulsion to drink' (Edwards and Gross 1976 p. 1060) and Heather *et al.* adopted this approach in the development of their measurement scale. Beyond the above, they offered no further explanation of impaired control but expressed the belief that once a satisfactory instrument was devised it would be possible to elucidate the nature of the phenomenon, to examine the relationship between the impaired control construct and dependence and to examine its predictive and clinical utility.

The Impaired Control Scale (ICS) devised by Heather *et al.* (1993) is a questionnaire in three parts. The first part measures the frequency of attempts to control drinking in the past six months (subsequently named Attempted Control; ICSAC), the second part measures the frequency of failures to control drinking in the past six months (and subsequently named Failed Control: ICSFC) and the third part measures beliefs about the person's current ability to control drinking (subsequently named Perceived Control: ICSPC, see Heather *et al.* 1998). The point was to distinguish those who were successfully controlling their drinking from those who were not trying to control it at all: both would achieve low scores on Part 2 items but the former group would gain

high scores on Part 1 items while the latter group would obtain low scores on these items. Further, the authors predicted that those who had given up attempts at control would be distinguished from those who had never felt the need for control by the differences in their responses to items in Part 3 of the scale. Scale items in Parts 2 and 3 are identical, except that Part 2 refers to what has happened in the past six months and Part 3 items refer to beliefs about what would happen now. Items in these parts refer to the inability or difficulty in stopping once started, inability or difficulty in maintaining abstinence, drinking despite recognition of negative consequences, speed of drinking (as a behavioural correlate of impaired control), using external cues to terminate drinking and overall attempts to control drinking. The questionnaire was specifically designed to address the problems raised by Chick (1980b) regarding the presence or absence of intention to control which were discussed in an earlier section of this chapter.

When tested in an Australian clinical sample of 98 volunteers attending treatment services for alcohol related problems, the ICS was shown to have high levels of internal consistency and test-retest reliability (Heather *et al.* 1993). The results of principal components analysis indicated that each part of the scale was dominated by a single major component, that Part 1 (ICSAC) measured a different variable to Part 2 (ICSFC) and Part 3 (ICSPC), that Parts 2 and 3 measured similar but distinct variables. In order to examine the relationship between impaired control and the alcohol dependence syndrome, scores for Part 2 of the ICS and dependence scores as measured by the Severity of Alcohol Dependence Data (SADD) (Raistrick *et al.* 1983) in the validation study (Heather *et al.* 1993) were subjected to principal components analysis. Results from the rotated solution showed two components which were separate but related. ICS scores loaded on a different factor to the majority of dependence scores with a moderate correlation between the sets of scores, leading the authors to conclude that a strong association exists between impaired control and the dependence syndrome:

“...that impaired control is related to a general factor of alcohol dependence but empirically distinct from it.” (Heather *et al.* 1993 p. 707)

Impaired control and inability to abstain did not form separate constructs, a finding similar to that of Kahler *et al.* (1995) who used multiple measures of dependence which contained both impaired control items and inability to abstain items.

The psychometric properties of the Impaired Control Scale were broadly confirmed in an English clinical sample (Heather *et al.* 1998) where Impaired Control scores were also shown to be

significantly correlated with treatment outcome:

*"Clients who presented with higher levels of impaired control on the ICS were less likely to have a successful outcome to treatment."
(Heather et al. 1998 p. 769)*

The authors report that degree of impaired control predicted outcome in clients who had returned to drinking at some point during the follow up period and among those aiming for an abstinence goal; it did not predict outcome amongst those aiming for a controlled drinking goal. Further on the question of prediction, when results of the 1998 study were subjected to logistic regression analysis and impaired control was compared with alcohol dependence as a predictor of outcome, it was found that impaired control was not an independent predictor for the whole sample, but only for those who had wished to stop drinking and had returned to drinking during the follow up period. For this sub-sample, impaired control was an independent predictor of outcome when the effects of dependence were removed. Although impaired control was not able to predict choice of drinking goal, the authors nonetheless argue that it merits separate measurement because of its ability to predict relapse in clients who have chosen a goal of total abstinence.

Current theory of dependence places impaired control at the very heart of the phenomenon and empirical attempts to resolve the question of whether impaired control is part of dependence or closely related to it appear to be leaning towards the former position (Heather *et al.* 1998; Stockwell *et al.* 1994; Raistrick *et al.* 1994) though Heather *et al.* (1998) have made a claim to continue to measure it separately for the potential clinical utility of doing so, with particular reference to prediction of relapse amongst clients who are aiming for an abstinence goal. In the present study, where the nature of decline in dependence is under investigation, a measure of dependence or of a component of dependence was required in addition to the main measure of dependence used (the Leeds Dependence Questionnaire). The Impaired Control Scale was chosen as the theoretical deliberations which informed its development, coupled with its performance in the two studies described above rendered it most suitable for this purpose. As the scale was developed and validated in populations of problem drinkers, its use in the present study required a version suitable for heroin users as well as for alcohol users. I decided to use the original scale with the problem drinker group in the main study (Study 4) and to use a version adapted for heroin users and as close as possible to the original scale, with the heroin user group. Adaptation and validation of the original ICS for this purpose is reported below.

5.7 Adaptation and validation of the Impaired Control Scale (ICS) for use with heroin addicts

The ICS was chosen for use in the present study as a concurrent measure of a central component of dependence that is consistent with the psychological understanding of the dependence phenomenon. At the time of making the choice of instruments for the study, the ICQ (Stockwell *et al.* 1994) for which significant correlations with the ICS were demonstrated in the above mentioned study and which is much easier to administer, consisting as it does of five items rather than twenty five, was not yet in the public domain. The ICS was validated in general and treatment populations of alcohol drinkers and therefore required adaptation and validation of the scale for populations of heroin users.

5.7.1 Study 3 and the samples used in it

The study conducted for the purpose of adapting the ICS and validating the adapted scale, the ICSdrg, was Study 3 (adaptation and validation) outlined in Chapter 4. In this study, adaptation and validation of the Coping Behaviours Inventory, described below in Chapter 6, were also conducted. In total, four separate samples were used in Study 3 and three of these were used for the purpose of adapting the ICS and validating the ICSdrg: Sample 3 was recruited for the purpose of checking the items for the adapted ICS, the ICSdrg; Sample 4 was recruited for the purpose of validating the adapted scale (as well as for the purpose of validating the adapted CBI described in Chapter 6), and Sample 5 was recruited for the test retest reliability study of both adapted instruments. These samples were named and described briefly in Chapter 4. Instruments administered to each of the samples in the study are presented in Table 5.1 below.

5.7.2 The study site

Samples 3, 4 and 5, used for the adaptation of the ICS, the validation and test of reliability of the adapted version were recruited at the Leeds Addiction Unit, described above in Chapter 4, during routine attendances at the clinic room where pharmacological treatments are dispensed and monitored, and at out-patient clinics.

Table 5.1 *The samples recruited for Study 3: sample size and measures administered to each.*

measures	sample2 n=45 (used for adapting CBI)	sample 3 n=30 (used for adapting ICS)	sample 4 n=118 (used for validating both)	sample 5 n=61 (used for retest both scales)
LDQ	✓		✓	
SSQ				✓
interview re coping	✓			
ICSdrg 1 st pilot		✓		
interview re control		✓		
ICSdrg			✓	✓
CBIdrg			✓	✓
main substance/use data	✓	✓	✓	✓
age and gender			✓	✓

5.7.3 Procedures

Following discussions with Nick Heather (the first author of the ICS), I adapted individual items in the ICS by replacing the alcohol related words with heroin or heroin use related words and by replacing the instruction referring respondents to the past six months with a reference to the past three months. The guiding principle was to replace as few words as possible. The reason for modifying the instruction was two-fold: the planned follow-up periods for the main study were three and twelve months and therefore the results obtained at the first follow-up point needed to be based on the follow-up period. Further it was, and remains, my view that dependence and therefore also impaired control is capable of change in a period less than six months and that it is difficult for participants to give responses that are based on this length of time. The adapted instrument (see Appendix 4) was named ICSdrg and was administered to thirty attenders for problems of heroin use at the Leeds Addiction Unit (Sample 3). I interviewed the respondents as to the suitability of the items and the ability of these to reflect feelings they had about their drug use and its control.

No individual expressed difficulty with any of the adapted items, though a small number of people expressed difficulty with the length of the instructions in Part 2. Occasional complaints were made about repetition of the items in Parts 2 and 3 and these may have been the result of not reading the instructions. Possibly respondents were put off doing so by the length of these

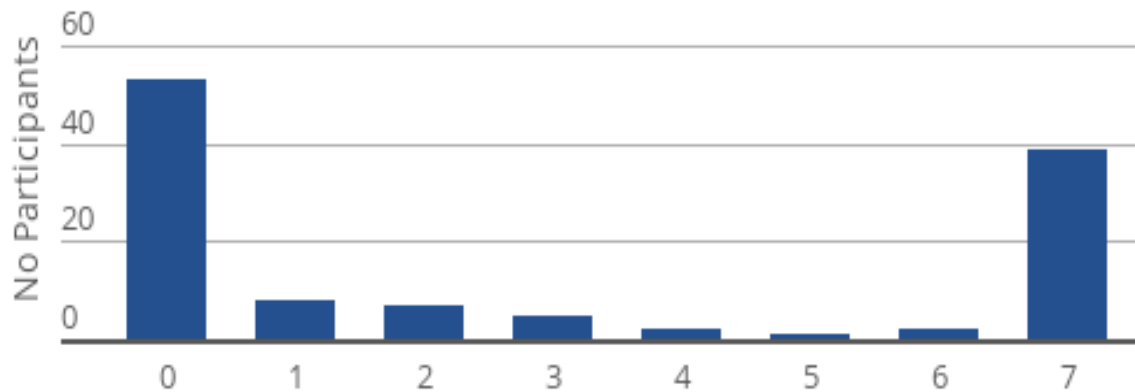
instructions. As there was no consistent reporting of difficulty with any of the adapted scale items, these were retained. The instructions were also retained in an attempt to use a scale as similar as possible to that used by the alcohol sub-sample. It was considered that any difficulty experienced with the instructions would not be unique to this substance group; caution could be exercised by requesting that respondents read the instructions carefully and seek assistance if necessary.

The revised scale was then administered to Sample 4, 118 individuals attending the Leeds Addiction Unit at various stages of their treatment for heroin addiction. These respondents were asked for their consent to complete a set of questionnaires while waiting for their appointment for initial assessment, for heroin detoxification or for out-patient treatment of dependence. The questionnaire battery comprised the Leeds Dependence Questionnaire (LDQ) (see Appendix 1), the adapted Impaired Control Scale (ICSdrg) described above (see Appendix 4), the adapted Coping Behaviours Inventory (CBIdrg) described in Chapter 6 (see Appendix 11), and six questions about recent use (see Appendix 5). Age and gender were recorded for each respondent. Complete questionnaire sets were obtained for 100 individuals and the two adapted questionnaires were completed by 118 individuals. Test re-test reliability analysis was conducted with a separate sample of 50 respondents attending the Leeds Addiction Unit at various stages of their treatment for heroin dependence. In agreement with Nick Heather, I thought that a number of the items referring to patterns of use might be potentially problematic for adaptation to users of heroin. Therefore, I interviewed a further small sample of 10 individuals as to their understanding of these particular items.

5.7.4 Results: sample characteristics

Respondents were 89 males (75% of the total) and 29 females (25% of the total) attending for assessment or treatment of heroin dependence; this was an identical gender ratio to that found in the heroin sub-sample of the main study Sample 6c (see Chapter 7). Mean age was 27.7 years (SD 6.3) with a range of 16 to 50, compared to a mean age of 25 for the heroin sub-sample of the main study. Forty-five per cent of the sample was abstinent from heroin and 33% were using heroin on a daily basis. A further 12% were using on one to three days of the week and 4.3% were using heroin between four and six days of the week (see Figure 5.1). Thus the typical patterns of heroin use in this sample were total abstinence or daily use.

Figure 5.1 *Histogram: number of participants by number of days per week using heroin:*
Sample 4 (n=118)



Mean peak daily use of heroin for the non-abstinent sub-sample was .72 grams (SD = .5) and mean number of days used in the past week for the non-abstinent sub-sample was 5.2 (SD = 2.4). Mean dependence score for the group was 14.8 (SD = 9). Mean dependence score for the non-abstinent sub-sample was 19.3 (SD = 8.4) and mean dependence score for the abstinent sub-sample was 10 (SD = 7.3). A significant positive correlation ($r=.6$; $p<.001$) was found for the whole sample between the number of days per week using and total dependence score and also for the amount used on heaviest day and total dependence score ($r=.6$; $p<.001$).

5.7.5 *Item analysis and internal consistency*

As described above, the ICSdrg consists of three parts and these were analysed separately, being “conceptually distinguishable but theoretically related scales” (Heather *et al.* 1993 p. 703). A subject to item ratio greater than 5:1 was maintained for each of the parts and respondents used the full range of possible responses for each of the items. The first part, referred to as ICSAC and consisting of five items, measures attempts to control the use of heroin over the past three months. The mean inter-item correlation was .61 and item-total correlations were all above .65 (an item-total correlation of .40 being the minimum acceptable, see Nunnally 1978). Internal consistency was measured by Cronbach's coefficient alpha (Cronbach 1951) which was found to be high at .88.

The second part of the scale, referred to as ICSFC and consisting of ten items, measures the extent to which control has failed to be maintained; some of the items in this part refer to intention to control and some do not. Three respondents did not complete this part, finding these items

irrelevant due to the fact of their total abstinence from heroin during the past three months. Item analysis is based upon 115 respondents. The mean inter-item correlation for this section was lower at .31 and item-total correlations were all above .4 with the exception of the fifth item ('During the past three months I started using drugs when I knew it would cause me problems'). This item had an item-total correlation of .3. Cronbach's alpha for this part of the scale was .82.

The third part of the scale, referred to as ICSPC and consisting of ten items, measures perceived control: respondents' beliefs about their current ability to control their use of heroin. Six respondents did not complete this part of the scale. The mean inter-item correlation was .38, item-total correlations were all above .43 and Cronbach's alpha was .86 (see Appendix 6). These scores compare closely with those found by Heather *et al.* 1993 in the original validation of the scale.

Further item analysis was conducted combining all 25 items in the scale; one hundred and eleven respondents completed all three parts of the scale. The first five items (constituting Part 1 of the scale) were found to have strong positive correlations with each other and negative correlations with all remaining items in the scale. The remaining 20 items had positive correlations with each other with two exceptions. Correlations were calculated between each item and the item total when that item had been deleted. Item total correlations for the first five items were similar to each other, all negative and ranging from -.25 to -.36, while item total correlations for the remaining 20 items were also similar to each other, all positive and ranging from .36 to .65. Thus item analysis of the combined parts seems to support the view that Part 1 (AC) measured a distinct phenomenon which is negatively related to Parts 2 (FC) and 3 (PC). Cronbach's coefficient alpha for the whole scale was .81. Deletion of each of the first five items slightly raised Cronbach's alpha in each case, by approximately .02 whereas deletion of all other items resulted in a marginal (in the region of .01) lowering of Cronbach's alpha (see Appendix 7). This lends support to the finding that responses to the first five items were consistent with each other and distinct from responses to the remaining items in the scale.

5.7.6 Construct validity of the ICSdrg

"To the extent that a variable is abstract rather than concrete, we speak of it as being a construct" (Nunnally 1978 p. 96). Where a scale is devised to measure a construct, its validity for this purpose can be assessed by comparison with other scales that have been validated as being capable of measuring the same construct or a construct that can be argued to be theoretically positively correlated with it (Carmines and Zeller 1979). At the time of adapting and validating the

impaired control scale for heroin users, no alternative scale for the measurement of impaired control in this group was found. However, as is discussed in the earlier part of the chapter, impaired control is seen as the central feature of dependence as it is understood in the psychological sense and it was therefore felt appropriate to test construct validity by comparison with sample scores for the measure of dependence, the Leeds Dependence Questionnaire (LDQ) (see Chapter 3). Correlations among scores for the three parts of the ICSdrg and the LDQ are shown in Table 5.2. For this part of the analysis, impaired control items 3 and 7 in the LDQ were removed. In the development of the LDQ, item 3 ‘Do you feel that your need for drugs is too strong to control’ was designed to be an inability to abstain item, whereas ‘Do you feel that you have to carry on once you have started’ was designed to be the impaired control item. However, since both meanings were used and investigated in the Impaired Control Scale, it was thought appropriate to remove both items in the comparison. Each part of the ICSdrg showed a significant correlation with total dependence score (see Table 5.2).

High scores on ICSFC and ICSPC refer to experienced greater difficulty and expected greater difficulty respectively in controlling heroin use. Both these show strong positive correlations with each other and with dependence scores. Attempts to control heroin use (ICSAC) were significantly negatively correlated with failed control (ICSFC) and with expected failed control (ICSPC) as well as with dependence scores.

Table 5.2 *Correlations among ICSdrg part scores and the LDQ; Sample 4 (n=118, data missing for 7 respondents).*

	ICSFC	ICSPC	LDQTOT (r)
ICSAC (attempted control)	-.44*	-.51*	-.32**
ICSFC (failed control)	—	.66*	.49*
ICSPC (perceived control)		—	.49*

* p=.000; ** p=.001 LDQTOT (r) refers to the LDQ total score with impaired control and inability to abstain items removed.

Construct validity may also be measured by factor analysis; where it is proposed that a single construct is being measured by a scale, factor analysis may be able to demonstrate that scale

items all contribute to the measurement of that construct. The Impaired Control Scale has three parts which were shown, in the validation of the original questionnaire, to measure three separate though theoretically related aspects which contribute to an overall definition of impaired control. The first part is designed to address the question of whether the respondent has attempted control over their substance use while the next two parts examine the question of whether this control was achieved and whether the respondent believed that they would be able to assert control over use. Evidence to suggest that each of the sub-scales tapped a single construct was derived from principal components analysis of each part separately. Part 1 (attempts to control) yielded a single main factor accounting for 68.7% of the variance with all items loading above 0.77. Part 2 (failed control) yielded a two factor structure with the first factor accounting for 38% of the variance and a second factor accounting for a further 19% of the variance. All items loaded above .4 on the first factor and those items that were negatively worded had negative loadings greater than .4 on the second factor. Part 3 (perceived control) again yielded a two factor structure with a main factor accounting for 45.3% of the variance and a second factor accounting for a further 19% of the variance. Once again, the second factor was accounted for by the negatively worded items all of which had loadings greater than .5 on this factor. These findings are shown in Appendix 8; they are almost identical to those of Heather *et al.* (1998): in that study, a two factor solution was found for Parts 2 and 3 of the scale with the second factor accounting for 15% of the variance in each part and being made up of the negatively worded items which had large negative loadings on the factor.

Although the number of respondents who completed all three parts of the scale (n=111 as some of the data were missing in the case of 7 of the respondents) fell short of that recommended sample size for factor analysis (Nunnally 1978 recommends a subject item ratio of at least 10:1), principal components analysis of the whole scale was nonetheless carried out. The above findings were confirmed in that the analysis yielded three main factors, one was accounted for by loadings above .37 for all the items in Parts 2 and 3, the second factor was accounted for by loadings greater than .35 for negatively worded items in Parts 2 and 3 and the third factor was accounted for by item loadings greater than .4 for the first five items (the ICSAC sub-scale). These five items had high negative loadings on the first factor. In the rotated factor solution, the first five items had low negative loadings on the first and second factors and high positive loadings on the third factor. This analysis suggests that the five items making up attempts to control form one construct that is distinct from failed control and perceived failed control items, but does not distinguish the latter two parts of the scale from each other.

On the question of whether items based upon patterns of use, specifically items 3, 4, 9, 15,

19 and 25 all of which refer to slowing down and cutting down drug use, would be readily adaptable to heroin users, the interviews with 10 heroin users at different stages of their using career were recorded. Four respondents said that cutting down and slowing down use referred to within session reduction, that is, using a smaller quantity of the drug and five respondents said that cutting down and slowing down referred to between session reduction, or using on fewer occasions per day or per week. One respondent said it could mean either or both. These responses were consistent with those to be expected from the alcohol sample and did not appear to perform differently from other items in the relevant parts of the scale. None of the respondents interviewed reported any difficulty in understanding these items with reference to heroin use.

5.7.7 Content validity

Content validity refers to the way a scale measures the entire domain of content;

"Rather than test the validity of measures after they are constructed, one should ensure validity by the plan and procedures of construction.....content validity rests mainly on appeals to reason regarding the adequacy with which important content has been sampled and on the adequacy with which the content has been cast in the form of test items" (Nunnally 1978 p. 92, 93)

In this chapter the construct impaired control has been discussed, its various meanings examined and current understanding described. In the original Impaired Control Scale, the understanding of impaired control as referring both to perceived inability to abstain and perceived inability to stop once started was applied. This domain of meaning and the balance of content between these components were retained in the adapted scale. The adapted scale is thought to have good face validity in that it appears to measure what is commonly understood to constitute impaired control and the items were reported to make sense by respondents in the pilot phase of adaptation.

5.7.8 Concurrent validity

Impaired control might be expected to predict the extent of use of the substance in that those who showed greater impaired control would be likely to use more of the substance than those who

had more control. Nunnally used the term prediction in the validation of scales to refer to:

“functional relations between an instrument and events occurring before, during or after the instrument is applied” (Nunnally 1978 p. 88)

What is being suggested here is the examination of correlations between scores on measures that would be expected to covary with impaired control because of a hypothesised relationship between the phenomena. Nunnally referred to criterion-related validity or predictive validity, while elsewhere, for example in the validation studies of the impaired control scale already referred to, the term concurrent validity is used.

In the present validation study, relationships with levels and patterns of use would be expected to hold when examining the sub-scale scores: more attempts to control would be associated with lower levels of use, more failed control with higher levels of use and more expected failed control would also be associated with higher levels of use. Measures of substance use were therefore chosen to examine the criterion-related validity of the adapted Impaired Control Scale. Correlations between ICSdrg, patterns of use and quantities used are shown in Table 5.3.

Table 5.3 *Correlations between ICSdrg part scores, number of days using and quantity used on heaviest day: Sample 4 (n=118)*

	DAYS	QF
ICSAC	-.26***	-.29**
ICSFC	.47*	.45*
ICSPC	.37*	.41*
DAYS		.75*

* p= .000; **p=.002; *** p=.005

Correlations were all significant; as shown in Table 5.2, attempts to control were negatively correlated with failed control and perceived control. They were also negatively correlated with number of days used in the past week and with quantity of heroin used on the heaviest day as shown in Table 5.3. Significant positive correlations were found between failed control and perceived (failed) control as well as between both of these and the number of days and quantity of heroin used

in the past week.

5.7.9 Reliability

Reliability of a scale may be measured in a number of ways and two were chosen in the present study. The internal consistency method was reported above in section 5.7.5 and found to be satisfactory; the test re-test reliability method is reported below. In order to examine the re-test reliability of the adapted Impaired Control Scale, the instrument was administered as part of a battery of questionnaires to a separate sample of 61 individuals attending the clinic at the Leeds Addiction Unit at different stages of their treatment for heroin dependence. Oppenheim (1992) has described problems of resistance and of a practice effect that may impede the process of administering the same scale in the same conditions which is the basic requirement for this test. For this reason the requirement of completing the scale twice in the space of a week was carefully explained at the outset and individuals expressing any reluctance were not included in the study. The possibility of a practice effect was thought to be minimised by a minimum gap of 48 hours between completion of the scale on the two occasions; additionally it was surmised that the fact that there were three scales in the battery decreased the likelihood of a practice effect.

The sample consisted of 40 males (65.6%) and 21 females (34.4%), their mean age was 25.7 (SD = 4.9) and a range of 17 to 37. The mean time between first and second scale completion was 5.3 days with a minimum of two days and a maximum of 14 days. The three parts of the scale were treated separately as described in the previous sections of this chapter. A significant correlation was found between the mean scores for each of the parts; the mean scores at the first and second time points were then compared in order to eliminate the possibility that the correlation was based upon change rather than constancy. No significant difference was found in the mean total score for each part of the scale between the first and second scale completion, indicating that the responses had remained constant. The results of these analyses are presented in Table 5.4.

Table 5.4 *Correlations and comparisons between the means for time 1 and time 2 responses to the three parts of the adapted Impaired Control Scale: Sample 5 (n=61)*

Variables	Number of pairs	Correlation	2-tail significance	Means	2-tail significance
ICSACT1	56	.67	.001	12.3	ns
ICSACT2				12.6	
ICSFCT1	44	.47	.001	23	ns
ICSFCT2				20.6	
ICSPCT1	50	.51	.001	20.1	ns
ICSPCT2				18	

Notable in the above table is the fact that of the 61 respondents who were given a battery of three scales which were being examined for the purpose of this study, 56 completed the first part of the adapted Impaired Control Scale, 50 completed the third part and only 44 completed the second part, which refers to their ability to control their use of heroin over the past three months. The most commonly given reason for non-completion of the second part was that the items were thought to be irrelevant if they had been abstinent from heroin for this duration of time. It is likely that this sample differed from the sample of new attenders in the main study in that it contained a larger proportion of people who were abstinent from their primary drug of misuse, in this case heroin, given that they were at various stages in the treatment process. However, in this small study, no data on substance use were collected so it is not possible to investigate this suggestion.

5.8 Discussion

It became apparent during the pilot phase that the items about limiting use, for instance the first item in Parts 1, 2 and 3 ‘During the past three months, I found it difficult to limit the amount I used’ and ‘I would find it difficult to limit the amount I used’ might elicit a different pattern of responses in the heroin group. Equally there was concern that items referring to slowing down and cutting down might not be meaningful to the heroin users group. Whereas dependent alcohol use may sometimes be characterised by drinking in a seemingly limitless fashion, the dependent pattern of heroin use may be somewhat different. People tend to place an absolute limit on the amount they use within a session due to a number of factors, notably the overdose potential of heroin, the fact

that a given dose will have a much more predictable effect and duration than alcohol, the availability and the cost of the drug. Interviews with respondents in the validation sample revealed that, despite these potential differences, people using heroin did find meaningful the questions about limiting their intake. They described limiting the amount used within a single session as well as limiting the number of times they used the drug throughout the day or the week. Thus while the idea of having no limit might be problematic with heroin users, the idea of limiting use was found to mean much the same as it does with reference to alcohol use. It would appear to be the case that the setting of absolute limits was determined by different criteria, i.e. those spelt out above, than the criteria used by those drinking alcohol.

Examination of the adapted Impaired Control Scale revealed similar findings to those of Heather *et al.* in both validation studies of the original scale (Heather *et al.* 1993, 1998). Internal consistency, content validity, construct validity and concurrent validity have been demonstrated. In the main, factor analysis lent support to the intention to measure separately attempts to control and ability to control use, whether experienced or expected. Principal components analysis of the original Impaired Control Scale (Heather *et al.* 1993) was conducted for the three parts combined and yielded one component on which all items in Parts 2 and 3 loaded and a different factor on which Part 1 items all loaded. Items from Part 1 were reported to load only weakly on the first factor. In the rotated solution, three factors were found, corresponding to Parts 1, 2 and 3 respectively, with low correlations between Parts 1 and 2 (.01) and between Parts 1 and 3 (.14). Correlation between Parts 2 and 3 was much higher (.48), leading the authors to confirm their a priori assumption that Part 1 measured the conscious attempt to control drinking, while Parts 2 and 3 measured the more related questions of whether control had been successfully maintained in the past and whether the respondent believed they were able to maintain control in the present. Factor loadings for items belonging respectively to Parts 2 and 3 in the present study were not distinguishable; items from these parts of the scale showed highest loadings on the same first factor.

Nor was it possible to identify separate factors for items associated more clearly with impaired control than with inability to abstain, along the lines discussed in the earlier part of this chapter. Unlike the original scale, Parts 2 and 3 did not appear to form separate factors in this study.

More worryingly, factor analysis revealed that the attempt to avoid the response bias that is response set (the tendency to tick the same responses for all items) that was built into the scale may have resulted simply in the identification of this source of bias. The fact that the negatively worded items consistently formed a separate factor for both parts of the scale which contained such items (namely Parts 2 and 3), that these items were distinguished from the rest only by the fact that they

were negatively worded and not on the basis of the content of the items (indeed content was very similar to those items not presented in this way) suggests that respondents either did not understand the questions or that there was a consistency in the choice of response to tick, a response set, that was independent of the question being asked. There was, however, nothing to distinguish the negatively worded items in the item analysis, examining inter-item correlations and item total correlations (see Appendix 6 and 7).

No such finding was reported in the original validation study (Heather *et al.* 1993). However, exactly the same finding was reported in the 1998 validation study (Heather *et al.* 1998). Heather suggested that a possible remedy would be to change the order of the questions so that the negatively worded items occurred earlier in the scale (as it is they occur at the 4th, 6th, 7th, and 10th items of both Parts 2 and 3) and may thereby prevent the response from being set in this way.

At the outset, the authors of the original Impaired Control Scale were concerned to avoid the problem of whether or not there was intention to control as discussed by Chick (1980a, 1980b). In Chick's standardised interview schedule designed to measure the alcohol dependence syndrome, there was one question in which reference was made to “sticking to a limit”, and one in which the respondent had to decide whether he or she had been “what you would call drunk” (Chick, 1980a, pp. 184-185). A number of difficulties were referred to by Chick: the large number of ‘not applicable’ responses to these items and the question of whether, if the individual did get drunk, had they had an initial intention to do so, had they changed their mind once drinking had commenced or had some internal mechanism, beyond the control of the drinker, caused the continued drinking? In designing the Impaired Control Scale to take these problems into account, Heather *et al.* (1993) did two things: i) they included a short section with questions on whether the respondent had attempted to control their use or not; ii) they worded the items in all parts of the scale in such a way that they referred to being able to stop once started or to being able to resist starting without making any assumption about intention. In the validation of the adapted instrument and in the test re-test reliability study, some of the respondents who had been abstinent for longer than the three months enquired about found the whole of Part 2 of the scale to be not applicable and this finding was repeated in the main study. These respondents had no problem completing Part 3 of the scale.

Problems of response bias, coupled with the irritation expressed by a small number of respondents at the length and seemingly repetitious nature of the items render the utility of this scale for routine use in some doubt. Furthermore, the marked difference in the number of individuals completing the different parts of the scale raises questions of relevance of the items at different stages of the dependence career. For the purpose of the present study, the psychometric

properties of the original and the adapted scale were thought to be satisfactory and its demonstrated relationship with a measure of dependence supported its use in the exploration of the nature of change in dependence while taking account of the limitations described.

Chapter 6

Coping and dependence

6.0 Introduction

The concept of coping is central to many addiction treatment approaches (see for example Kadden *et al.* 1992; American Psychiatric Association, Work Group on Substance Use Disorders 1995; Monti *et al.* 1995) where it is generally hypothesised that if patients learn to cope in alternative ways with situations which elicit drug taking responses, then the threat of relapse is diminished (Hodgson and Rankin 1982; Marlatt and Gordon 1985). In the cue exposure approach to the treatment of addictive behaviour, response prevention is based upon the application of coping strategies thus targeting and diminishing the dependent behaviour itself (Dawe and Powell 1995; Rohsenow *et al.* 1995). On the basis of such evidence, investigation of the use of coping strategies was thought to be capable of enhancing an attempt to elucidate the nature of change in dependence.

In the first part of this chapter, the literature on coping and substance use is explored and methods of measuring coping in groups of substance users, including the Coping Behaviours Inventory (CBI), one of the main instruments used to test hypotheses in the main study, are described. In the second part of the chapter, adaptation of the CBI for use with groups of help seeking heroin users is reported and this is followed by a report of the validation and reliability testing of the adapted version of the scale, the CBI_{drg}. Both form part of Study 3 (adaptation and validation), initially described in Chapter 4 and subsequently with reference to the adaptation of the ICS and validation of the ICS_{drg}, in Chapter 5.

6.1 Is there a relationship between levels of dependence and types of coping?

One of the methods proposed to examine the question of how dependence changes is to compare changes in dependence scores over time with behavioural and cognitive coping strategies. If it is the case that dependence endures but is suppressed or inhibited during abstinence, it may be possible to detect the use of different strategies in the process of change over time. Is a reduction in dependence associated with different behaviours, different coping styles than when dependence endures? Do people with high dependence use more behavioural coping strategies than those with

low dependence? Are more cognitive coping strategies used by people with low dependence and is there a sequence moving from the behavioural to the cognitive as dependence diminishes? Posing the question in this way, it appears that dependence is something that people have and coping is something that people do. It may be that the relationship is quite different, that both are things that people do and that people with high dependence use fewer coping strategies of any kind than people with low dependence. In the main analysis, the relationship between dependence and coping will be explored in order to elucidate the nature of change in dependence and the role that coping strategies may play in such change. One of the factors likely to affect the nature of coping strategies used is treatment which, as noted in the discussion below, tends to focus upon the teaching of behavioural coping strategies.

6.2 Coping and relapse

In the addiction literature the role of coping has been examined with reference to the maintenance of behaviour change and relapse, where coping refers to "what an individual does or thinks in a relapse crisis situation so as to handle the risk for renewed substance use" (Moser and Annis 1996). It was described in a model of relapse in a landmark study on the commonalities across the addictive behaviours (Marlatt and Gordon 1985) where situational determinants and the application of coping behaviours were proposed as the factors predicting relapse and continued abstinence. While this model has been criticised for its lack of attention to the role of decision making in relapse and prevention of relapse processes (Saunders and Houghton 1996), the role of coping strategies has continued to be a fruitful focus for examining factors in outcome. The number and type of coping strategies used, the situational determinants of their application, the perception of their effectiveness and their relationship with other important factors in relapse have been examined.

6.2.1 Cognitive and behavioural coping responses and relationships with outcome

Shiffman (1989) distinguished coping responses along a number of dimensions including the cognitive / behavioural dichotomy. Behavioural coping involves overt action and, he claims, is favoured by clinicians for seeming to be more "potent". Cognitive coping may, on the other hand be more critical to maintaining behaviour change. In an earlier study, he compared the use of behavioural and cognitive coping strategies and examined the relationship between these, the situational determinants of relapse and the outcomes of crisis situations, defined as those in which a

relapse was likely to occur.

Shiffman (1982) demonstrated the importance of cognitive coping responses and showed that these were less likely to be affected by situational determinants than were behavioural coping strategies. In a study of 183 ex-smokers who called a telephone service for help in staying off cigarette smoking when they felt they were about to relapse or had just started to relapse, interviewers obtained information about the relapse situation, the possible precipitants and the coping behaviours the caller had used in the attempt to refrain. While experience of withdrawal symptoms since quitting and immediately prior to the critical situation which initiated the call were examined, no attempt was made to assess severity of dependence. The findings suggest that situational determinants were important antecedents of relapse crises but did not determine the outcome. Rather it was the use of coping responses that determined the outcome. Situational determinants, specifically drinking alcohol, affected the application of behavioural coping and depression reduced the effectiveness of behavioural coping. With these exceptions, there was no difference overall between the effectiveness of behavioural or cognitive coping responses; participants who used both types were more likely to survive the situation than those who used only one type or who used none at all. In an extension of the study conducted two years later (Shiffman 1984), the relationship between behavioural and cognitive coping was examined for the entire sample of 264 ex-smokers; a relationship of unequal interdependence was found between the two groups of responses. Behavioural coping behaviours were accompanied by cognitive coping behaviours 79% of the time, while cognitive coping was accompanied by behavioural coping 63% of the time. The number of coping responses used was not predictive of the outcome. As mentioned with reference to the earlier study, no attempt was made to assess dependence, but when age, number of cigarettes smoked or number of years smoking were examined, no relationship with coping was found. Formal treatment was shown to affect the nature of coping responses with people undergoing such treatment being more likely to use behavioural responses than untreated people, more likely to combine behavioural with cognitive responses and less likely to use cognitive coping alone. Both groups were equally likely to report using cognitive coping. Overall the study found that the combination of behavioural and cognitive coping responses was significantly more effective in maintaining abstinence than using either type of response alone, or than using no coping. No one behavioural coping response was superior in its effectiveness to any other; in the cognitive coping category however, while will power was found to be significantly different to no coping, it was also found to be significantly less effective in its association with outcome. Self-punitive cognitions are associated with significantly more relapses than other cognitive coping

responses and this rate of relapse is no different from that associated with no coping response. With the exception of these two types of cognitive coping responses, no difference was found between the effectiveness of other types of coping responses.

In a later study examining the relationship between coping and situational determinants (Shiffman and Jarvik 1987), data from the population of ex-smokers calling a relapse prevention helpline reported in the earlier studies (Shiffman 1982, 1984) were used to demonstrate that the use of coping strategies decays over time. This may be a function of the fact that temptations to smoke diminish over time and therefore coping strategies may be required on fewer occasions. They also found that behavioural coping strategies were affected by situational determinants while cognitive strategies were not, but suggested this finding may be influenced by differential ability in the recall of behavioural and cognitive events. In the present study the relationship between the nature and use of coping strategies over time and the severity and decline in dependence is examined. Atrophy in the need to cope over time, if found, may be a consequence of the decline in dependence. The possibility of differential recall is a source of confound in interpreting findings in the present study.

Litman *et al.* (1979) showed that cognitive coping and flexibility of coping are more characteristic of people who survive relapse situations. In examining the relationship between coping and relapse, Litman and her colleagues also showed a relationship between severity of dependence and the perceived effectiveness of coping. Their sample was made up of 120 people, 49 of whom had relapsed within the two weeks prior to testing, 29 of whom were known to have been abstinent for six months or more and 42 who had not relapsed within the past two weeks but also had not gained six months abstinence. Survivors were older and saw themselves as more dependent than relapsers. Questions relating to the severity of physiological withdrawal symptoms and self-perception of being "hooked on alcohol" were used to measure dependence. The perception and use of cognitive control as an effective coping strategy distinguished the survivors from the relapsers in this study. Specifically, positive thinking was the type of coping behaviour which distinguished the two groups. However, the authors recognise that the perception of dependence and the perception of cognitive control as an effective coping strategy may be related to each other independently of relapse behaviour or otherwise. A further dimension explored in this study was the number and the variety of coping strategies used. Survivors "may tend to use more coping behaviours and report more types of coping behaviour that are effective than those who relapse". (Litman *et al.* 1979 p. 93).

Moser and Annis (1996) examined the influence of coping on the outcome of relapse crises in a sample of 125 treated alcoholics during the first 12 weeks following treatment completion. In

their coding of coping responses, they used a four category classification in which the active (or approach) / avoidance categories were subdivided by the cognitive/behavioural categories. Active cognitive coping responses were those that consisted of looking at the problem directly and employing a problem solving approach, redefinition, thinking of the consequences, supportive thoughts and self-talk. Cognitive-avoidance strategies were those which attempted to avoid the problem by ignoring it or relying on will power or resolve. Active behavioural strategies were those which dealt directly with the problem by seeking help and support from others, practising refusal skills or alternative activities. Behavioural avoidance strategies involved escape and tension reduction by eating, smoking or taking an alcohol sensitising drug.

The authors found that the number of responses employed up to two was associated with a significant difference between drinking and abstinence in relapse crisis situations and that the number of responses used was also significantly related to the quantity of drinking where it did occur. Like the Shiffman study described above, this study found no difference in the relationship between outcome and the use of either cognitive or behavioural coping strategies, but where participants in the study used a combination of cognitive and behavioural coping responses they were more likely to remain abstinent. However, when this finding was re-examined to distinguish the combination of types with the fact that inevitably the combination would involve the use of two or more strategies then the combination itself lost its significance, while the overall number of strategies used remained significant. On the active / avoidance dichotomy however, a difference was found between those who used active coping only compared to those who used avoidance coping only; those who used active coping only were significantly more likely to remain abstinent than those who used avoidance coping only. Those who used a combination were more likely to remain abstinent than those who used one or the other but again this finding was confounded by the fact that those who used both were more likely to use more strategies numerically. With reference to the drinking outcomes where drinking did occur the only strategy that was more effective than none was behavioural avoidance and specifically it was more effective than active behavioural coping in resulting in a light drinking outcome. People who used a combination of behavioural and cognitive strategies were more likely to achieve a light drinking outcome than people who used one or the other and no difference was found in relation to this outcome between these two strategies used separately. In this study the authors were unable to establish whether it was the case that the inevitably larger numbers of strategies used when combining had a confounding effect, or whether the combination had greater influence of itself. On the question of avoidance versus active coping, a light drinking outcome was more likely for participants who used a combination of the two types of

strategies and this finding was sustained when the possible confound of the inevitably greater numbers was controlled for.

Significance of the number of strategies used found in this study is at odds with the findings reported by Shiffman in 1984. The authors attribute this to a difference in the methodology of the analysis, where using a logistic regression analysis yielded the finding, for example, that doubling the number of responses up to two doubled the probability of an abstinent outcome. The findings of Moser and Annis are, however consistent with those of Litman *et al.* (1979) who reported that survivors used more coping strategies than relapsers but did not replicate this finding in their 1984 study (Litman *et al.* 1984), and Bliss *et al.* (1989) who reported that use of more than one response significantly increased the smoker's chances of remaining abstinent compared with the use of only one response. Bliss *et al.* also reported the finding that it was the overall number of coping responses used, as opposed to the nature or the combination of those responses, which was predictive of outcome.

Moos and colleagues investigated the relationship between coping strategies and long term outcome of treated patients (Moos *et al.* 1990). They classified coping strategies into Avoidance and Approach categories and developed a measure of salient aspects of approach coping, such as positive reappraisal, seeking support and problem solving, and salient aspects of avoidance coping such as trying not to think about a problem and venting one's anger about it. The scale they used, the Health and Daily Living Form (HDL) (Moos *et al.* 1984; Lettieri *et al.* 1985) was developed for the purpose of measuring coping in a variety of situations but has been applied by the authors to identify coping in patients with alcohol problems. In this scale, patients are asked to consider a stressful event and describe how it was handled in terms of indices of active cognitive, active behavioural and avoidance coping responses. In the development of the scale the authors found a relationship between coping styles, the development of problems and outcome. "...people who rely more on approach coping and less on avoidance coping tend to be more successful in managing life crises and their consequences; these people are less likely to develop substance abuse or psychiatric problems and more likely to remit or recover if they do develop such problems." (Moos 1994 p. 33).

In an eight year follow up study, they found that reliance on active coping skills promotes remission. "Patients who engaged in more active cognitive coping at 2 years post-treatment tended to drink less and be less depressed 8 years later. Patients who relied more on avoidance coping responses 2 years after treatment tended to be more depressed 8 years later" (Finney and Moos 1992 pp. 148-149).

More recently, Moos used the Coping Response Inventory (Moos 1993) with alcohol

patients and looked at a dimension of coping style he has referred to as coping orientation; he distinguished affect regulation (e.g. "told myself things would get better", "exercised to reduce the tension") from problem solving (e.g. active attempts to address problems directly, like organising a detoxification programme or taking disulfiram) and found a relationship between these styles, entry to treatment and outcome.

Moos and colleagues have found that the use of coping behaviours is associated with outcome and they have distinguished coping behaviours along approach / avoidance lines rather than cognitive / behavioural lines. This is a different dimension to the one proposed in the present study and one which should be addressed in analysis of the data.

DiClemente and Prochaska demonstrated that subjects in a study of 872 smokers and ex-smokers used different coping strategies at different stages of change (DiClemente and Prochaska 1985). People described as immotives or pre-contemplators, i.e. those not contemplating change, predictably used fewest coping strategies to quit. Contemplators used cognitive coping strategies and few behavioural coping strategies, arguably an equally tautological finding. Of most relevance to the present discussion is the finding that what turned recent quitters into either relapsers or long term quitters was the difference found in the use of both cognitive (self-reevaluation and self-efficacy) and behavioural (helping relationships) coping strategies, or processes in the language used by these authors. Relapsers used more self-reevaluation while long term quitters had higher self-efficacy and used more support from helping relationships.

6.3 Coping and dependence

In the present study an attempt is made to elucidate the nature of decline in dependence by looking at the use of coping behaviours as dependence changes over time. While Litman and her colleagues used a measure of self-attributed physiological dependence on alcohol in early studies (Litman *et al.* 1979), the reported analysis compared this with relapse or survival and not with the nature of the coping behaviours used. Furthermore, the understanding of dependence as a physiological phenomenon used by Litman and her colleagues is not used in the present study. It is hypothesised that participants with higher levels of dependence use more behavioural coping strategies in the course of reducing their substance use and / or dependence, and people with lower dependence use more cognitive coping strategies. The basis for this is a similar clinical observation to that made by Shiffman (1984): formal treatment has tended to focus on the teaching of behavioural coping strategies because it is increasingly well established that people do better in an

environment supportive of abstinence or control and engagement with that environment implies the use of behavioural coping strategies. Two points from the above brief review may be of relevance here: that untreated people more commonly use only cognitive coping strategies and that the use of behavioural strategies is predicted by situational determinants whereas the use of cognitive strategies is not (Shiffman and Jarvik 1987). In so far as people with higher degrees of dependence experience greater difficulty in abstaining (this is in the nature of dependence and different from the question of whether they are more or less successful in abstaining) it is at least possible that behavioural strategies will be more commonly used in this group, due to the greater effort required in reducing their dependence. It has further been hypothesised that dependence will endure for longer in those individuals with higher levels of dependence at the first measurement point and as a result they will undertake a greater number and variety of coping strategies than people with lower levels of dependence in the pursuit of reducing that dependence. Participants in the present study were not asked about their perception of effectiveness; they were asked which things they did in order to try to refrain from use. The number and type of coping strategies was then compared to drinking and drug use at each data collection point and to the contemporaneous degree of dependence.

Differences in research methodology, in classification of coping responses, in classification of relapse circumstances and situational determinants of these and of the application of coping responses render comparisons between studies difficult. Shiffman (1989) has called for a taxonomy of coping strategies without which, he claims, it remains difficult to establish which types of behaviours are used in which situations to what effect. He proposed a taxonomy based upon the sequence of their application as well as the nature of the behaviour itself. For our present purposes however, a questionnaire based upon the simple cognitive / behavioural dichotomy and capable of enumerating strategies used was selected. Furthermore the purpose of its use is to elucidate whether the decline in dependence follows a different course for high and low dependence individuals rather than whether or not they will relapse.

6.4 The measurement of coping strategies

Semi-structured interview techniques (Shiffman 1982, 1984; Shiffman and Jarvik 1987; Bliss *et al.* 1989) and self-completion inventories (Litman *et al.* 1983; Litman *et al.* 1984; Moos 1993) have been used to measure the nature and extent of use of coping strategies in substance use disorders. In the present study, self-completion questionnaires were chosen for all measurements for

reasons of resource availability and applicability to routine clinical practice. For the purpose of measuring coping strategies, an existing instrument was examined for its suitability and adapted for use in the target population. The Coping Behaviours Inventory (CBI) (Litman *et al.* 1983) was chosen as the most suitable instrument for this patient population.

Litman and her colleagues (1983) conducted interviews with hospitalised alcoholic patients in which they were asked to describe the methods they used to avoid relapse. On the basis of these interviews, sentence completion questionnaires were devised using the patients' own concepts and language, and these, together with further interviews were used to construct the Coping Behaviours Inventory (CBI), consisting of a combination of cognitive and behavioural strategies. Frequency of use of these coping strategies was rated on a four point scale from (0) 'I have never tried this', (1) 'I have sometimes tried this', (2) 'I have often tried this' to (3) 'I have usually tried this'. The CBI was administered to current alcoholic patients at four hospitals in London and Manchester and to past patients from these hospitals known to have been abstinent from alcohol for six months or more. Principal components analysis yielded four factors and these were: i) positive thinking, ii) negative thinking, iii) avoidance and iv) distraction or substitution. The positive thinking factor refers to being realistic about having an alcohol problem, the negative thinking factor refers to thoughts about the negative consequences of having such a problem, avoidance refers to the behavioural strategy of avoiding drinkers and drinking situations and distraction or substitution refers to the pursuit of activities alternative to and inconsistent with drinking. Thus there are two cognitive and two behavioural factors in this inventory. Using only those items which most significantly discriminated relapsers from survivors, questionnaire items were reduced from 60 to 36 and administered to 256 patients presenting for treatment of their alcohol problem at seven different treatment agencies including in-patient and out-patient hospital facilities which were a mixture of private, National Health Service and non-statutory facilities.

Stability of the structure of coping behaviours was demonstrated by the repetition after five years, across different sites, socio-demographic groups and geographical groups of patients. In this study, the number of coping strategies used discriminated between relapsers and survivors and a significant discriminator was the positive thinking factor. Additional information obtained from respondents included drinking and relapse history, measures of self-efficacy and self-esteem, locus of control, perceived social supports, commitment, motivation and the patient's perception of the therapist.

The Effectiveness of Coping Behaviours Inventory is a self-report scale measuring how effective these coping behaviours are perceived to be (Litman *et al.* 1984). Subjects are required to

respond to the same 36 items, but the instructions on the second occasion are different to those given on the first occasion. Responses are 'usually stops me' (2), 'sometimes stops me' (1), 'never stops me' (0) and 'don't know' (0). In the 1984 study the authors found that frequency of coping behaviours per se when measured at intake was not related to drinking outcome, whereas perceived effectiveness of coping behaviours did distinguish between heavy drinkers (defined as those who drank the daily equivalent of five or more pints of beer, one and a half or more bottles of wine, one bottle of fortified wine and half a bottle of spirits) and abstainers (those for whom there was no evidence of any drinking during the period from discharge to follow up). The abstinent group had a higher mean score for the effectiveness of coping behaviours overall, and significantly higher scores on two of the four factors. The component factors were: positive thinking, negative thinking, avoidance / distraction and social support seeking. Moderate drinkers (defined as those whose consumption was less than the daily equivalent for the heavy drinker group) at follow up had lower scores on both scales than did abstainers or heavy drinkers. In other words they used fewer coping strategies and thought the coping strategies were less effective than did either the heavy drinkers or the abstainers. These latter two groups were thought perhaps to be more severely dependent than the moderate drinking group and the authors therefore investigated the relationship between coping behaviour frequency, perceived effectiveness of coping behaviours and dependence. The measure of dependence used was a behavioural / physiological scale consisting of six items measuring the intensity of symptoms such as tremulousness, loss of control and morning drinking. They did not find any significant differences between the three groups on their dependence scores at intake. In other words, degree of dependence, when measured on the basis of the syndrome idea, did not distinguish the groups. No relationship was found between dependence and coping behaviours or their perceived effectiveness; a relationship was found between frequency of use of coping behaviours and perceived effectiveness and drinking outcome in the heavy drinkers / abstainers group.

When the authors looked at the coping behaviours which participants in the three outcome groups (light / moderate drinkers, abstainers, heavy drinkers) had *not* used at intake, the light / moderate drinking group differed significantly from the other two groups combined. Subjects in this group ticked the answer 'I have never tried this' significantly more often than subjects in the other two groups. It may be that people who achieve a moderate drinking outcome use different coping strategies or fewer coping strategies than people who have a heavy drinking or abstinent outcome and this may be due to a difference in degree of dependence that a questionnaire measuring physiological symptoms of withdrawal is not able to measure. It has been suggested elsewhere

(Sanchez-Craig *et al.* 1984, Foy *et al.* 1984) that subjects with high dependence are less likely to control their drinking, that is to drink in moderation at follow up than are subjects with low dependence. The relationship between dependence in the psychological sense and coping strategies remains to be tested.

While Litman and her colleagues have directly compared the predictive ability of frequency of use of coping strategies with the perceived effectiveness of coping strategies and found the latter to have greater predictive power with reference to drinking outcome, the present study aims to examine the relationship between the nature of coping strategies used, the frequency of their use and degrees of dependence. The purpose is to identify whether different coping strategies are associated with different degrees of dependence and whether the use of coping strategies changes over time with changes in degree of dependence. Previous work has suggested that people with low dependence do not use many coping strategies, (they do not need to, Litman *et al.* 1984) and one of the aims of the present study is to re-examine this question using a psychological construct of dependence.

In the literature reviewed, the focus on coping strategies has been concerned with their relationship with substance misuse outcomes; a relationship between coping and relapse during a period of abstinence or control has been demonstrated, though the effectiveness of type versus number of coping strategies with reference to outcome has varied with different methodologies and definitions. The relationship between type of coping and type of outcome is also unclear due to the different definitions used in drinking status and the fact that smoking outcomes have more usually been treated as dichotomous, thus not giving much clue as to the role of degree of dependence in differentiating outcomes. In the present study, the measurement of coping strategies is used in the attempt to identify processes in the reduction of dependence, an outcome of a different nature to those described above.

6.5 Adaptation and validation of the Coping Behaviours Inventory for use with heroin addicts

Existing scales target either a particular substance or a particular age group and are therefore not suitable for use by multiple drug users of all ages in the help seeking population nor for comparison between the users of different drugs. In order to measure coping in the heroin sub-sample of the present study, it was necessary to adapt an existing validated instrument for the measurement of coping in relapse and survival following treatment for alcohol dependence and misuse.

The Coping Behaviours Inventory (CBI) (Litman *et al.* 1983) (see Appendix 9) was selected as the most suitable questionnaire for use in this study for the following reasons: i) it was validated for use in clinical samples of problem drinkers in the UK; ii) the items included in it most closely resembled the items generated in interviews with help seekers for both alcohol and heroin at the Leeds Addiction Unit and it therefore appeared to be the scale most suitable for adaptation to heroin users..

Adaptation of the CBI and validation of the adapted scale, the CBIdrg, was conducted as part of Study 3 (adaptation and validation) described in Chapter 4. Three samples, also described in Chapter 4 were used: Sample 2 was used for generating statements about coping, comparing and collapsing these with items in the original CBI with changed wording suitable for heroin users only where this was strictly necessary. Sample 4 was the sample used for the validation of the CBIdrg (as well as for the validation of ICSdrg reported in Chapter 5), and Sample 5 was the sample used for test retest reliability of the CBIdrg, again together with such test of the ICSdrg.

6.5.1 Method

In order to test the relevance and potential adaptability of the Coping Behaviours Inventory (Litman *et al.* 1983), I interviewed 45 individuals abstinent from their primary drug of dependence, described in Chapter 4 as Sample 2, about the coping strategies they used when trying to avoid using the drug.

For the purposes of this study, the cognitive / behavioural distinction most commonly used in other studies was retained in the adapted inventory. Respondents were asked by the interviewer "Tell me all the things you do and think to avoid using(name of substance)". They were prompted with the question "Is there anything else?" The list of strategies generated from responses recorded in the interviews is found at Appendix 10. Responses were coded as 'Cognitive' or 'Behavioural' coping strategies. The statements generated in these interviews were checked against the Litman *et al.* (1984) items and duplication eliminated. They were then piloted with a further sample of clinic attenders and reduced to 38 items (see Appendix 11). Only two of these items were not covered in any way by the existing items in the original CBI (see Appendix 9) and these two items were retained for the purpose of validating the adapted scale.

The adapted scale was then constructed in the same way as the original CBI: respondents are asked to tick a four point frequency scale from (0) 'Never' to (3) 'Usually', in response to the question: how often have you used these ways to stop yourself using drugs again? The 38 item scale contained 18 behavioural items and 20 cognitive items (see Appendix 11) although in subsequent

factor analysis, this distinction did not result in separate factors in the scale (see below). The adapted inventory was subjected to validation in a sample of 118 people attending the Leeds Addiction Unit for treatment of a heroin problem.

6.5.2 Procedures for assessing the reliability and validity of the adapted Coping Behaviours Inventory (CBI(drg))

The sample (Sample 4), the battery of questionnaires and the procedures for the validation of the CBI(drg) were described in Chapter 5, section 5.7.3 and 5.7.4. Table 5.1 in Chapter 5 presents a summary of the instruments administered. Complete questionnaire sets were obtained for 100 individuals and the adapted questionnaire was completed by 118 individuals. Test re-test reliability analysis was conducted with a separate sample of 61 respondents described as Sample 5 in Chapter 4. The CBI(drg) was administered to this sample on two occasions separated by a minimum of 2 days and a maximum of 14 days. Procedures and sample characteristics are described in Chapter 5, section 5.7.9.

6.5.3 Results: item analysis and internal consistency

The mean total score for the adapted Coping Behaviours Inventory was 53.7 with a range of 0 to 92. The respondent scoring 0 simply put a line through the whole questionnaire but it is not clear whether this was a reluctance to respond to individual items or the finding that none of these coping strategies were used. The distribution of total scores followed the normal distribution curve. Responses covered the full range of response choices and, with the exception of the respondent described above, all respondents used at least some of the items. Mean item score was 1.4 with the lowest mean item score being .23 (item 12) and the highest 2.26 (item 5). The mean inter-item correlation was .23. Item-total correlations ranged from .17 to .67 with the lowest item-total correlations being for behavioural coping strategies (items 33, 12, 8, 2, 37 and 10) and the highest item-total correlations being for cognitive coping strategies (items 32, 31, 19, 17, 22 and 13). The adapted scale had high internal consistency, with an alpha coefficient of .92. Alpha was not markedly raised by the deletion of any item (see Appendix 12).

Factor analysis was also used to assess reliability of the adapted scale as it takes account of the fact that items may measure a construct unequally (Carmines & Zeller 1979). Principal Components Analysis extracted 11 factors with an eigenvalue greater than one which accounted for 67% of the variance. The first factor had an eigenvalue of 10 and accounted for 26.4% of the variance. Thirty-two of the items had factor loadings over .35 on the first factor (Spector 1992 p. 55

states that a minimum value of about .30 to .35 is required to consider that an item loads on any factor). The six items whose loading on this factor was less than .35 were all behavioural avoidance items (items 2, 10, 12, 18, 33 and 37); the highest factor loadings for these items were distributed amongst the remainder of the factors. It was difficult to interpret all the other factors, though one was made up of alternative positive activities and another behavioural avoidance items. The remaining factors accounted for between 6.5% and 2.7% of the variance. Since the sample size was unsuitable for factor analysis, having a subject : item ratio much smaller than 10 : 1 recommended by Nunnally (1978 p. 421), factor analysis was not pursued beyond examination of the question of whether there were two distinct factors accounting for cognitive and behavioural coping strategies respectively.

For the rest of the validation, the inventory was used precisely as that, an inventory of cognitive and behavioural coping strategies, consisting of both positive thoughts about giving up, negative thoughts about use, behavioural avoidance strategies and alternative activities inconsistent with using drugs. When the data were re-analysed into dichotomous categories to examine whether strategies had been used or not (as opposed to the frequency of their use), and divided into cognitive and behavioural coping inventories (see Appendix 13), the mean score for cognitive coping was significantly greater than the mean score for behavioural coping with a ratio of 4:3. The ratio of cognitive to behavioural items was computed from the frequency scores and the mean ratio was found to be 1.75:1. Only 5% of respondents used more behavioural than cognitive coping strategies. A significant positive correlation was also found between the use of cognitive and behavioural coping strategies.

6.5.4 Content validity

Repeated interviews conducted with participants at various stages of their addiction careers formed part of the process of examining the suitability of the CBI for adaptation to users of substances other than alcohol, as reported in an earlier section of this chapter. The scale was thought to be comprehensive and meaningful to respondents with drug and alcohol misuse disorders. As a result of these interviews, only two items were added to the scale due to the fact that they were not covered by existing items. In the event, one of these items referring to taking exercise, was used very little (mean item score .8 placing it among the five least used items) and the other item, referring to the taking of sensitising or substitute medication, is readily measurable by other means. It was therefore felt to be justified to delete these items for the purpose of comparability with the original CBI that was administered to the alcohol sub-sample in the main study.

6.5.5 Construct validity

For the purpose of examining construct validity, no scales were available specifically to measure coping strategies relevant to users of heroin. As mentioned in the validation of the Impaired Control Scale, factor analysis may be used to ascertain whether scale items measure the same construct. As discussed earlier, while 32 items had a factor loading greater than .4 on a main factor, this factor accounted for only 26.4% of the variance and the sample size was in any event too small for any conclusions to be drawn. The scale does, however, have good face validity and items clearly address methods of avoiding substance use.

6.5.6 Concurrent validity

For the purpose of examining concurrent validity of the scale, total scores and cognitive and behavioural sub-scale scores were compared with frequency and amount of heroin used, on the basis of the assumption that the more coping strategies were used to avoid consumption, the lower consumption would be. Correlations among measures of use, the total score for the coping behaviours scale, the cognitive sub-scale and the behavioural sub-scale were in the expected direction (ie negative) but did not reach significance. Correlations between coping and degree of dependence were also negative but did not reach significance.

6.5.7 Test re-test reliability

The adapted Coping Behaviours Inventory was subjected to a test re-test method for examining its reliability, while attempting to avoid the problems of the effects of resistance or of practice discussed by Oppenheim (1992) and addressed in the previous chapter. The separate sample used for the purpose of test re-test reliability was described as Sample 5 in Chapter 4. The adapted Coping Behaviours Inventory (CBI_{dr}) was administered in a battery containing two other questionnaires (being similarly subjected to tests of reliability in their own right) to 61 individuals of whom 57 completed this scale on two occasions, the first described below as t1 and the second as t2. Mean time between first and second scale completion, as already described in Chapter 5, was 5.3 days with a minimum of 2 days and a maximum of 14 days. Correlations and differences between the mean total scores for the two sets of responses are presented in Table 6.1.

Table 6.1 *Correlations and comparisons between the means for responses at t1 and t2 to the adapted Coping Behaviours Inventory: Sample 5 (n=61)*

Variables	Number of pairs	Correlation	2-tail significance	Means	2-tail significance
CBITOTT1	57	.77	.001	54.9	ns
CBITOTT2				57.1*	

* 95% confidence interval for the difference between the means

A significant positive correlation was found between the mean total scores at time 1 and time 2; the mean correlation between the individual items at t1 and t2 was .5. No significant difference was found between the means of the total scores at these two time points indicating that responses had not changed over the time period and therefore the correlation can be assumed to support the reliability of the instrument.

6.6 Discussion

Assessment of predictive validity was not part of this study as respondents in the validation sample were not followed up. The requirements of content and construct validity (Cronbach 1970) were addressed in the process of adapting the existing questionnaire, starting with the interviewing of a sample of participants at different stages of their addiction career and treatment, with a range of people who were stably abstinent to people who were embarking upon a course of treatment, checking statements elicited with items in the original questionnaire, eliminating statements that were duplicated and ensuring coverage of both cognitive and behavioural items in the final scale. Although content validity is hard to measure (Carmines & Zeller 1979), construct validity was addressed by ensuring that items in the questionnaire covered those coping strategies found in the substance misuse and coping behaviours literature reviewed. Cognitive items were more frequently used than behavioural items and this finding is consistent with previous findings in this field. The questionnaire has good face validity, the questions being straightforward enquiries about the performance of specific behaviours designed to avoid substance use.

In the original Litman study, four main factors were identified which were said to "adequately summarise this Inventory" (Litman 1983 pp. 271-272). These factors were identified as 'Positive Thinking', 'Negative Thinking', 'Avoidance / Distraction' and 'Seeking Social Supports'. In

the present study, one main factor emerged in the scale and items loading on this factor were a combination of cognitive and behavioural coping strategies. Additional factors consisted of alternative positive activities items, behavioural avoidance items, positive cognitions about not using but these were not pure factors in the sense that not all items that could be defined in the same way loaded on the same factors and some of the factors were difficult to interpret at all. Given the insufficient size of the sample for the purpose of this analysis, coupled with the results that were found, it was not possible to say that there were two factors accounted for by cognitive and behavioural coping strategies which measured the same phenomenon. It was therefore decided, for the purposes of this study, to use the scale as two inventories, one for cognitive coping and one for behavioural coping.

Due to the length of the questionnaire, the question of item reduction was addressed. Spector (1992) suggests that one method of item reduction is to proceed on the basis of removing those items with item-total correlations less than .40. On this basis, ten items were removed: these were item numbers 2, 8, 10, 12, 14, 21, 23, 33, 35 and 37, all behavioural items with the exception of item 23. The alpha coefficient was raised by .003 as a result (to slightly over .92 as opposed to slightly under .92). As the difference rendered to alpha by item reduction was so small, but the removal of these items shifted the balance of items markedly towards a far greater proportion of cognitive items, the original set of 36 items (minus the two additional items) was used in the main analysis.

In the addiction outcome literature, outcome expectancies, self-efficacy, coping strategies and the perceived effectiveness of coping strategies all have predictive ability. It would appear, from examining the items generated in this small study, that the cognitive coping strategies identified were cognitions based upon a combination of negative outcome expectancies for continuing use and positive outcome expectancies for change. These two categories of coping strategies have been examined for their ability to predict outcome in people in treatment and not in treatment and have been found to be good predictors of outcome (Brown 1985, Jones and McMahon 1994). Jones and McMahon (1994) have argued that the research has focussed on positive outcome expectancies for drinking and their ability to predict relapse to the exclusion of attention to negative outcome expectancies and their ability to predict survival (or abstinence). Their study of negative outcome expectancies for drinking shows an equal ability to predict outcome in treatment and community samples (McMahon & Jones 1996). Though not all cognitive coping strategies can be clearly defined as positive and negative outcome expectancies in the current study, those cognitive items most frequently used are an equal number of positive thoughts

about stopping and negative thoughts about continuing.

Significant correlations between coping behaviours as measured by the adapted Coping Behaviours Inventory, patterns of use or levels of dependence were not found in the sample used for this validation study; this may be due to the selection of respondents who were at different stages of their treatment for the sample. There is a possibility that correlations may emerge as a result of change in dependence and the question of what happens with coping strategies, both cognitive and behavioural, when dependence changes, is explored in the analysis of change in Sample 6 in the main study, Study 4.

Chapter 7

The main study: methods, procedures and sample characteristics

7.0 Introduction

In order to investigate the nature of change in dependence, a follow-up study of individuals seeking help for problems of alcohol and heroin dependence and misuse was carried out. The site chosen for recruitment to the study was the Leeds Addiction Unit, first described in Chapter 4; further relevant descriptive detail is presented below.

In this chapter, the sample selection and the methods of data collection are described. This is followed by a description of the samples captured at the three data collection points: intake (t1), three months (t2) and twelve months (t3), and a description of the ways in which those individuals who were traced and who participated in follow-up differed from those who were not traced and who did not participate in follow-up. The purpose of presenting the time 1 (t1) data for those not followed up at each data collection point and comparing these with the data for those who were followed up, is to attempt to establish the possible bias in the findings relating to the sample that was followed up. Demographic characteristics, measures of substance use and dependence, general health and social satisfaction for each of the sub-samples are given. The whole sample seen at intake (n=230) is described as Sample 6, those seen at intake and three months are Sample 6a, those seen at intake and twelve months are 6b and those seen at all three data collection points are Sample 6c.

7.1 Sampling

The aim of sampling was to obtain a representative sample of a typical help seeking population of primary heroin and alcohol users, in similar proportions to those reflected in normal referral patterns at the Leeds Addiction Unit (Leeds Addiction Unit 1997) and with similar gender and age distributions. Demographic and substance use data from other, similar agencies were examined to establish the extent to which help-seekers at the study agency were representative of help-seekers at similar agencies locally and nationally. The site for sample selection was the agency

base and was chosen on the basis of convenience due to resource limitations. While a convenience sample is a type of non-probability sample (Henry 1990) and such samples are characterised by a degree of subjective judgment in the selection process, such judgment was limited to selection of the period of recruitment and to the application of minimal exclusion criteria in the same way that would occur in a probability sample.

The goal was to select a sample which was representative of all help-seekers at specialist National Health Service agencies for problems of heroin and alcohol use and dependence. The sample was somewhat biased towards those patients who attend the central agency site for at least their first appointment as opposed to those who were seen in their own homes or other community venue. The possible basis for such bias is discussed in the section below.

7.1.1 The research site

The agency chosen for the study is a National Health Service out-patient and day-patient facility with six hospital beds (since closed) at a separate site. Detoxification programmes and psycho-social treatments of substance dependence are provided by three clinical teams under the overall management of a consultant addiction psychiatrist. The agency is a specialist service provided by the Leeds Community and Mental Health NHS Trust. Each clinical team contains a multi-disciplinary staff group with medical staff (mainly psychiatrists and a general practitioner), psychiatric nursing staff, a psychologist, social worker and addiction therapists. In addition to the clinical teams, a training team provides a series of University courses and short courses for those professional groups engaged in addiction work in the specialist and generalist sectors; an Information and Research team operate the Regional Drug Misuse Database (Department of Health 1989, 1996) and maintain the Unit databases for purposes of clinical evaluation and audit.

This is the largest addiction agency in the city with referrals from the range of sources typically found to refer people for help for addiction problems: general practitioners, the probation service, social services, general hospitals, friends, relatives or self-referrals. New clinic attenders are invited to attend for assessment on one day of the week to be seen by either a psychiatrist, psychiatric nurse, psychologist or addiction therapist. Following receipt of a referral, an appointment is sent for assessment either at the agency, at a locality clinic or in the patient's own home, providing the patient is not already being seen (having been referred by a different agency) or has not been seen during the past six months (in which case the response is to offer further outpatient appointment).

As the cost of seeing patients in the community is considerably greater than that of seeing them at the base unit, a specific reason for doing so is required. Selection by the agency of patients to be seen at home or elsewhere in the community is based upon the following criteria: normally patients over the age of 70 and below the age of 16 will be seen at their homes or another community venue. This is for reasons of mobility in the first instance and prevention of contamination or induction into more serious methods and patterns of substance use in the second. Where people are immobilised due to physical disability, social phobia or agoraphobia and similar anxiety problems or commitments to caring for others, they will be seen at their own homes. The present study sample is not representative of these groups. As the author and researcher distributing the questionnaires and conducting the short structured interview were based at the centre, the sample is biased in favour of those patients seen at the clinical base.

The agency has a high throughput of patients with an average of 51 appointments for initial consultation being sent out each week during the year of recruitment to the study (the beginning of April 1996 to the end of March 1997). The average number of new patients seen for consultation each week was 22 with 54.7% of these for problems related to heroin misuse and 37.7% for problems related to alcohol misuse. The remaining 7.4% were seeking help for problems related to the use of other drugs such as amphetamine and cocaine (Leeds Addiction Unit 1997). Due to the very small proportion of such patients being seen, these patients were not included in the study. Of the 92.4% of all referrals to the study agency during the study period which were for problems of heroin and alcohol dependence and misuse, 58.8% were primary heroin users and 41.2% were primary alcohol users. Of the total number of referrals for heroin or alcohol problems, 43.6% were seen for an assessment (the first face to face appointment), and for subsequent treatment. Of the number of attendances for assessment, subsequent treatment or both, 60.3% were primary users of heroin and 39.7% were primary users of alcohol. Of the total of 1067 individuals seen for first

consultation during the recruitment year, 387 help seekers with primary opiate use and 289 help seekers with primary alcohol use were seen at the agency base, the site chosen for the study sample selection.

7.1.2 Sample selection and sources of potential bias

On the basis of the data presented in the foregoing sections, a potential source of bias in the sample selection was choice of the agency base for recruitment of all participants to the study. Compared to all help seekers at the agency, those seen outside the agency base are the very young, the very old, the house-bound for domestic reasons or for reasons of illness and immobility. These individuals will have been under-represented in the study sample which could be said to be representative of those who attend the agency base for their assessment and treatment; additionally, as a proportion of all those seen by the agency, the study sample has a higher proportion of heroin to alcohol users. Data on age and gender differences for the entire help seeking population seen at the agency base as opposed to the community were not available.

7.1.3 Sample Size

Recruitment rates for new patients attending the Leeds Addiction Unit were examined in order to establish a realistic sample size that could be obtained at the initial data collection point and at two follow-up points within existing time and resource constraints, as well as satisfying minimum requirements of the data analysis. It was estimated that the largest number of items in the item pool of any of the planned multi-variate analyses would be 19 and for this an ideal sample size of 190 should be obtained for those tests which required a 10:1 subject-item ratio, though a subject-item ratio of 5:1 may be satisfactory (Nunnally 1978). It was thought to be unrealistic within given resources to follow up 190 individuals at three months and twelve months; to do so would have required an initial recruitment of 317 individuals and time constraints were thought to preclude this figure. Further discussion of sample selection and sample size is in Chapter 10.

I decided, on the basis of available resources, to attempt to recruit 100 participants at both the follow-up points and that this figure would constitute 60% of the original sample. A minimum of 166 participants was therefore the target for recruitment at the first data collection point. Sixty per-cent was thought to be a realistic proportion for which to aim in view of the difficulties reported in following up this sort of population in the absence of considerable research funds (Cottler *et al.* 1996). Routine follow-up at the Leeds Addiction Unit up to the time of the study was conducted by postal questionnaire and yielded a follow-up rate of 25%.

7.1.4 Recruitment to the study

In the event, it was possible to recruit 230 consecutive new attenders for treatment of heroin or alcohol dependence who were prepared to give their consent to be followed up, who were not overtly intoxicated at the time of first attendance nor showing signs of active psychiatric illness and who had a primary problem of alcohol or heroin dependence or misuse. The total number recruited constituted 34% of the total number of patients seen for initial assessment for heroin and alcohol misuse and dependence at the base unit during the study recruitment year. The recruitment period was of five months duration and the potential sample size for recruitment during this time was 282 individuals (based upon the estimate of the number of heroin and alcohol patients seen at the base unit over a five month period during the study recruitment year). Of this potential number, 81.6% were recruited into the study. The remainder were not recruited to the study for reasons of intoxication, current psychiatric illness or, in only one case, refusal to participate in follow-up.

The source of the referrals of patients seen for the study was typical of agency referrals, all were new referrals, defined as those who have not been seen at the agency during the past six months. The sample therefore included people who had never been seen at the agency; none of the study participants had received treatment for their substance misuse at this specialist agency during the previous six months. Some of them may have received a substitute prescription from the general practitioner, attended a voluntary agency or self-help group for people wishing to become or remain abstinent.

Of the 230 participants recruited to the study, 65.7% participated in the three month follow-up and a total of 83% were accounted for. At the twelve month follow-up point, 60.4% participated in follow-up and 81.7% of the original sample were accounted for. Of the original sample, 44% (101 individuals) were followed up at both three months and at twelve months.

7.2 Data Collection Procedures

In the discussion on enhancing the validity of self-report data (see Chapter 2 on measuring dependence), a table was presented (adapted from Babor *et al.* 1987b) listing procedures for minimising response bias and enhancing validity. Methods used in the present study are described in this section.

Once I had identified potential study recruits, they were approached either by me or a research assistant (Roger Brearley), and asked for their consent to take part. All participants who agreed to complete the questionnaire battery and the brief interview and to be followed up twice for

the purpose of collecting the same data again were given a brief explanation of the purpose of the project, were informed of what would happen to the data collected and were assured anonymity and confidentiality. Complete separation of the follow-up data from clinical case notes was assured and participants were informed that data collected at the first data collection point would be used for clinical decision making as well as for the follow-up project in the usual way. Assistance was offered in the event of difficulty understanding the instructions or the questions themselves. Encouragement to view follow-up as an opportunity (for reporting success, for remaining in contact) was given as was emphasis on the importance of knowing outcomes for patients attending a treatment agency.

For the purpose of the present study it was concluded that there was sufficient evidence for the accuracy of self-report data compared to more time consuming and intrusive methods to justify obtaining drinking and drug use data in as few questions as possible. The time scale was the past week unless the instrument used was validated specifically for a longer time frame. An attempt was made to ensure that participants who were intoxicated were not expected to complete the battery until they were sober. Even so it is acknowledged that, in the absence of concurrent breath and blood tests, it is not possible to establish sobriety with complete confidence and a rough and ready test of fitness to respond was applied.

The main instrument designed to measure dependence had been examined for readability and found to be satisfactory. Potential problems of recall were addressed by targeting a time span of one week in the brief interview and two of the instruments and the question "what do you usually do?" for another of the instruments. There was some question as to whether participants would have difficulty with recall for the Impaired Control Scale which enquires about the past three months, but this had already been reduced from six months with the first author's (Nick Heather, see Chapter 5) consent and problems in coming up with a summary for the past three months were thought to overshadow problems of recall. Nonetheless the usual problems of recall, usual that is, to the whole population and to excessive drinkers and drug users in particular, would apply.

Additional justification for the particular study protocol chosen was the availability of resources for the research and the pursuit of a set of instruments and methods that would be suitable for routine use in a busy clinic. To these were added the instruments designed to elucidate the nature of change in the condition being studied, namely dependence and these would not form part of the routine measures. Requirements for this were consistent with the restrictions on the research resource. The questions and the questionnaires should be as unintrusive as possible in that they were capable of completion within 10-20 minutes and they were a combination of a short interview

with self- completion questionnaires.

7.2.1 Data collection at intake

The author and a research assistant identified all potential study recruits from the lists of new patients attending assessment appointments on the designated day of each month for the first data collection period. Potential study recruits were identified as all those attending with primary problems of alcohol or heroin misuse and or dependence. The study was described to each as she or he arrived, their verbal consent was sought and when gained these patients were included in the study sample.

The study was explained to study recruits who were then asked for their consent:

- 1) to complete two questionnaires in addition to the battery of self- completion assessment questionnaires which is routinely administered at the first attendance at the agency;
- 2) to give to the researcher information on current use;
- 3) to be followed up at home at three months and at twelve months following postal contact regardless of their treatment status at the time; in other words, inclusion was on an intention to treat basis;
- 4) if the above did not yield a response, for the research team to contact one named contact person for the purpose of establishing their whereabouts but not for gaining information regarding their drug or alcohol use.

Signed consent was requested for the last two items. Information offered by the study participants on the name and details of a locator contact person were included in the consent form (see Appendix 17).

The battery of self-completion questionnaires and the supplementary questions were administered prior to the initial assessment on arrival at the treatment centre. Participants were offered assistance in completing the questionnaires if they required it. They were further informed that clinical staff would not have access to any follow-up information. They were requested to give information regarding their chosen contact person who would be approached to help the researchers to trace their whereabouts should they have moved.

7.2.2 Measures: self-completion scales

The following five self-completion measures were administered to all study participants at the first data collection point and were repeated at the second and third data collection points.

1. the Leeds Dependence Questionnaire (LDQ) (Raistrick *et al.* 1994)(see Appendix 1)
2. the General Health Questionnaire (GHQ) (Goldberg 1972) (see Appendix 14)
3. the Social Satisfaction Questionnaire (SSQ) (Raistrick *et al.* in preparation) (see Appendix 15)
4. the Impaired Control Scale (ICS) (Heather *et al.* 1993) (see Appendix 3) or the adapted version for heroin users (see Chapter 5 and Appendix 4)
5. the Coping Behaviours Inventory (CBI) (Litman *et al.* 1983) (see Appendix 9) or the adapted version for heroin users (see Chapter 6 and Appendix 11).

The first three of these scales were chosen for the following reasons: the Leeds Dependence Questionnaire was used to investigate the main study hypotheses which refer to the nature of change in substance dependence. Validation studies of the Leeds Dependence Questionnaire are presented in Chapter 3 where instructions and scoring methods are described. The GHQ and the SSQ, described below, were thought to be related but distinct variables which tap into domains commonly found to be affected by substance use (Raistrick *et al.* 1994). Confirmation by factor analysis of the distinctiveness of these variables from each other and from the other two main study variables (Impaired Control and Coping Behaviours) is reported in Chapter 9. The background, instructions and validation studies for the Impaired Control Scale and adaptation and validation of a version for heroin users is described in Chapter 5. Validation of the Coping Behaviours Inventory and adaptation and validation of a version for heroin users is described in Chapter 6.

7.2.3 *The General Health Questionnaire*

The 12 item version of the General Health Questionnaire (GHQ) (Goldberg 1972) was already in routine use at the study agency and was administered to all new patients as part of the assessment package. It was included in the present study on the grounds that it was thought to measure a distinct domain that was closely related to dependence and may be found to predict outcomes in dependence. The General Health Questionnaire was:

"designed to be a self-administered screening test aimed at detecting psychiatric disorders among respondents in community settings and non-psychiatric clinical settings such as primary care or among general medical out-patients..... It aimed at detecting

those forms of psychiatric disorder which may have relevance to a patient's presence in a medical clinic, so that its focus must be on psychological components of ill-health."

(Goldberg and Williams 1988 p.1).

Test items were chosen to distinguish between psychiatric cases and non-cases, to detect breaks in normal function and the appearance of new phenomena of a distressing nature. It is deemed sensitive to transient disorders which may remit without treatment and although not designed to detect functional psychoses such as schizophrenia or psychotic depression, Goldberg and Williams (1988) report that these conditions are usually detected. Originally designed as a 60 item instrument, the GHQ was reduced to a number of shorter versions with only a small reduction in the validity and reliability coefficients and with some loss in percentage sensitivity and specificity. The 12 item version was the one chosen for routine clinical use at Leeds due to its relative brevity and the redundancy of items in the 60 item version for the purpose of screening where more intensive examination can take place (Goldberg and Williams 1988 p. 61); the 12 item version was thought to be the most acceptable and least intrusive in routine clinical practice while retaining the essential purpose for which the instrument was designed. In the original validation of the Leeds Dependence Questionnaire where the GHQ was used as a criterion measure, Raistrick *et al.* (1994) reported significant correlations between GHQ scores and LDQ scores for the opiate and the alcohol total samples ($r=.33$, $p<.05$ and $r=.51$, $p<.001$ respectively) and in the follow-up samples significant correlations were found for the opiate sample at intake ($r=.44$, $p<.05$) and follow-up ($r=.56$, $p<.01$) but for the alcohol sample only at follow-up ($r=.70$, $p<.001$) (Raistrick *et al.* 1994 pp. 568-569).

The method of scoring the GHQ used in both the present study and the validation of the LDQ study was 0-0-1-1 for the four possible response choices (see Appendix 14).

7.2.4 The Social Satisfaction Questionnaire

The Social Satisfaction Questionnaire (SSQ) aims, as the title suggests, to measure social satisfaction and was adapted from the 33 item Social Problem Questionnaire (SPQ) (Corney and Clare 1985) which was designed as "a compact, comprehensible, valid and reliable self-report questionnaire which can screen individuals in primary care or related settings who are particularly at risk for manifesting social maladjustment and / or dysfunction" (p. 638). Recognising the difficulties inherent in attempts to measure and compare objective social circumstances, the SPQ

combined items enquiring about objective circumstances with items enquiring about the degree of satisfaction experienced with reference to these. The domains covered are: housing, occupation, finances, social activities and relationships, relatives, marital status problems and satisfaction, children, other domestic relationships, legal matters and questions for those living alone. The scale was piloted and tested in primary care samples (including the responses of relatives), in psychiatric and epilepsy out-patients and in a social work caseload and found to be a valid and reliable measure readily acceptable for use either by postal or face to face contact.

The SSQ was adapted from the SPQ for the purpose of routine assessment and outcome measurement for patients attending the addiction services in Leeds and in Newcastle-upon-Tyne (Raistrick *et al.* in preparation). In order to comply with the requirement of a ten minute assessment package (Raistrick *et al.* 1994), items enquiring about objective circumstances were removed and those enquiring about satisfaction were retained. The resulting eight items address the domains of relationships, living arrangements and accommodation, social activity, employment and finances. Four response choices list degrees of satisfaction and dissatisfaction. Scores range from 0 - 3, the higher the score the greater the dissatisfaction. (Subsequently the scoring system was reversed so that they better reflected the meaning given in the title of the questionnaire).

The scale was administered to a sample of 1681 patients attending for first out-patient appointment for treatment of their substance misuse and dependence at two addiction agencies, the Leeds Addiction Unit and the Regional Drug and Alcohol Service in Newcastle upon Tyne. Respondents at the two sites differed in the proportions of people attending for problems with alcohol compared to other drugs, with the Leeds centre having more similar proportions of each (47% and 53% respectively) than the Newcastle centre (60% and 40% respectively). Small but statistically significant differences were found in the mean age, mean dependence and GHQ scores between the two centres but no differences in gender proportions were found.

When the respondents at the two sites were combined into one sample and compared by main substance, significant differences emerged in the psychopathology score (as measured by the GHQ), the mean dependence score and age; problem drinkers were older (39.7 compared with 27.1 years), had lower mean dependence scores (18.4, s.d. 7.9 compared with 21.5 s.d 6.9) and lower mean psychopathology scores (22.4, s.d. 8.8 compared with 23.9 s.d. 8.1) than those presenting with problems with other drugs.

In order to examine homogeneity of items and internal consistency of the scale, responses to the items were subjected to item analysis. Each of the eight items showed a statistically significant correlation with total SSQ score with that item deleted. (Spearman's rho ranged from .57 to .66 and

all correlations were significant at the .001 level). In order to examine its factor structure the scale was subjected to exploratory Principal Components Analysis which yielded two main factors accounting for 38.7% and 15.4% of the variance respectively. Further analysis with Varimax Rotation showed that the two factors comprised four items each. Items 1, 2, 7 and 8 (see Appendix 15) had loadings .55 and over on the first factor and items 3, 4, 5 and 6 had loadings of .59 and over on the second factor. The first factor appears to consist of aspects of home life while the second factor appears to consist of social aspects external to home life (employment, finance and social activities).

Concurrent validity was examined by correlating the two separate factors with dependence and psychopathology scores. The expectation would be that there would be co-variance but not large correlations given the hypothesised distinctiveness of the domains of dependence, psychological health and social satisfaction. This was found to be the case (Raistrick *et al.* in preparation). Increasing levels of social dissatisfaction as measured by both factors were associated with increasing levels of dependence and psychopathology. However, there was a negative correlation between age and factor two: the younger respondents expressed greater levels of dissatisfaction on items referring to employment, finance and social activities than did older clients. These findings were confirmed in a stepwise multiple regression analysis. Independent variables were age, gender, GHQ score, LDQ score and substance group and separate analyses were carried out for the two factors. Gender and substance group were not found to be independent predictors of social dissatisfaction, dependence and psychopathology scores were independent predictors of both factors and age was an independent predictor of the second factor.

A further test of the reliability of the scale was conducted with a separate sample using the test re-test method. This is the only part of the validation of the SSQ which I conducted as part of the present set of studies. The scale was administered as part of a package of three questionnaires to 61 respondents attending the addiction agency in Leeds for treatment of their problem heroin use (Sample 5 described in Chapter 4). The time frame for the collection of these data post-dated that for the large sample described above. It was a narrower sample in that it did not include problem drinkers. The re-test sample consisted of 40 males (65.6%) and 21 females (34.4%), their mean age was 25.7 (SD = 4.9) and a range of 17 to 37. The mean time between first and second scale completion was 5.3 days (SD = 3.75) with a minimum of two days and a maximum of 14 days. The study in which these data were collected was Study 3 (adaptation and validation), the retest reliability part of the study reported in Chapters 5 and 6.

A significant correlation was found between the mean SSQ scores derived at the two data

collection points; the mean scores at the first and second time points were then compared in order to eliminate the possibility that the correlation was based upon change rather than constancy. No significant difference was found in the mean total score for the scale between the first and second scale completion, indicating that the responses had remained constant. The results of this analysis are presented in Table 7.1.

Table 7.1 *Correlations and comparisons between the means for t1 and t2 responses to the Social Satisfaction Questionnaire (SSQ): Sample 5 (n=61)*

Variables	Number of pairs	Spearman's rho correlation coefficient	2-tail significance	Means	2-tail significance
SSQT1	61	.82*	.01	9.3	ns
SSQT2				8.7	

This figure is based on total scores. The mean correlation for individual item scores was found to be .77

The SSQ has shown some good psychometric properties; the two factor solution identified in Principal Components Analysis will be addressed where the scale is used in the main analysis in this study.

7.2.5 Measures: the brief interview

A brief structured interview (see Appendix 5) was conducted with all study participants at each of the sampling points. At the first data collection point, study recruits were asked which was their main substance of use, for how long had they used this substance and for how long, in their opinion, had their use been problematic. Further they were asked whether they had used the substance in the past week. If so, on how many days had they used it and what was the quantity used on the heaviest day of use. Use data were collected for the past week in line with the time scale for the Leeds Dependence Questionnaire. Study participants were also asked whether they were attempting abstinence and, if successful, what had been the duration of their abstinence. Thus they may have become abstinent during the past week, in which case they would have a positive quantity score as well as a positive score for number of days abstinent. If a study participant had been abstinent longer than a week then they would have a zero quantity score. (Data form for the brief interview is shown in Appendix 5).

Current use of alcohol was recorded as specific beverage drunk and amount consumed on the heaviest drinking day of the past week. These data were then recalculated as grams of alcohol

by the author. The rationale for asking about the heaviest drinking day is discussed by Raistrick *et al.* (1994) and is based upon a comparison of methods of obtaining accurate self-report data in problem drinking and drug using populations. These are discussed in Chapter 3. Current use of heroin was calculated on the basis of amount of money spent on heroin per day on the heaviest day in the past week. The rationale for asking about the heaviest day follows that for alcohol. Amount spent is the most consistent measure reported by users. The gram equivalent of amount spent was checked at several intervals throughout the data collection period and found to be stable. There is regional variation in the purity of street heroin and in the amount of heroin that constitutes a regular daily habit. Since the entire sample was drawn from one city and quantities checked across the city, it was agreed in consultation with clinical staff in daily contact with help seeking heroin dependent people, to use a calculation that £20.00 spent would yield .3 grams of heroin. Again all calculations for amounts of heroin used in grams were made by the author. Calculation of a daily amount on the basis of amount of money spent was kept separate from the estimation of number of days per week using. This is for reasons relevant to the main analysis where number of days per week using would be investigated as to its relevance to severity of dependence.

Questionnaires to be used both in the study and in routine clinical practice were duplicated and the study sample information stored separately. All data were entered into SPSS files by the author.

7.3 Follow-up

Two follow-up periods were planned, one at three months which was thought to be a time frame of sufficient duration for changes to occur in the main study measures. It is a relatively common follow-up period in this field of study, expected to pick up any treatment effect. The second data collection point was planned to be twelve months from recruitment to the study in order further to determine the course and nature of changes where change occurred.

7.3.1 Follow-up measures

The five self-completion questionnaires were repeated at both the three month and the twelve month data collection points. The brief structured interview was shortened by taking out the items referring to age, sex, life time duration of use and of problem use. Remaining were the questions about main substance, use during the past week, attempts at abstinence and duration abstinence if successful. The reason for repeating the question about main substance was that the

study was designed to examine the nature of change in dependence on a main substance. If participants had changed the main substance upon which they were dependent during the follow-up period, they would be excluded from the analysis for the simple reason that quantity of use data would not be comparable. In the event only one set of responses could not be used in the analysis for this reason.

7.3.2 The method of follow-up at three months and at twelve months

Two weeks in advance of the (first) three month follow-up point, a letter was sent to each study participant reminding them that they had agreed to follow-up and explaining the purpose of follow-up. The option of a domiciliary visit, an appointment at the treatment agency or at a venue of their choice was offered. Study participants were requested to confirm their ability to attend the follow-up interview. This, in the event was not used to deter visits as it was quickly found to be an unreliable indicator of whether the person was expecting to be visited. Equally study participants who did go to the trouble of suggesting alternative venues did not always adhere to the suggestion they had made. In the absence of any response from the participant, a visit was made to the home address they had given.

If study participants were not contacted at the first visit then the information given on the consent form regarding a third party was pursued. If this did not yield a result, the clinical database was examined to see whether the person was currently in treatment. If they were, then the person was contacted during the clinical visit. This was a less than optimal arrangement from the point of view of gaining accurate information on current drug use even though the information was requested by the researcher, not the clinical staff. If this method failed to yield a result then the given address was checked with the original referral source and the questionnaires and a front sheet enquiring about recent use were sent by post once again with a request to return them. No further efforts were able to be made given the available resources.

Records were kept of information gathered on the whereabouts of study participants who were not contacted for follow-up. This information was from friends, neighbours, general practitioners where these were the source of referral, community records of deaths and agency records.

A summary of the follow-up steps, referred to as three levels of follow-up is given below:

- 1 Follow-up letter sent; appointment at venue to be agreed with study participant. If confirmed, or if no contact, home visit carried out as suggested in the letter.
- 2 If not found, contact was attempted with the informant given in the consent form. If

not found, the clinical database was examined and where possible, a meeting was arranged via the clinical contact.

- 3 If this was not possible because there was no clinical contact, the address was checked and a further letter and stamped addressed envelope were sent with questionnaires and front sheet, requesting their return.

7.3.3 The process of follow-up at three months

A total of 157 (68.3) individuals were seen at three month follow-up of whom 151 (65.7%) completed the questionnaire battery and the remaining 6 declined to be interviewed or complete the questionnaires despite having given initial consent.

Of the 151 study participants (Sample 6a) who were contacted at the three month follow-up point and who agreed to participate in follow-up, 92 (40% of the original sample) were seen at the first attempt using the first level method of follow-up. Of this number 81 were seen at home and 11 were seen at the clinic. A further 4 participants were contacted using one repeat of this method and two more using three and four repeats of this method. Thus 98 participants were contacted using this method in a total of 107 attempts. At the next level of follow-up, 44 participants were contacted after a total of 100 attempts at the levels one and two. At the third level of sending out postal questionnaires 9 participants were contacted following a total of 30 attempts at the levels one, two and three.

Of the 79 participants who did not participate in follow-up, information regarding 41 of them was obtained: 20 were traced and a further 21 were accounted for. Seven participants refused to complete the questionnaires at the point of follow-up. Two participants died during the three month follow-up period, both were young male heroin users. One participant had joined the army and was therefore not followed up. Eight participants were known to be in prison and not contacted and two had developed a psychotic illness for which they were receiving treatment. Twenty-one participants were known to have moved and there was no new information regarding their whereabouts. Thus of the 230 participants in the original sample, 38 or 16.5% were unaccounted for at three months (See Table 7.2).

Table 7.2 *Study participants traced at three month follow-up (t2)*

	No. of attempts	No. of participants	%	Cumulative %
Seen at follow-up				
Level 1 follow-up	107	98	42.6	42.6
Level 2 follow-up	100	44	19.1	61.7
Level 3 follow-up	30	9	3.9	65.6
Seen - no follow-up data	n/a	9	3.9	69.5
Not seen at follow-up				
Accounted for - not seen	n/a	32	13.9	83.4
Not accounted for	n/a	38	16.6	100
TOTAL		230	100	100

7.3.4 *The process of follow-up at twelve months*

A total of 152 individuals (66% of the original sample) were seen at the twelve month follow-up; of these 139 (60.4% of the original sample) completed the questionnaires and interview; thirteen participants did not complete the questionnaires; three of these were receiving treatment for their addiction at a different agency and no longer agreed to participate, 9 individuals simply stated they did not wish to participate and a further one was receiving treatment for a psychotic illness and therefore excluded from follow-up.

Of the 139 individuals who participated in follow-up, 85 (37% of the whole sample) were seen at the first attempt using the first level of follow-up. Of this number, 75 were seen at home and the remaining 10 requested to be seen at the clinic. A further six participants were contacted using one repeat of this method and one more using three repeats of this method. Thus 92 individuals were contacted using this method in a total of 100 attempts.

At the next level of follow-up, 42 participants were contacted after a total of 127 attempts; of this number, four were visited in prison. At the third level of sending out postal questionnaires, five participants were contacted following a total of 23 attempts at the levels one, two and three (see Table 7.3).

Of the original sample of 230 participants, 91 (39.6%) did not participate in the twelve month follow-up. Of these, 42 had also not been seen at the three month follow-up. Information regarding a total of 50 of them was obtained. Seventeen of them were known to have moved (including the one who had joined the army) and addresses for five of these were obtained; however they declined to respond to postal questionnaires. Twenty-five participants were known to be in prison and not contacted; there was a warrant for the arrest of another participant and his whereabouts were unknown. Two participants were known to have become homeless and could not be located. Five had died during the entire follow-up period, all male, three young heroin users and two alcohol users (see Table 7.3).

Table 7.3 *Study participants traced at twelve month follow-up (t3)*

	No. of attempts	No. study participants	%	Cumulative %
Seen at follow-up				
Level 1 follow-up	100	92	40.0	40.0
Level 2 follow-up	127	42	18.2	58.2
Level 3 follow-up	23	5	2.2	60.4
Seen - no follow-up data	n/a	13	5.6	66.0
Not seen at follow-up				
Accounted for - not seen	n/a	50	21.8	87.8
Not accounted for	n/a	28	12.2	100
TOTAL		230	100	100

The proportion of respondents seen at the twelve month follow-up met the target of 60% set at the beginning of the study, but identification of respondents seen at both the follow-up points revealed that, of the 139 individuals from whom data were collected twelve months, 101 had participated in the three month follow-up as well. Thus, a total of 43.9% of the original sample participated at all three data collection points.

Chapter 8

Study 4: the main study. Results 1

8.0 Sample characteristics

In this chapter, the study samples seen at each of the data collection points are described and compared and findings relating to changes in use, dependence, psychological health and social satisfaction scores are reported. All analyses of the data were performed using SPSS for Windows (versions 6.1 and 8.0). Four samples are described in the results chapters which are the present chapter and the following chapter (Chapters 8 and 9); these are:

- i Sample 6: the entire sample recruited to the main study and seen at intake (t1).
- ii Sample 6a is the sample seen at t1 and at three month follow-up (t2)
- iii Sample 6b is the sample seen at t1 and twelve month follow-up (t3)
- iv Sample 6c is the sample seen at t1, t2 and t3.

Thus all of those in Samples 6a, 6b and 6c were in Sample 6.

First, Sample 6 is described and data are presented by substance group. The sample seen at three months (Sample 6a) is then described and comparisons between demographic data and t1 main measures for this sample and the group not followed up at three months are presented. With the exception of amounts used, these data are not presented by substance group. Changes detected between the initial data collection point (t1) and the three month data collection point (t2) are then presented for Sample 6a.

The sample seen at twelve months (Sample 6b) is described next and again comparisons between the demographic data and scores on the t1 main measures for this sample and the group not seen at twelve months are presented. Changes detected between the initial data collection point (t1) and the twelve month data collection point (t3) are presented for Sample 6b.

Comparisons are then made between the whole sample recruited (Sample 6), the sample followed up at three months (Sample 6a) and the sample followed up at twelve months (Sample 6b).

The sample seen at all three data collection points (Sample 6c) is then described and t1 data are presented by substance group. Data collected at three months (t2) and at twelve months (t3) are

presented and changes detected over the two follow-up periods are described.

8.1 Sample 6: questionnaire and interview results t1

A total of 230 individuals were seen at t1, 152 (66.1%) of whom were primary heroin users and 78 (33.9%) were primary alcohol users, 182 (79.1%) were male and 48 (20.9%) were female (see Table 8.1). The mean age for the whole group was 29.5 years, the range was 15 to 80 years. As described in Chapter 7, section 7.1.4, this sample constituted nearly 82% of consecutive attenders at the host agency over a five month period. Given the exclusion criteria of active mental illness, intoxication and (one) refusal to participate, this sample was thought to be representative of the population of people attending the agency with primary heroin and alcohol dependence and related problems. Generalisability from the study sample is further discussed in Chapter 10.

Mean duration of self-reported use of the primary substance was 8.1 years with a range of 3 months to 66 years and mean duration of self-reported problem use was 4.4 years with a range of .08 to 55 years. Twenty-six individuals (11.3%) reported total abstinence for the past seven days, 35 (15.1%) reported using between one and five days of the past week and 169 (73.5%) reported using on seven days of the week. Ninety-six participants said that they were attempting abstinence, while 134 said they were not.

Table 8.1 *Drug group and age by gender: Sample 6 (n = 230)*

		male	female	total
heroin		123	29	152 (66.1%)
alcohol		59	19	78 (33.9%)
age	mean	29.2	30.7	
	SD	11.3	12.8	
	range	15-80	17-80	
total		182 (79.1%)	48 (20.9%)	230 (100%)

The mean dependence score for the whole sample was 20.2 (SD = 7), range 0-30; mean score for the General Health Questionnaire for the whole sample was 8.2 (SD = 3.5), range 0-12 and the mean Social Satisfaction score for Sample 6 was 9.9 (SD = 5.7), range 0-24. The higher the

score the greater the severity on all these three measures. The data are presented by primary substance (heroin or alcohol) in Table 8.2.

Table 8.2 *t1 data by substance: Sample 6 (n = 230)*

		heroin n = 152	alcohol n = 78	p<
gender: % male		80.9	75.6	ns ¹
age	mean	23.9	40.4	.001 ²
	SD	5.4	12.6	
	range	15-47	19-80	
days per week	mean	6.2	4.6	.001 ²
	SD	2.1	2.8	
duration use (in years)	mean	3.3	19.6	.001 ²
	SD	3.1	12.2	
	range	.25-31	2-66	
duration problem use (in years)	mean	2.2	8.6	.001 ²
	SD	2.8	8.7	
	range	.08-31	.3-55	
abstinent (%)		11 (7.2)	16 (20.5)	.001 ³
1-3 days per week use (%)		6 (4)	9 (11.5)	.001 ³
4-6 days per week use (%)		8 (5.2)	14 (18)	.001 ³
daily use (%)		127 (83.6)	39 (50)	.001 ³
grams per heaviest day	mean	.7	174	na
	SD	.5	146.7	
	range	0-1.8	0-684	
LDQ	mean	21.2	18.2	.01 ²
	SD	6.3	7.8	
GHQ	mean	8.6	7.4	ns ²
	SD	2.9	4.2	
SSQ	mean	10.4	9.1	ns ²
	SD	5.4	6.5	

¹ Mann Whitney U test for difference in the means of independent samples

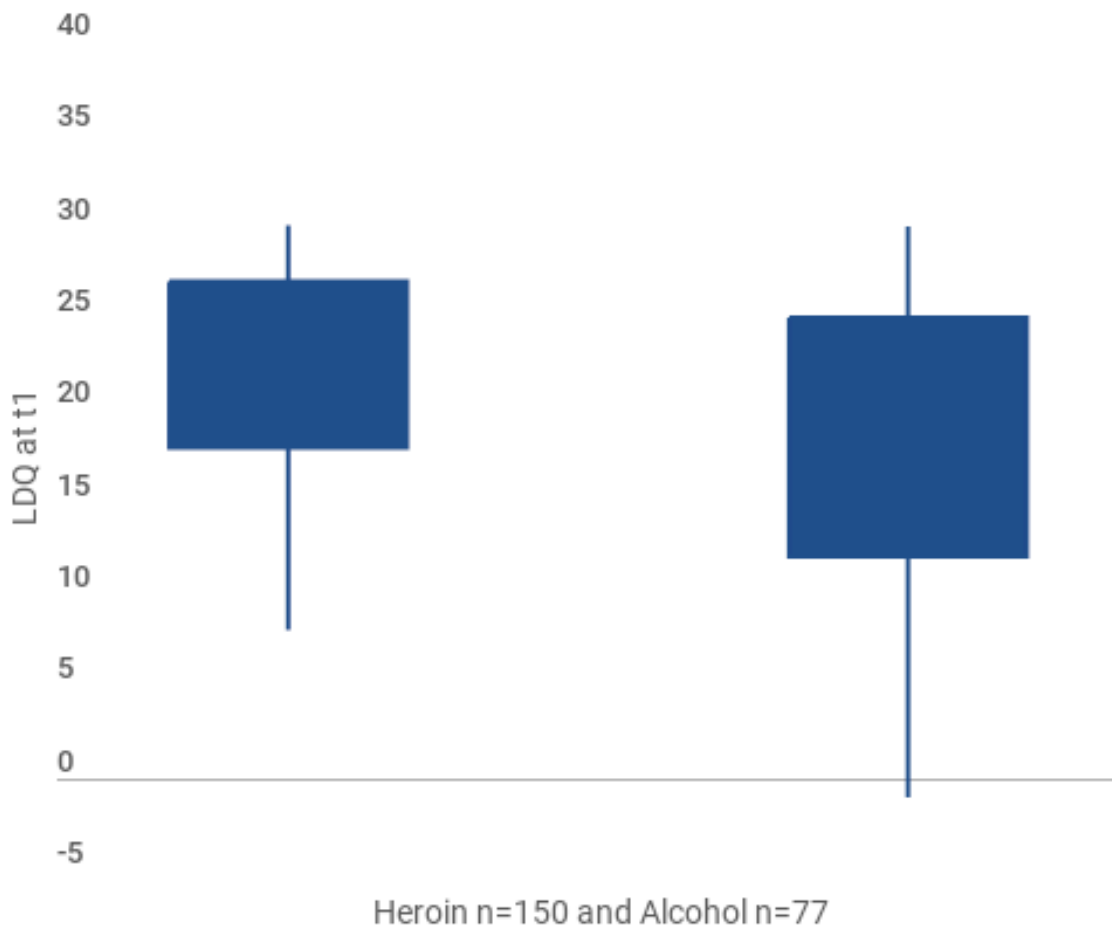
² t-tests for equality of the means of independent samples; difference between the means fell within a 95% confidence interval.

³ chi square

Mean age of the heroin user group was 23.9 (SD = 5.4) and a range of 15 to 47 years while the mean age of the alcohol user group was 40.4 (SD = 12.6) with a range of 19 to 80 years. Mean age in the heroin group was just over half that of the alcohol group, while the ratio of men to women was higher in the heroin group. Heroin users had a significantly shorter duration of use and of problem use than alcohol users. A significantly higher proportion of alcohol users than heroin

users were abstainers at the time of initial assessment, 20.5% compared with 7.2% and there was a significantly higher proportion of daily users in the heroin group than in the alcohol group, 83.6% compared with 50%. Mean dependence score for the heroin group was significantly higher than it was for the alcohol group, and this difference in dependence between groups is further illustrated in the boxplot in Figure 8.1. The Levene test for homogeneity of variances produced a significance level of .009 suggesting unequal variances for the two drug groups. General Health Questionnaire and Social Satisfaction Questionnaire scores, though lower in both cases for the alcohol group (denoting less severity) than the heroin group, were not significantly different.

Figure 8.1 *Mean total dependence scores: Sample 6 heroin group (n=150) and alcohol group (n=77) (LDQ data missing for 3 participants)*



When the data were further analysed by gender, no significant gender differences were found in either drug group for peak daily quantity used, duration of use, duration of problem use, dependence score, psychological health score or social satisfaction score. With the exception of the dependence score, women obtained lower scores on each of these measures but none of the differences reached statistical significance. A significant difference ($p < .02$) was found in the alcohol group for number of days per week using where women were drinking on average on 5.8 days of the past week and men were drinking on average on 4.3 days. Further investigation of this drinking pattern revealed that the majority of women (73.7%) were drinking on seven days of the week, while the proportion of men who reported daily drinking was 42.4%. In the heroin sub-sample, women were even more likely to report using heroin on seven days of the week, with 93% of women in this group claiming daily use; of the men in the heroin sub-sample, 81.3% reported daily use. In this sample, there was not a significant difference between the mean number of days per week using for men and women. Patterns of drinking and drug use are presented in Table 8.3.

Table 8.3 *Patterns of drug taking and drinking for men and women by substance group: Sample 6 (n = 230).*

	heroin		alcohol	
	male	female	male	female
abstinent (%)	8.1	3.4	23.7	10.5
Using 1-3 days (%)	4	3.4	13.6	5.3
using 4-6 days (%)	6.5	-	20.4	10.6
using daily (%)	81.3	93.1	42.4	73.7
mean days per week using	6.1	6.6	4.3	5.8*
mean quantity used on heaviest day	.68	.7	186.6	135.3

* $p < .05$

Women reported drinking lower quantities of alcohol as measured by quantity drunk on the heaviest day but the difference between men and women was not significant. There was no difference between the mean number of grams of heroin used on the heaviest day by men and that used by women.

8.2 Sample 6a: questionnaire and interview results at t1

Of the original sample of 230 individuals, 83.5% were accounted for at three month follow-up. Of these, 151 (65.7% of the original sample) agreed to participate in follow-up: 116 were men (63.7% of the original sample of men) and 35 were women (72.9% of the original sample of women). Of the original sample of 152 heroin users, 62.5% were seen and of the original sample of 78 alcohol users, 71.8% were seen (see Table 8.4).

Table 8.4 *Percentages of Sample 6 seen at three months and at twelve months by drug use and gender, and mean age: Sample 6, Sample 6a and Sample 6b*

		Sample 6 (n = 230)	Sample 6a (n = 151)	% of Sample 6 (66%)	Sample 6b (n = 138)	% of Sample 6 (60%)
Drug group						
Heroin		152	95	63	87	57
Alcohol		78	56	72	51	65
Gender						
Male		182	116	64	102	56
Female		48	35	73	36	75
Age	mean	29.5	30.9		30.6	
	SD		11.8		11.8	
	range		17-80		15-80	

The mean age of Sample 6a was 30.9 (SD = 11.8) with a range of 17 to 80 years. The mean age of the heroin sub-sample was 24.7 (SD = 5.7) with a range of 17 - 47 years and the mean age of the alcohol sub-sample was 41.5 (SD = 2.1) with a range of 19 - 80 years. Thus the mean age of the sample that was seen at three month follow-up in both substance groups was greater by approximately one year than the mean age of the entire t1 sample, Sample 6.

8.2.1 Comparison between Sample 6a and the group that did not participate in follow-up at three months: questionnaire and interview results t1.

Table 8.5 shows a number of differences in demographic data, substance use, dependence, psychological health and social satisfaction data collected at t1 for the samples that did and did not participate in follow-up at three months.

Table 8.5 *t1 measures for Sample 6, Sample 6a and the group not seen at t2*

		Sample 6 (n = 230)	Sample 6a (n = 151)	not seen at t2 (n = 79)	p < (seen/not seen at t2)
drug					
heroin (%)		66.1	62.9	72.2	.002 ¹
alcohol (%)		33.9	37.1	27.8	.001 ¹
gender					
men (%)		79.1	76.8	83.5	.001 ¹
women (%)		20.9	23.2	16.5	.002 ¹
age					.009 ²
mean		29.5	30.9	26.9	
SD		11.6	11.8	10.7	
	range	15-80	17-80	15-80	
drug use					
duration use (years)					
	mean	8.8 sd 10.8	9.4 sd 10.9	7.7 sd 10.5	ns ²
	SD				
problem use(years)					
	mean	4.4	4.8	3.7	ns ²
	SD	6.3	7	4.7	
days per week					
	mean	5.7	5.3	6.3	.001 ²
	SD	2.5	2.7	1.7	
grams heroin per day					
	mean	.7	.7	.8	ns ²
	SD	.5	.5	.4	
grams alcohol per day		174 sd 146.7	159.8 sd 142.5	210.3 sd 154.5	ns ²
functioning variables					
LDQ	mean	20.2	19.3	21.9	.007 ³
	SD	7.0	7.2	6.3	
GHQ	mean	8.2	7.9	8.8	ns ³
	SD	3.5	3.6	3.0	
SSQ	mean	9.9	9.6	10.6	ns ³
	SD	5.7	5.6	6.0	

¹ chi square

² t-test for equality of the means of independent samples

³ Mann Whitney U test for difference in the means of independent samples

The sample that participated in the three month follow-up contained a greater proportion of women than Sample 6, the entire t1 sample, and a significantly greater proportion of women than the group that did not participate in follow-up, 23.2% compared with 16.5%. Alcohol users made up

a larger proportion of the sample seen for follow-up than the group not seen for follow-up, 37% compared with 27.8%, and a larger proportion of the original sample of alcohol users was seen at three month follow-up compared to the proportion of heroin users of the original sample of heroin users. Participants in the follow-up group were significantly older, had significantly fewer days per week using, had a longer mean duration of use which did not reach significance, lower quantities of both heroin and alcohol used which also did not reach significance. They had significantly lower dependence scores but no significant difference was found in General Health Questionnaire scores or in Social Satisfaction Questionnaire scores though in both cases these scores were higher (denoting greater severity) for the group not seen at three months compared to the sample seen at three months.

Of the 151 individuals, who participated in the three month follow-up, 122 (80.8%) received treatment at the agency subsequent to their first assessment appointment. Of the 79 study participants (34.3% of the original sample) who did not participate in follow-up at three months, none received further treatment at the agency subsequent to their first assessment appointment.

8.2.2 Sample 6a: Changes in substance use and dependence between t1 and t2

A significant reduction was found in the average number of days per week using the primary drug at three month follow-up compared to intake in the sample seen at three months; a significant reduction was also found for the sample in mean dependence score, in General Health Questionnaire score and in Social Satisfaction Questionnaire score (reductions in all these scores denote improvement, see Table 8.6). When amount of drug used on the heaviest day was examined for the two substance groups separately, a significant reduction was found for the heroin group while the reduction found for the alcohol group did not reach significance.

In order to examine more closely the changes in patterns of use within the two substance groups, the number of days per week using was divided into four categories: abstinence, using on 1-3 days per week, using on 4-6 days per week and using daily. Data presented in Table 8.7 show that, in the heroin group, a significantly larger proportion of participants were abstinent at three month follow-up compared to baseline, a greater proportion were using intermittently at the three month follow-up and the proportion of the sample using daily was halved. In the alcohol group, the proportion abstinent had increased from 25% to 35.7%, there was an increase from 30.4% to 37.5% of the alcohol group drinking intermittently and the proportion drinking on a daily basis was reduced from 44.6% to 25%.

Table 8.6 *Changes detected over the three month follow-up period in Sample 6a*
(*n = 151; heroin: n = 95; alcohol: n = 56*)

	t1 mean and SD	t2 mean and SD	p<
no. of days used in previous week	5.3 (2.7)	3.2 (3.2)	.001 ¹
grams used on heaviest day: heroin	.7 (.5)	.3 (.3)	.001 ¹
grams used on heaviest day: alcohol	153.5 (135.5)	128.3 (145.2)	ns ¹
LDQ	19.3 (7.2)	12.4 (8.7)	.001 ²
GHQ	7.9 (3.6)	5.4 (4.3)	.001 ²
SSQ	9.6 (5.6)	8.3 (6.1)	.03 ²

¹ t test for difference between the means

² Wilcoxon signed rank test for related samples

Table 8.7 *Numbers and percentages of participants abstinent, using intermittently or using daily at intake (t1) and at three month follow-up (t2): Sample 6a (n=151)*

	t 1	t 2
Heroin n=95		
Abstinent past week	10 (9.5%)	41 (43.2%)
1-3 days per week	3 (3.2%)	11 (11.5%)
4-6 days per week	5 (5.3%)	2 (2.1%)
Daily use	77 (81%)	41 (43.2%)
Alcohol n=56		
Abstinent past week	14 (25%)	20 (35.7%)
1-3 days per week	7 (12.5%)	14 (25%)
4-6 days per week	10 (17.9%)	7 (12.5%)
Daily use	25 (44.6%)	14 (25%)
Missing		1 (1.8%)

8.3 Sample 6b: questionnaire and interview results at t1

Of the 230 study participants, a total of 188 (81.7%) were traced at twelve months. Of these, 139 participated in follow-up but data were analysed for only 138 of them because one participant had changed his primary substance from heroin to alcohol. For the purpose of the present study it was not appropriate to include t3 data for this participant in the analyses which included the twelve month follow-up data. Of the 139 individuals who were followed up at twelve months, 37 had not been followed up at three months. Of the 138 individuals for whom data were collected at twelve months, the sample referred to as Sample 6b, 87 (63%) were primary heroin users and 51 (37%) were primary alcohol users. Thus the proportion of heroin users to alcohol users in the sample followed up at t2 and the sample followed up at t3 were similar. One hundred and two (73.9%) were men and 36 (26.1%) were women. Thus 75% of the original sample of women were seen at twelve months whereas 56% of the original sample of men were seen and the difference between these proportions was significant. Mean age of the twelve month follow-up sample was 30.6 (SD = 11.8) and the range was 15 to 80 (see Table 8.4). Mean age of the heroin group was 24.3 (SD = 5.8) and the range was 15 - 47. Mean age of the alcohol group was 41.3 (SD = 11.6) and the range was 20 - 80.

8.3.1 Comparisons between Sample 6b and the group not seen at twelve months: questionnaire and interview results at t1

Data collected at t1 are presented for the sample seen at t3 (Sample 6b) and the group not seen at t3 (see Table 8.8). Of the 151 study participants who participated in follow-up at three months (t2), 49 were not seen at twelve months (t3) and data collected at the time for one participant was not used in the analysis, as described above. Data collected at t1 are therefore presented in Table 8.8 for 92 individuals not seen at t3. Forty-two individuals did not participate in follow-up either at t2 or at t3.

There was a larger ratio of alcohol users to heroin users and women to men in the sample seen at twelve months compared to the group not seen at twelve months. There is a significant difference in the proportion of women in the sample seen at t3 (26.1%) and the proportion of women in the group not seen at t3 (13%). Of the original sample of women, those in Sample 6, 73% were seen at three months and 75% were seen at twelve months (see Table 8.4). The greater proportion of men in the group not seen at t3 compared to the sample seen at t3 did not reach

significance.

Table 8.8 *t1 measures for Sample 6, Sample 6b and the group not seen at t3*

	Sample 6 (n = 230)	Sample 6b (n = 138)	not seen at t3 (n = 92)	p < (seen/not seen at t3)
drug				
heroin (%)	66.1	63	70.7	ns ¹
alcohol (%)	33.9	37	29.3	.007 ¹
gender				
men (%)	80.9	73.9	87	ns ¹
women (%)	19.1	26.1	13	.001 ¹
age				
mean	29.5	30.6	27.9	.04 ²
SD	11.6	11.8	11.2	
range	15-80	15-80	17-80	
drug use				
duration use (years)				
mean	8.8	9.8	7.3	.05 ²
SD	10.8	11.2	10.1	
duration problem use (years)				
mean	4.4	5	3.6	ns ²
SD	6.3	7.3	4.3	
days per week				
mean	5.7	5.5	5.8	ns ²
SD	2.5	2.5	4.3	
grams heroin per day				
mean	.7	.7	.7	ns ²
SD	.5	.5	.4	
grams alcohol per day				
mean	174	181.3	160.5	ns ²
SD	146.7	155.5	130.2	
functioning variables				
LDQ				
mean	20.2	19.5	21.3	ns ³
SD	7	7.4	6.2	
GHQ				
mean	8.2	7.9	8.7	ns ³
SD	3.5	3.6	3.2	
SSQ				
mean	9.9	9.1	11.2	.007 ³
SD	5.7	5.6	5.8	

¹ chi square

² t-test for equality of the means of independent samples

³ Mann Whitney U test for difference in the means of independent samples

Alcohol and heroin use are similar in Sample 6b and the group not seen at twelve months,

dependence and psychological health scores are higher but not significantly so in the group not seen at twelve months compared to Sample 6b, seen at twelve months. Thus, with the exception of the amount of alcohol used, there is a trend towards greater severity in the group not seen at t3. The social satisfaction score for the group not seen at twelve months is significantly higher, denoting greater dissatisfaction, than that of the sample seen at twelve months. There are nearly no differences in the t1 scores between the samples seen at three months and at twelve months and of course this is in large part due to the fact that some 73% of the Sample 6b were the same people as those in Sample 6a.

8.3.2 *Sample 6b: changes in substance use and dependence between t1 and t3*

Reductions in scores on all substance use measures, including amount of alcohol consumed on heaviest day, between the first data collection point and twelve months reached statistical significance. Dependence, General Health Questionnaire and Social Satisfaction Questionnaire scores were significantly reduced suggesting improvement over this period (see Table 8.9).

Table 8.9 *Changes detected over the twelve month follow-up period: Sample 6b*
(*n=138; heroin: n= 87; alcohol: n= 51*)

	t1 mean and SD	t3 mean and SD	p<
no. of days used in previous week	5.5 (2.5)	2.7 (3)	.001 ¹
grams used on heaviest day: heroin	.7 (.5)	.3 (.3)	.001 ¹
grams used on heaviest day: alcohol	181.3 (155.5)	110.9 (125)	.003 ¹
LDQ	19.5 (7.4)	11.6 (9.3)	.001 ²
GHQ	7.9 (3.6)	4.3 (4.3)	.001 ²
SSQ	9.1 (5.6)	7.5 (5.5)	.001 ²

¹ Related Samples t-test

² Wilcoxon Matched Pairs Signed Ranks Test

Detailed examination of the use data for the sample that was seen at t3 reveal an increase of 37% in the proportion of the heroin group abstinent at twelve months compared to the proportion abstinent at t1, and this increase is similar to that found in the sample followed up at three months (see Table 8.7). The difference between the proportion of alcohol users abstinent at t1 and at t3

(approximately 20%, see Table 8.10) is twice the difference between the proportion of alcohol users abstinent at t1 and t2 (approximately 10%, see Table 8.7). The proportion of nearly 82% of the heroin sub-sample using daily at t1 was reduced to less than 30% at t3 and the proportion of daily users of alcohol in the t3 sample was reduced by half. There were slightly more alcohol users drinking intermittently (mainly 1-3 days per week) than at t1 and 15% more heroin users using intermittently (again mainly on 1-3 days of the week) at t3 compared to t1 (see Table 8.10).

Table 8.10 *Numbers and percentages of participants abstinent, using intermittently or using daily at intake (t1) and at twelve month follow-up (t3): Sample 6b (n=138)*

	t1	t3
Heroin n=87		
Abstinent past week	9 (10.4%)	41 (47.1%)
1-3 days use	5 (5.7%)	17 (19.5%)
4-6 days use	2 (2.3%)	3 (3.5%)
Daily use	71 (81.6%)	26 (29.9%)
Alcohol n=51		
Abstinent past week	8 (15.7%)	18 (35.3%)
1-3 days use	6 (11.8%)	15 (29.4%)
4-6 days use	10 (19.6%)	5 (9.8%)
Daily use	27 (52.9%)	13 (25.5%)

Up to this point the samples seen at t2 and at t3 have been treated separately though, as mentioned above, there is considerable overlap in the participants making up each sample. In the following sections, the smallest sample, that seen at all three data collection points, is described.

8.4 Sample 6c: The sample seen at three month and at twelve month follow-up

Comparisons of the mean scores for t1 with those for t2 identified in Sample 6a and comparisons of the mean scores for t1 with those for t3 in Sample 6b suggested that the extent of changes in both samples was similar, with slightly larger changes occurring in Sample 6b. These

results were described above. However, further examination of the sample seen at all three data collection points, Sample 6c, provided the basis for tracing the changes that occurred over time. Data from this sample provided the basis of examining the question of the rate and sequence of change as well as the nature and predictors of such change.

A total of 101 individuals were seen at all three data collection points. Fifty-nine per cent of them were primary heroin users and 41% were primary alcohol users (see Table 8.11). Due to the greater likelihood of tracing alcohol users compared to heroin users for follow-up, the difference in proportion between the two substance groups is the smallest in this sample. The proportion of men is smaller in the heroin group compared with that in the original heroin group (75% compared with 80.9%) and the proportion of men in the alcohol group is significantly smaller than that in the original sample (66% compared with 75.6%). These differences are due to the finding that there is a greater likelihood of follow-up for women than there is for men at both three months and at twelve months and that this likelihood appears to grow over time.

Heroin users are significantly younger than alcohol users, have a shorter duration of use and a shorter duration of problem use (an average of 2.5 years) than alcohol users (who have an average of 9.6 years of problem use). This suggests that problem heroin users are likely to seek help much earlier in their problem using career than alcohol users.

As in Sample 6, other aspects of the pattern of use of the two substances varied: while similar proportions of individuals were abstinent at t1, marked differences in the proportions using on a daily basis and using on less than a daily basis were observed. A significantly greater proportion of heroin users were daily users of their primary drug (78.3% compared with 48.8% of alcohol users), though no significant differences were found in severity of dependence between the two substance groups at t1. Levene's test for homogeneity of variances for dependence confirmed no significant differences in the variances of the two drug groups. In one-way analysis of variance no significant difference emerged between the means for the two drug groups ($F=1.8$; significance = .18) and it was therefore thought satisfactory to explore the nature of change in dependence for the drug groups combined.

No significant differences were found between the substance groups on scores of psychological ill-health or social dissatisfaction in the sample seen at the three data collection points. Relationships between these and dependence scores are further explored in Chapter 9.

Table 8.11 *t1 data by substance: Sample 6c (n = 101)*

		heroin (n=60)	alcohol (n=41)	p<
gender	(% male)	75	66	
age	mean	25	42.7	
	SD	6.1	11.7	
	range	17-47	22-80	
days per week	mean	5.7	4.6	.009 ¹
	SD	2.6	2.8	
	range	0-7	0-7	
daily peak quantity				
(grams)	mean	.65	174.3	na
	SD	.52	144.6	
	range	0-1.8	0-578	
duration use	mean	3.7	21.1	.001 ¹
(years)	SD	4.3	12.4	
	range	.25-31	2-60	
duration problem				
use (years)	mean	2.5	9.6	.001 ¹
	SD	4.1	10.3	
	range	.08-31	.3-55	
abstinent past week		8 (13.3%)	7 (17.1%)	ns ²
1-3 days per week	use	4 (5%)	6 (14.7%)	
4-6 days per week	use	2 (3.4%)	8 (19.5%)	
daily	users	47 (78.3%)	20 (48.8%)	
LDQ	mean	19.7	17.6	ns ³
	SD	7.2	8.2	
	range	1-30	0-30	
GHQ	mean	7.9	6.9	ns ³
	SD	3.3	4.3	
	range	0-12	0-12	
SSQ	mean	8.9	8.2	ns ³
	SD	4.8	6.2	
	range	1-19	0-22	

¹ t-test of significance between means

² chi square

³ Mann Whitney U test of significance

The pattern of use in the alcohol group appears to be more varied than in the heroin group by virtue of the more even distribution of scores across the different categories of use. A significant correlation was found between drug group and the number of days per week using (Spearman's rho correlation coefficient .3, 2-tailed significance $p < .01$) and between sex and number of days using

(Spearman's rho correlation coefficient .21, 2-tailed significance $p < .01$). However, when both sex and drug group were entered into a linear regression analysis, sex was found significantly to predict number of days per week using whereas drug group was not. This relationship was further examined in those with high dependence in the whole t1 sample (LDQ score equal to or greater than 24); sex and drug group were again entered in a regression analysis and for this sample, drug group was a significant predictor of number of days per week using while sex was not. This lends support to the suggestion that heroin users with high dependence may be more likely to use heroin on seven days of the week than are alcohol users with high dependence.

8.4.1 Changes in substance use and dependence in Sample 6c

The sample was subdivided by main substance in order to examine substance specific changes and a number of significant differences were detected over the follow-up period: for the heroin group, significant reductions in number of days per week using, in mean amount used on the heaviest day, in mean dependence score and in mean general health score were detected between t1 and t2. An additional reduction in the mean number of days per week using in the previous week between three and twelve month follow-up was found to be significant and there was a significant increase in the proportion of the sample who were abstinent at three months. There was a significant decrease in the proportion of the sample who were using on 7 days of the week and a further significant decrease in this proportion between three months and twelve months. There was an increase in the proportions using between one and three days of the week between t1 and t2 and between t2 and t3 and the proportion using between four and six days of the week was identical at the three data collection points. Reductions in quantity of heroin used on the heaviest day, in dependence, psychological ill-health and social dissatisfaction which were found between three months and twelve months did not reach significance; significant differences between t1 and t3 scores for these variables were found (see Table 8.12).

For the alcohol group, significant reductions in the mean number of days per week drinking occurred between the first data collection point (t1) and the three month follow-up (t2) and between the first data collection point and the twelve month follow-up (t3). However no significant changes occurred between the three and the twelve months follow-up and this was the case for mean dependence score and for psychological health score. Social satisfaction score, however showed no significant differences between t1 and three months, nor between three months and twelve months; however there was a significant reduction in social dissatisfaction over the whole follow-up period, that is between t1 and the twelve month follow-up. There was a reduction in amount drunk on the

heaviest day between t1 and t2 and a further reduction between t2 and t3 but these changes were not significant. Changes between t1 and t3 did reach significance, however (see Table 8.13).

Table 8.12 *Changes detected between t1 and t2, t2 and t3, t1 and t3 in Sample 6c: heroin group (n = 60)*

	t1	t2	t3	p< (t1/t2)	p< (t2/t3)	p< (t1/t3)
no. of days used in previous week	5.7	3.4	2.2	.001 ¹	.001 ¹	.001 ¹
grams used on heaviest day	.7	.3	.2	.001 ¹	ns ¹	.001 ¹
abstinent past 7 days (%)	13	43	55		ns ²	
1-3 days use (%)	5	10	16.6			
4-6 days use (%)	3.4	3.4	3.4			
7 days use (%)	78	43	25			
mean LDQ score	19.7	11.8	10.6	.001 ²	ns ³	.001 ³
mean GHQ score	7.9	5.4	4.9	.001 ²	ns ³	.001 ³
mean SSQ score	8.9	8.1	7.6	ns ²	ns ³	.05 ³

¹ t-test ² chi square ³ Mann Whitney U test of significance

Table 8.13 *Changes detected between t1 and t2, t2 and t3, t1 and t3 in Sample 6c: alcohol group (n = 41)*

	t1	t2	t3	p< (t1/t2)	p < (t2/t3)	p< (t1/t3)
no. of days drinking in previous week	4.6	2.5	2.4	.001	ns	.001 ¹
grams drunk on heaviest day	174.3	121.6	88	ns	ns	.001 ¹
abstinent past 7 days (%)	17.1	36.6	41.5			
1-3 days drinking (%)	14.7	30	29.3			
4-6 days drinking (%)	19.5	12.5	9.7			
7 days drinking (%)	48.8	20	19.5			
mean LDQ	17.6	11.6	10.4	.001	ns	.001 ²
mean GHQ	6.9	4.1	3	.002	ns	.001 ²
mean SSQ	8.2	7	6.4	ns	ns	.01 ²

¹ t-test ² Mann Whitney U test

8.5 Correlations among measures of use and dependence at each of the three data collection points

Use data were collected in two separate questions at each data collection point: participants were asked on how many days of the past week they had used their primary substance (heroin or alcohol) and they were then asked what amount they had used on the heaviest day (see Chapter 7). The raw data, obtained in amount of each specific beverage alcohol or amount of money spent on heroin and calculated on the basis of £20.00 being the monetary equivalent of .3 grams of heroin, were computed into grams of alcohol or heroin. Bivariate correlational analysis was used to examine the relationships between these two measures and significant positive correlations were found between the mean number of days per week using during the last week and the amount used on the heaviest day at each of the data collection points for both substance groups (see Table 8.14). While correlations between the measures at each of the data collection points were highly significant, larger correlations were found at both t2 and t3 compared with t1, for both substances.

Table 8.14 *Correlations between the number of days per week using and the amount used on the heaviest day (qf) by substance: Sample 6c (n=101)*

	qft1	qft2	qft3
heroin			
days t1	.55*		
days t2		.74*	
days t3			.79*
alcohol			
days t1	.5*		
days t2		.68*	
days t3			.79*

* p<.001

Correlations among other scores were then examined: the correlations between dependence and number of days using and dependence and amount used on heaviest day were examined separately for the two substances and are shown in Table 8.15.

Table 8.15 *Correlations among dependence scores, amount used on heaviest day of the past week and number of days of the past week using at each of the three data collection points: Spearman's rho correlation coefficients. Sample 6c (n = 101)*

	amount t1	amount t2	amount t3	days t1	days t2	days t3
Heroin						
LDQ t1	.54*			.38*		
LDQ t2		.66*			.75*	
LDQ t3			.66*			.67*
Alcohol						
LDQ t1	.64*			.53*		
LDQ t2		.43*			.4*	
LDQ t3			.6*			.54*
* p<.01 (1-tailed)						

Significant positive correlations were found between dependence scores and amount used on the heaviest day during the previous week at each of the time points for each of the substances and these correlations were most similar at t3. The least similar, and a slightly smaller correlation was found between dependence and amount for the alcohol group at t2. The largest correlation was found between dependence and number of days per week used in the past week for the heroin group at t2. Generally there were greater differences in the correlations between dependence and number of days in the past week using for the two substances than there were in correlations between dependence and amount used. When within substance groups comparisons were made, it became apparent that the correlations between dependence and amount used on the heaviest day and dependence and number of days using in the past week were similar at each of the data collection points and identical at t3 for the heroin group. In the alcohol group the same similarities were found and the correlations between dependence and amount used and dependence and number of days were most similar at t2.

Table 8.16 *Correlations between duration of abstinence and mean total dependence scores at each of the data collection points: Spearman's rho correlation coefficients: Sample 6c (n = 101)*

	LDQ t1	LDQ t2	LDQ t3
duration abstinence t1:			
whole sample	-.47*		
alcohol	-.58*		
heroin	-.36*		
duration abstinence t2:			
whole sample		-.57*	
alcohol		-.38**	
heroin		-.67*	
duration abstinence t3:			
whole sample			-.66*
alcohol			-.58*
heroin			-.73*
*p<.01 (2-tailed)			
**p<.05 (2-tailed)			

In Sample 6c, seen at both t2 and t3, the number of participants who reported abstinence for the past week rose from 15 (14.9%) at t1 to 41 (40.6%) at t2 to 50 (49.5%) at t3. The mean dependence score for the abstinent sub-samples at each data collection point declined from 10.7 at t1 to 6.1 at t2 and to 5.9 at t3. However, 11 participants were abstinent at all three data collection points and while their dependence scores declined between t1 and t2 from 10.8 to 2.7, this score increased for this small group to 6.4 at twelve months. This may be an anomalous finding attributable to the size of the sample.

When the relationship between the reported duration of abstinence and the mean dependence score was examined, significant negative correlations were found at t1, t2 and t3 for the entire follow-up sample and for the two substance sub-samples (see Table 8.16), suggesting that the greater the duration of abstinence the lower the dependence score. Thus a picture of change over time begins to emerge. Dependence scores decrease with a decrease in the quantity and frequency of substance use and continue to decrease with increasing duration of abstinence.

8.6 Summary

In this chapter the samples seen at each of the data collection points were described and compared with those not seen in order to identify what sampling bias might effect conclusions

drawn from subsequent analysis of the data. Generally speaking the proportion of women increased in the follow-up samples, the mean age of those seen was higher, they had a longer duration of use and of problem use and slightly, though not significantly lower severity of problems of dependence, psychological health and social satisfaction. This profile may be characteristic of those who are more committed to engaging with a treatment agency and in the process of treatment compared to those who have considered treatment and then lost contact.

Scores on all measures were compared for those who were seen at three months and at twelve month follow-up and there appeared to be change, generally in the direction of improvement, between intake and both follow-up points. There were significant increases in the proportions of people reporting abstinence in the past seven days in both substance groups between intake and three months, significant reductions in the amount of the substance used for the heroin group and in the number of people using on a daily basis in both substance groups. There were significant reductions in dependence scores in both substance groups over this period and improvements in psychological health and social satisfaction. Dependence and use of the substance continued to show significant correlations throughout the course of these changes.

Similarly, significant changes were shown on all these measures between intake and twelve months including a significant reduction in the amount of alcohol used on the heaviest day. However, when changes were examined in the group that were followed up at both three months and twelve months, differences in the scores between three month and twelve month follow-up were not significant, with one exception. There appears to have been a significant difference between the number of days per week using heroin at three months and at twelve months as well as over the whole period and over the first three months. Thus there is a suggestion here that changes achieved in the first three months were sustained but not improved at twelve months with the exception of the use of heroin, which continued to be reduced and the use of alcohol where a significant reduction was shown for the twelve months follow-up period only. Whether the changes were sustained, or rather it was the case that different sorts of changes thereafter were masked by the simple presentation of the differences in mean scores and proportions is explored further in Chapter 9.

Measures of impaired control and coping behaviours, not reported in Chapter 8 because their inclusion was designed for the purpose of further investigating the nature of change in dependence, are described and investigated in Chapter 9, following the further investigation of those changes in dependence scores and other measures reported above.

Chapter 9

Study 4: the main study. Results 2

9.0 Introduction

The suggestion from findings reported in Chapter 8, that changes in dependence occur over time, is further explored in this chapter. The study hypotheses, presented as null hypotheses, stated that dependence would endure over time and that the use of different types of coping strategies would not be distinguished by degree of dependence or change over time. In order to test these hypotheses, the nature of change in dependence is examined, findings regarding the other measures taken at each data collection point are described as potential correlates of change, and predictors of change are explored.

Samples used in the analyses are Sample 6a: those seen at intake and at three month follow-up, and Sample 6c: those seen at intake, at three month and at twelve month follow-up. Comparisons are not made between the samples as there is considerable overlap; all those in Sample 6c, the smallest sample, are also in Sample 6a and in Sample 6b. The analysis of data for Sample 6a was conducted for exploratory purposes initially, this being the larger sample. In each analysis the sample is specified and reasons for basing the analysis on each sample are given. Problems regarding the measurement of change are discussed in Chapter 10.

9.1 The change in dependence

In Chapter 8, significantly reduced mean dependence scores were reported at three months (t2) and at twelve months (t3) compared with intake (t1). When mean dependence scores at t2 were compared with those for t3, the latter were found to be lower but not significantly so. Thus mean dependence score was reduced over time up to three months, and it appeared that this reduction was maintained at twelve months. Further examination of the data revealed that this impression did not adequately describe the fluctuations for and between individuals in their dependence scores. Problems with group mean scores, discussed in Chapter 10, are illustrated by these findings, which are described in greater detail below.

Complexity in the course of change in dependence was further suggested by examination of the correlations among dependence scores: significant positive correlations were found between

total dependence scores at intake and three months and between total dependence scores at three months and twelve months for the whole follow-up sample. The correlation between dependence scores at three months and twelve months was smaller than that between intake and three months. No such significant correlation was found between dependence scores at intake and at twelve months for the whole sample and the heroin sub-sample. Nor was a significant correlation found between dependence at three months and at twelve months for the heroin sub-sample. The largest correlation was found between dependence scores at intake and three months for the alcohol sub-sample and a smaller but significant positive correlation (correlation coefficient .29; $p < .05$, 1-tailed) was found between intake and twelve month dependence scores for the alcohol sub-sample suggesting that dependence at baseline may be more predictive for alcohol dependence than it is for heroin dependence. Correlation coefficients and their levels of significance for Sample 6c and the constituent substance groups are shown in Table 9.1.

Table 9.1 *Correlations between total dependence scores at t1 (LDQ t1) and t2 (LDQ t2), t2 and t3 (LDQ t3) and t1 and t3: Spearman's rho correlation coefficients and levels of significance: Sample 6c (n = 101, data missing for 2 participants)*

	LDQ t2	LDQ t3
Sample 6c (n=99)		
LDQ t1	.46**	.08
LDQ t2		.21*
heroin sub-sample (n=59)		
LDQ t1	.3*	-.08
LDQ t2		.03
alcohol sub-sample (n=40)		
LDQ t1	.7**	.29*
LDQ t2		.48**
*p < .05 (1-tailed)		
**p < .01 (1-tailed)		

One-tailed tests of significance for the difference between these correlations (Howell 1997) showed that the correlation between total dependence score at intake (LDQ t1) and at three months (LDQ t2) for the heroin sub-sample (correlation coefficient .3) was significantly different ($z=2.633$;

$p < .01$) from the correlation between these total dependence scores for the alcohol sub-sample (correlation coefficient .7, see Table 9.1). Furthermore, the correlation between total dependence score at intake and twelve months in the heroin sub-sample (correlation coefficient -.08) was significantly different ($z = 1.788$; $p < .05$) from the correlation between these total dependence scores in the alcohol sub-sample (correlation coefficient .29). The correlation between total dependence score at three months (LDQ t2) and at twelve months (LDQ t3) for the heroin sub-sample (correlation coefficient .03) was significantly different ($z = 2.327$; $p < .01$) from that of the alcohol sub-sample (correlation coefficient .48).

In order to examine change in dependence, a change score was computed for the difference between dependence at intake and three months (t1-t2), the difference between dependence at three months and at twelve months (t2-t3) and the difference between intake and twelve months (t1-t3). Change in dependence scores between t1 and t2 was a mean reduction of the order of 7 points on the LDQ, the median change was a reduction of 5.5 points. Change in dependence scores between t2 and t3, in other words, between three and twelve months was a mean reduction of the order of 1.2 points and the median reduction score was 0.

When the mean of the change scores between t1 and t3 was computed, a mean reduction of 8.4 points was found with a median reduction score of 7 points. The mode was a reduction of 5 points. Mean change scores and their distributions are shown in Table 9.2. There were no significant differences between the drug groups in the amount of change in dependence between intake and three months, three months and twelve months or intake and twelve months.

Individual differences in the amount of change were considerable as suggested by the common range for each of the follow-up periods, compared to the mean change scores. Between t1 and t2 for example, 10% reduced their dependence score by only one point while 20% reduced their dependence score by 14 points or more (up to 27 points). Also, the nature of change both within and between individuals appears quite different for the first three months compared with the following nine months. The proportions of respondents who reduced their mean dependence score, who increased their mean dependence score and who did not change their mean dependence score were examined in order to trace the course of change between t1 and t2, and t2 and t3; the findings are shown in Table 9.3.

Table 9.2 *Change in dependence between intake and three months, three months and twelve months and intake and twelve months: mean, median and mode change scores:*
sample 6c (n = 101)

		LDQ change between t1 and t2	LDQ change between t2 and t3	LDQ change between t1 and t3
N	valid	98	100	99
	missing	3	1	2
Mean		-7.02	-1.2	-8.4
Median		-5.5	0	-7.0
Mode		-4*	0	-5
SD		8.6	11.2	11.3
range		-27 to +11	-28 to +26	-30 to +29
percentiles	25	-12.3	-10.0	-16.0
	50	-5.5	0	-7.0
	75	-1.0	4.75	-2.0

The minus sign denotes a reduction in dependence score

* two modes were found: the other was -1.

Table 9.3 *Percentages of the cohort who had change and no change in mean dependence scores between t1 and t2, t2 and t3, and t1 and t3: Sample 6c (n = 101)*

	change between t1 and t2 (n=98)*	change between t2 and t3 (n=100)*	change between t1 and t3 (n=99)*
increased dependence	17.3% (from -1 to -11)	40% (from -1 to -26)	19.2% (from -1 to -29)
no change	2.1%	11%	2%
decreased dependence	80.6% (from 1 to 28)	49% (from 1 to 28)	78.8% (from 1 to 30)

* t1 dependence data missing for 2 individuals and t2 dependence data missing for one individual.

The amount and direction of change for individuals between t1 and t2 and between t2 and t3 are shown in Table 9.4. More than a third of the cohort had a consistent reduction in dependence with another third showing an initial reduction followed by an increase in dependence. While a total of 79 individuals *reduced* their dependence score between t1 and t2, a total of 38 individuals *increased* their dependence score between t2 and t3 and 31 of these were people who had reduced

their dependence score between t1 and t2.

Thirty-nine individuals (approximately 39%) of the cohort had reduced their dependence at t2 and reduced it further at t3. Six individuals (approximately 6%) had increased their dependence at t2 and further increased it at t3. No individuals showed no change at all in mean dependence scores between the data collection points. Thus the mean change score fails to reflect changes that occurred in individual cases over the whole twelve month follow-up period. Numbers of individuals and the direction of change in scores are presented in Table 9.4.

Table 9.4 *Changes in mean dependence scores for numbers of individuals between the first and second and the second and third data collection points: Sample 6c (n=101)*

Change:	t1 to t2	t2 to t3	n
	reduction	reduction	39
	reduction	no change	9
	reduction	increase	31
	increase	increase	6
	increase	no change	2
	increase	reduction	9
	no change	reduction	1
	no change	no change	0
	no change	increase	1
Total			98

In the above, any changes in dependence score, the means of those changes and the direction of changes are reported without reference to the meaning of the change scores. Difficulties in establishing the meaning of change scores are discussed in Chapter 10. One of the proposed solutions to the question of how to interpret change scores has been to set criteria for judging statistically reliable and clinically significant change and this is discussed below. As the purpose of the present study was to examine the nature of change in dependence, the analysis of correlates of change and predictors of change proceeds by using change scores for dependence in order that the entire spectrum of such change is included. In the latter part of the chapter, analyses of predictors of

change are repeated using criteria for statistically reliable and clinically significant change.

9.1.2 *Statistically reliable and clinically significant change in dependence*

The use of change scores has been criticised for failing to take account of the difference between individuals in the scores with which they start out and finish up and the reliability of the instruments used to measure the condition which is being investigated. (This debate is further discussed in Chapter 10). Addressing this criticism, Jacobson *et al.* (1999) proposed two criteria for asserting that clinically significant change, based upon the use of change scores, could be said to have occurred. These were: i) that the magnitude of change had to be statistically reliable and ii) that individuals end up in a range that renders them indistinguishable from well-functioning people. The calculation of statistically reliable change takes account of the reliability of the measurement instrument and thus avoids the pitfall of interpreting measurement error as change.

Jacobson and Truax (1991) proposed the following formula for the calculation of statistically reliable change (RC):

$$RC = x_2 - x_1 / S_{diff}$$

and state that a reliable change score greater than 1.96 is unlikely to occur ($p < .05$) without actual change.

Using the above formula, x_1 represents the t1 total dependence (in this case) score, x_2 represents the t2 total dependence score and S_{diff} is the standard error of the difference between two test scores. S_{diff} is computed from the standard error of measurement according to the formula:

$$S_{diff} = \sqrt{2(S_E)^2}$$

and S_E is calculated as:

$$S_E = S_1 \sqrt{1 - r_{xx}}$$

where r_{xx} is the test re-test reliability of the measure. This was calculated at 0.95 in the validation study of the LDQ (see Raistrick *et al.* 1994). S_1 is the standard deviation for the pretreatment experimental group or in the present case, for the mean total dependence score in Sample 6c at t1 and is calculated at 7.6. Thus the standard error of measurement S_E is calculated to be 1.7 and the standard error of the difference between the two test scores (S_{diff}) is 2.4. A reliable change score was then calculated for each participant using this formula.

Jacobson *et al.* (1999) propose three methods for fulfilling the second of their criteria for clinically significant change, which have varying degrees of stringency. These methods are briefly described below and further discussed in Chapter 10. In the three methods, cut-off points are proposed for asserting that change from the dysfunctional to the functional has occurred. In the first

method, this point is said to be reached with scores that fall outside the range of the dysfunctional behaviour, where the range is described as being two standard deviations in the direction of improvement. In the second method, the cut-off point is reached when scores fall within the functional range where the range is set at two standard deviations above (in the case of the measurement of dependence) the measurement for the normal population. The third method proposes a cut-off point where scores indicating the level of functioning suggest the client is statistically more likely to be in the functional than the dysfunctional population.

Table 9.5 *Total dependence scores at intake (t1) and three months (t2), and the difference between these scores for those in Sample 6c who achieved a reliable change in their dependence score at t2; n = 50*

	LDQ t1 ¹	LDQ t2 ²	LDQ ch ³ t1 - t2
mean	20.5	6.7	13.7
SD	6.6	6.2	6.2
median	21	5	12
mode	21*	0	8

¹ total dependence score at intake

² total dependence score at three months

³ difference between total dependence scores at t1 and t2 calculated as t1-t2.

* smallest of a number of modes

At three month follow-up, 50% of the follow-up Sample 6c had a reliable change score greater than 1.96, which, based upon Jacobson and Truax (1991), is likely to reflect real change, that is, a measure of change not attributable to the unreliability of the measurement instrument. Dependence data at t1 and t2 for the 50% (n = 50) of Sample 6c (n = 101 but dependence data were missing for three participants) who fulfilled the criterion for reliable change at t2 are presented in Table 9.5.

Of the 50 individuals who had a reliable change score >1.96 for dependence at t2, 31 had reduced their dependence score to 9 or below, that is within two standard deviations above the general population mean (Raistrick *et al.* 1994). This calculation is based upon the second of the three methods proposed by Jacobson *et al.* (1999) which can be applied for the purpose of meeting the second of the criteria for asserting that clinically significant change has occurred. While the mean dependence score for this group was reduced from 18.2 at t1 to 2.8 at t2, showing a mean change of 15.3 points, it increased between t2 and t3 to a mean score of 9.3 showing a mean change

of 6.5 in the direction of higher dependence (see Table 9.6). None of this cohort had further positive reliable change (ie in the direction of reduced dependence) but 16 (nearly 50%) of them had negative change (ie in the direction of increased dependence) that was statistically reliable.

Table 9.6 *Total dependence and change scores for those in Sample 6c (n=101) who met the two criteria for clinically significant change over the first three month follow-up period; n = 32 (3 missing cases)*

	LDQ t1	LDQ t2	LDQ t3	LDQ change between t1 and t2	LDQ change between t2 and t3
mean	18.2	2.8	9.3	15.3	-6.5
SD	6.7	2.7	8.3	6.7	8
median	18.5	2.5	8.5	14.5	-5.5
mode	21	0	0	8 ^a	0

^a multiple modes exist for which this is the lowest.

When reliable change and clinically significant change data between intake and three month follow-up for Sample 6c were analysed by drug group, no significant differences were found between the proportion of heroin users in the heroin group and the proportion of alcohol users in the alcohol group who had only statistically reliable change or both statistically reliable and clinically significant change (see Table 9.7).

Thirty two participants had a reliable change score greater than 1.96, ie their difference scores showed statistically reliable change, between three month and twelve month follow-up and of these, 24 had clinically significant change. This group changed quite differently from those who had significant change between t1 and t2. As a group they made very little change during the first three months; total dependence data at each of the data collection points, and change data measured at the follow-up points are presented in Table 9.8.

Table 9.7 *Percentage of participants in each drug group who had statistically reliable change and clinically significant change by drug group in the first three month follow-up period: Sample 6c (n=101; 3 missing cases)*

	heroin (n=59)	alcohol (n=39)	significanc e
statistically reliable change	52.5%	48.7%	ns
clinically significant change	33.9%	28.2%	ns

Table 9.8 *Total dependence and change scores for those in Sample 6c who met the two criteria for clinically significant change over the follow-up period between three months and twelve months; n = 24*

	LDQ t1	LDQ t2	LDQ t3	LDQ change bet t1 and t2	LDQ change between t2 and t3
mean	22.8	17.9	2.9	4.9	15.1
SD	5.1	5.8	2.8	6.5	6.4
median	23	18	1.5	4	13
mode	22*	11	1	4	13

* multiple modes exist of which this is the lowest

Sixty five participants in Sample 6c had statistically reliable change in dependence between intake and twelve months and 12 participants had statistically reliable change (a reliable change score greater than >1.96) at the end of each of the follow-up periods.

When reliable change and clinically significant change data between three month and twelve month follow-up for Sample 6c were analysed by drug group, no significant differences were found between the proportion of heroin users in the heroin group and the proportion of alcohol users in the alcohol group who had only statistically reliable change or both statistically reliable and clinically significant change (see Table 9.9). In both analyses, smaller proportions of alcohol users than heroin users had clinically significant changes in their dependence scores but these differences were

not significant.

Table 9.9 *Percentage of participants in each drug group who had statistically reliable change and clinically significant change by drug group in the follow-up period between three months and twelve months: Sample 6c (n=101; 1 missing case)*

	heroin (n=60)	alcohol (n=40)	significanc e
statistically reliable change	35%	27.5%	ns
clinically significant change	26.7%	20%	ns

The findings reported above show that there was a group of people who made significant changes in their level of dependence during the first three months, but did not change much thereafter and a group who did not make changes in dependence during the first three months, but had significant changes in dependence during the subsequent follow-up period to twelve months. For the 50 people who had statistically reliable change scores in dependence between intake and three months, a significant negative correlation was found between such change and change in dependence score between three months and twelve months (Spearman's rho correlation coefficient: $-.5$, $p < .01$, 1-tailed). For the 32 people who had a statistically reliable change score in dependence between three months and twelve months, a significant negative correlation was found between such change and change in dependence scores between intake and three months (Spearman's rho correlation coefficient $-.4$, $p < .05$, 1-tailed).

9.2 Correlates of change in dependence

In Chapter 8 it was reported that, in addition to an overall significant reduction in mean dependence score, changes also occurred in a number of the other domains measured, namely in amounts of the substance used, in frequency of use, in psychological health and in social satisfaction scores. Changes in impaired control (measured as attempts to control, ability to control and perceived control over use) and the use of coping strategies were also investigated. The

relationships between measures of impaired control and dependence and coping behaviours and dependence are examined separately with a view to constructing a model for the prediction of change in dependence.

9.2.1 *Dependence and use*

It has previously been shown (Raistrick *et. al.* 1994) that dependence scores as measured by the Leeds Dependence Questionnaire and measures of concurrent substance use are highly correlated in help seeking samples and in the present study these correlations have once more been demonstrated. Furthermore it has been possible to demonstrate that these correlations were found following a decline in dependence. Additionally it has been possible to continue to measure dependence once use has ceased completely and the Leeds Dependence Questionnaire was shown to have the ability to measure dependence in conditions of abstinence during the pilot phase of the study. Dependence scores for the abstinent participants in the main study were shown in the previous chapter.

9.2.2 *Dependence and Impaired Control*

The scale used to measure impaired control was the Impaired Control Scale (discussed in Chapter 5). The Impaired Control Scale consists of separate parts which measure attempts to control, perceived ability to control and beliefs about such ability. The latter two parts were designed to measure one component of dependence and were highly positively correlated with measures of dependence whereas the first part, measuring attempts to control, was thought to tap into a different behaviour which was negatively correlated with dependence. Measures of impaired control and relationships with measures of dependence at each of the data collection points are described.

Adaptation and validation of the Impaired Control Scale (originally validated for use with problem drinkers) for use with heroin users in the present study are reported in Chapter 5. The original scale was administered to the alcohol sub-sample and the adapted scale was administered to the heroin sub-sample as part of the battery of questionnaires administered at each of the three data collection points. There was a significant increase in attempts to control use at t2 compared with t1 ($p < .01$) and a significant increase at t3 compared to t1 ($p < .01$). There was no difference in mean scores for attempts to control at t2 compared with t3. Significant correlations were not found among these measures. There were significant reductions in impaired control as measured by the other two parts of the scale: failure in attempts to control (ICSFC) and perceived ability to control (ICSPC)

between t1 and t2 and between t1 and t3 ($p < .001$ in both cases) but no significant differences in the means of these two parts of the scale between t2 and t3. Given the significant correlations among different parts of the scale and dependence scores reported below, it is likely that difference in the means is unable to reflect the changes that are occurring as discussed above with reference to the changes in dependence.

Table 9.10 *Correlations between total dependence score and each of the three parts of the scale at t1, t2 and t3 : Spearman's rho correlation coefficients. Sample 6c (n=101)*

	LDQ t1	LDQ t2	LDQ t3
ICSACT1	-.53**		
ICSFCT1	.66**		
ICSPCT1	.74**		
ICSACT2		-.24*	
ICSFCT2		.49**	
ICSPCT2		.5**	
ICSACT3			-.31**
ICSFCT3			.68**
ICSPCT3			.62**

* p <.05 (1-tailed)
**p <.01 (1-tailed)

Significant correlations were found between the total dependence score and each part of the Impaired Control Scale at each of the data collection points for the two substance samples combined. A significant negative correlation was found between the total dependence score and the five items making up the first part of the scale and referring to attempts to control use (ICSAC), while significant positive correlations were found between total dependence score and the latter two parts of the scale, referring to success or failure in attempts to control (ICSFC) and perceived ability to control (ICSPC) at each of the data collection points. Correlations between each of the three parts of the Impaired Control Scale and total dependence scores at each of the three data collection points for the whole follow-up sample: Sample 6c, are shown in Table 9.10.

As the first part of the Impaired Control Scale was thus thought to measure a behaviour distinct from but correlated with dependence as measured by the LDQ, and the independence of these variables was demonstrated in Principal Components Analysis, reported below in Section 9.3, the first part alone was used in the analysis of predictors of change in dependence, described later in this chapter.

9.2.3 *The Coping Behaviours Inventory in the present study*

The Coping Behaviours Inventory (discussed in Chapter 6) was thought to be useful in elucidating the nature of change in dependence. It was hypothesised that there would be a difference in the use of coping strategies by high and low dependence individuals. It was proposed that examination of coping strategies as potential correlates of change in dependence, in addition to the other measures, might throw light on the nature of such change.

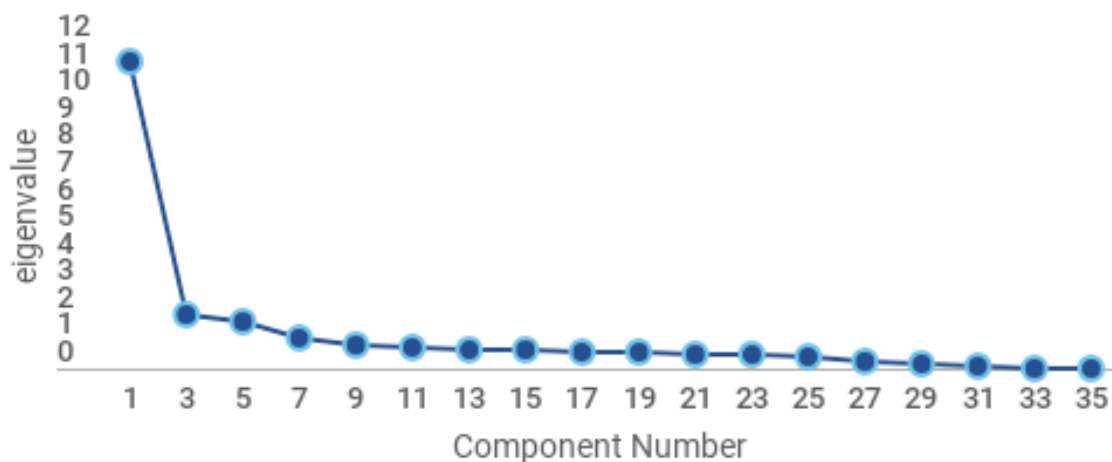
The null hypothesis, that people with high dependence will use the same coping strategies as people with low dependence, was examined using a scale which contained cognitive and behavioural coping items. The scale, the Coping Behaviours Inventory was originally designed for problem drinkers and was adapted to heroin users as part of the present study. One of the reasons this scale was thought to be suitable for use in the present study was that, in Principal Components Analysis of the original, four factors were found, two cognitive and two behavioural (Litman *et al.* 1983). Additionally, Litman's scale was validated in a UK population of help-seekers for problems of alcohol misuse and dependence and was therefore considered relevant to the target population in the current study.

Principal components analysis of responses to the original Coping Behaviours Inventory in the Sample 6 alcohol group ($n = 78$) of the present main study yielded 10 factors with an eigenvalue over 1 of which the first factor had an eigenvalue of 11.96 and accounted for 33.2% of the variance. Thirty of the 36 items had loadings over .35 on this factor; items 2,3,8,10,12 and 27 (see Appendix 9) had loadings less than .35 on the first factor, but loadings greater than .35 on one of the next three factors.

Factor analysis of the adapted scale produced 11 factors with an eigenvalue greater than 1 which accounted for 67% of the variance; the first factor accounted for 26.4% of the variance and 32 of the 38 items had factor loadings over .35 on this first factor. It was not the case that separate factors were found for cognitive and behavioural coping strategies, nor were factors similar to those found by Litman and her colleagues (1983) identified in the sample of heroin users who participated in the validation study of the adapted Coping Behaviours Inventory.

Principal components analysis of responses to the original and the adapted Coping Behaviours Inventory (CBI) in Sample 6 (n=230) as measured at t1 yielded a 9 factor solution (eigenvalues greater than 1) with the first factor accounting for 30.3% of the variance. The second factor had an eigenvalue of 2.2 (see Figure 9.1).

Figure 9.1 *Component structure for the original and adapted CBI: Sample 6 (n=230)*



In this sample, all items had loadings greater than .4 on the first factor with the exception of items 2, 8, 10 and 12. Thus a single main factor emerged for the Coping Behaviours Inventory in the samples examined. This finding is at odds with that of Litman and her colleagues whose Principal Components Analysis of the Coping Behaviours Inventory produced a four factor solution as described in Chapter 6. These factors were described as i) positive thinking, ii) negative thinking, iii) avoidance and iv) distraction/substitution (Litman *et al.* 1983 p. 270). The difference in findings between the present study and the Litman study may be accounted for by the fact that the original scale was administered almost twenty years before the present study. However, in the pilot phase of the present study considerable care was taken to ensure that the items were relevant and meaningful to contemporary addiction agency clients; more likely the difference is attributable to the number of factors chosen. In the Litman study the first factor had an eigenvalue of 13.9 and accounted for 38.6% of the variance, while eigenvalues for the remainder of the factors were below 2 and accounted for an additional 12% approximately of the variance. Though the remainder of the factors with an eigenvalue greater than 1 in the present study were difficult to interpret, it may be that seemingly different findings were a result of the interpretation of the factors rather than their

number and amount of variance accounted for by them. Additionally, in the present study the sample was of insufficient size to produce the subject item ratio of ten to one recommended by Nunnally (1978 p. 421) for factor analysis.

In view of the above, the composite scale was used as a whole and separate inventories of cognitive and behavioural coping (see Appendix 12) based upon the meaning of the items were used for the purpose of examining the main study hypotheses relating to the relationship between dependence and coping. The correlation between cognitive and behavioural coping was examined and a ratio of cognitive to behavioural coping was computed.

Cognitive and behavioural coping strategies were highly significantly correlated with each other at each of the data collection points and these correlations are shown in Table 9.11. Initial inspection of the data revealed a linear relationship between cognitive and behavioural coping and fairly normal distributions for scores in each category; there was one outlier in the heroin group who achieved a total cognitive coping score of 2 (mean total cognitive coping score 29.5), and one outlier who achieved a total coping score of 94 (mean total score 47.2) therefore Pearson correlation coefficients were calculated.

Table 9.11 *Correlations between cognitive and behavioural coping strategies at t1, t2 and t3:
Pearson correlation coefficients, Sample 6c (n=101)*

	behavioural coping t1	behavioural coping t2	behavioural coping t3
cognitive coping t1	.76*		
cognitive coping t2		.73*	
cognitive coping t3			.67*

* p<.01 (1-tailed)

The ratio of cognitive to behavioural items was computed using the mean score for individual items which made up the cognitive and behavioural coping strategies inventories separately. The ratio of cognitive to behavioural coping in the whole t1 sample: Sample 6, was 1.5:1 indicating the greater frequency of cognitive coping compared with behavioural coping.

When coping was examined for the follow-up sample, Sample 6c: those also seen at t2 and t3, the same ratio of 1.5:1 was found for cognitive to behavioural coping though mean scores were higher in the follow-up sample suggesting slightly greater frequency of use of all coping strategies

in this group than in the whole t1 sample (Sample 6). Means and ratios are shown in Table 9.12.

Table 9.12 *Mean item scores for cognitive and behavioural coping at t1 for the whole sample: Sample 6 (n=230; complete data available for 203) and Sample 6c (n=101; complete data available for 92)*

	Sample 6: n=203	Sample 6c: n=92
mean item score: cognitive coping	1.46	1.53
mean item score: behavioural coping	.95	1.04
ratio cognitive to behavioural coping	1.53:1	1.47:1

9.2.4 *Coping and change*

Mean total coping scores were computed and compared in a preliminary investigation of whether frequency of coping changed between the three data collection points; correlations were calculated in a preliminary examination of whether there was an association between the frequency of coping at one time and another. The frequency of the use of coping strategies changed over time: there was a significant increase in the mean total coping score at t2 compared with t1, and coping scores for t1 and t2 were significantly positively correlated with each other. This suggests that change occurred and that there was an association between coping at intake and coping at three months. There was a decrease in mean coping scores from t2 to t3 and these scores were also significantly positively correlated with each other. Change during the next nine months was in the opposite direction and the association between coping at the second and third data collection points continued.

Table 9.13 *Differences between means (shown in bold), Pearson's correlation coefficients and levels of significance for coping at t1, t2 and t3: Sample 6c (n=101; data available for 92)*

	CBI t1	CBI t2	CBI t3
CBI t1	-	.47*	.39*
CBI t2	6.4*	-	.39*
CBI t3	1.5	-4.3**	-

* p < .01 (1-tailed)

** p < .05 (1-tailed)

There was no difference between coping at t1 and t3 and these scores showed a significant positive correlation. Thus change in the first three months appears to have been cancelled out by change in the subsequent nine months but the association continued to be found. This suggests some consistency in people's use of coping strategies over time. Differences and correlations between the mean scores are shown in Table 9.13.

9.2.5 Coping, dependence and change in substance use

The relationships between coping and dependence were explored: significant negative correlations were found between dependence and all coping at intake (Spearman's rho correlation coefficient: -.144; p<.05; 2 tailed) and dependence and cognitive coping at intake (Spearman's rho correlation coefficient: -.176; p<.05, 2 tailed). No such correlations were found between behavioural coping and dependence at intake.

It was hypothesised that people with high dependence would use the same coping strategies as those with low dependence as their dependence changed. For the purpose of investigating these relationships, participants were assigned to categories of high, moderate and low dependence as determined by tertiles of t1 dependence scores for the entire sample. High dependence was a score of 24 or more, moderate dependence was a score of 18 to 23 and low dependence was a score less than 18. When those in the high dependence group who had become abstinent at three months were compared with those who were still using at three months, a significant difference was found in the frequency of the contemporaneous use of behavioural coping strategies. Those who had become abstinent used behavioural coping strategies significantly more frequently than those who had not become abstinent. In the low dependence group (LDQ <18 at intake), a significant difference was found between those who became abstinent and those who did not in the frequency of the

contemporaneous use of all coping strategies. Means of coping strategies used at three months and levels of significance are presented in Table 9.14.

The question of whether the use of cognitive and behavioural coping strategies was different in those who had high dependence and changed and those who had low dependence and changed was explored in the context of reliable and significant change and is discussed below.

Table 9.14 *Mean item totals for coping strategies at three months in high and low dependence people by categories of abstinence and use: Sample 6a (n=151)*

	abstinent	using	95% CI	t	df	p
<i>high dependence (n=47)</i>						
cognitive coping	32.6 sd 10	31.1 sd 12	-5.51 to 8.5	.43	45	ns
behavioural coping	20.9 sd 7.2	16.1 sd 7.9	.14 to 9.36	2.1	45	.04
all coping	53.5 sd 15.6	47.3 sd 19.4	-.4.68 to 17.13	1.2	45	ns
<i>low dependence (n=52)</i>						
cognitive coping	37 sd 13.8	28.6 sd 9.9	1.7 to 15	2.5	50	.01
behavioural coping	22.9 sd 8.8	14.2 sd 8	3.9 to 13.3	3.7	50	.001
all coping	59.8 sd 20.8	42.9 sd 16.3	6.6 to 27.4	3.3	50	.002

9.2.6 *Change in dependence and coping strategies*

In a separate analysis, the question of whether people with high dependence at intake and who had reliable change in their dependence score would use the same coping strategies as those with low dependence and reliable change in dependence was investigated. Correlational analysis was conducted separately to examine the relationships between different levels of dependence, change and the frequency of use of different methods of coping in the samples whose change scores were consistent with the criteria for reliable change (Jacobson and Truax 1991) described above and discussed in Chapter 10. As previously suggested, the criteria for statistically reliable change only are applied at this point, as the elucidation of nature of change rather than the measurement of outcome is the purpose of this enquiry.

In the high dependence group there were no significant correlations between dependence

and coping at t1 but at t2 a significant positive correlation emerged between frequency of behavioural coping and the amount of change between t1 and t2; no such correlation were found for cognitive coping. A significant negative correlation between both cognitive and behavioural coping and degree of dependence was found at t2. In the low dependence group no significant correlations were found between dependence, change and frequency of coping. These correlations are presented in Table 9.15.

Table 9.15 *Correlations for cognitive and behavioural coping with dependence scores and with change in dependence scores at t2 for high (≥ 24) and low (< 18) dependence groups who had reliable change at t2: Spearman's rho correlation coefficients: (Sample 6a, $n=151$; high dependence and reliable change $n=26$; low dependence and reliable change $n=23$)*

	high dependence		low dependence	
	LDQ t2	LDQchanget2	LDQ t2	LDQchanget2
cognitive coping t2	-.42*	.28	-.22	.23
behavioural coping t2	-.46*	.43*	-.1	-.09
all coping t2	-.5**	.4*	-.21	.1

* $p < .05$ (1-tailed)

** $p < .01$ (1-tailed)

These data suggest that greater frequency of behavioural coping at t2 is associated with greater change in dependence at t2 in those individuals with high dependence at t1 who have achieved a reliable change score in dependence at t2. No such association with cognitive coping strategies was found. In the low dependence sub-sample, no significant correlations were found in those who had reliable change either between dependence scores and the two sorts of coping strategies or with the total use of coping strategies, nor were any found between change and coping.

However, when the frequency of use of all coping strategies was compared for those with high dependence at intake who had achieved reliable change in dependence at three months with those who had not achieved such change, the greater frequency of use of coping strategies both at intake and at three months did not reach statistical significance. A significant difference was found in the frequency of the use of cognitive coping between those who had reliable change between three months and twelve months and those who did not achieve such change ($t=2.3$; $df=25$; $p<.03$,

2-tailed). Those who achieved reliable change used cognitive coping at twelve months significantly more frequently than those who did not achieve such change. The greater frequency of use of behavioural coping and of all coping at twelve months by those who had reliable change in dependence between three months and twelve months and those who did not, did not reach statistical significance.

These data suggest that coping changes with changes in dependence and use in people with high dependence, and that behavioural coping is associated with change during the first three months. What are the causes and the effects of changes in either cannot be established with these data and the intervals at which they have been collected.

The relative use of cognitive and behavioural coping strategies in the different dependence groups was examined in the group that achieved reliable change scores in dependence. The ratio of cognitive to behavioural items was computed using mean item scores; in Table 9.16 the ratios of cognitive to behavioural coping strategies used at t1 and t2 by people who showed reliable change at t2 in each of the high and low dependence groups are presented.

Table 9.16 *Ratios of cognitive to behavioural coping in those whose reliable change score was greater than 1.96: Sample 6a (n=151; high dependence n=26 and low dependence n=23 groups)*

	Ratio cognitive to behavioural coping:	
	t1	t2
Sample		
high dependence t1	1.37:1	1.56:1
low dependence t1	1.63:1	1.65:1

The ratios of cognitive to behavioural coping strategies at t1 and at t2 were computed for the high and low dependence sub-samples. The ratio of behavioural to cognitive coping was highest in the high dependence group, in other words at t1 the use of behavioural and cognitive coping was closer to one to one than it was in the low dependence group, suggesting only that a larger ratio of behavioural to cognitive coping was used in the high dependence group, but not that a higher frequency of behavioural to cognitive coping was used in this group.

9.2.7 Dependence and treatment

Treatment data were collected from a separate database in which the number of treatment events were recorded for type and duration. As the descriptive data were thought to be insufficiently specific and insufficiently consistently recorded for the purpose of comparison, a simple count of number of attendances for face to face treatments was computed for the purpose of examining correlates and predictors of change. Of the 101 individuals who were followed up at both three months (t2) and twelve months (t3), 26 individuals had no treatment beyond their initial assessment interview between t1 and t2 and 39 individuals had no treatment between t2 and t3. Seventeen individuals had no treatment beyond the initial assessment interview during the entire twelve month follow-up period. The mean number of treatment events, their range and standard deviations between t1 and t2, t2 and t3 and t1 and t3 are shown in Table 9.17.

Table 9.17 Treatment events attended during the follow-up periods, means, range and standard deviations: Sample 6c (n=101)

treatment events	mean	range	standard deviation
t1-t2	2.04	0-14	2.25
t2-t3	3.74	0-23	4.81
t1-t3	5.79	0-29	6.31

Relationships between these treatment events and dependence, substance use, attempts to control, coping and measures of social and psychological functioning at three month and twelve month follow-up were investigated. No significant correlations were found. When a change score was computed for the difference between dependence at t1 and dependence at t2, a small significant positive correlation emerged between this change score and treatment (see Table 9.18). The reliability of the treatment data cannot be described as these data were collected outside the present study.

Table 9.18 *Correlations among treatment events and change in dependence at three months and twelve months: Spearman's rho correlation coefficients. Sample 6c (n=101)*

	LDQ change between t1 and t2	LDQ change between t2 and t3
treatment events between t1 and t2	.2*	
treatment events between t2 and t3		.08

* p<.05 (1-tailed)

9.2.8 *Dependence, concurrent behaviours and functioning variables*

Significant correlations between dependence and use, attempts to control use and psychological health were described in Chapter 8 and above in Chapter 9. Social satisfaction was measured using the Social Satisfaction Questionnaire (SSQ), described in Chapter 7, where the higher the score the greater the social dissatisfaction. This method of scoring the SSQ was chosen in order that higher scores on the three functioning variables (dependence, psychological health and social satisfaction) consistently denoted greater severity. There is however, scope for confusion when referring to “high scores on the Social Satisfaction Questionnaire” and this method of scoring has been reversed since the present study was conducted. For our purposes here, data are reported as collected. The correlation between dependence and social satisfaction at t1 was not a significant one but when the social satisfaction data were re-analysed in line with the two factors reported in the validation of the instrument in Chapter 7, significant correlations were found between total dependence score at t1 and scores for the second factor (consisting of items referring to activities outside the home). Significant correlations were found between each factor (the first consisting of home life and relationship items) at t2 and total dependence score at t2. Furthermore there was a significant negative correlation between the change score for dependence (dependence score at t1 minus dependence score at t2) and both social satisfaction factors at t2 when they were compared separately, that is the greater the change the lower the social dissatisfaction. Time 3 data once again showed significant correlations between the second factor and total dependence score as well as with the change score for the difference in dependence between t1 and t3 and t2 and t3. Thus social dissatisfaction, particularly when measured with reference to activities outside the home, is mainly significantly positively correlated with dependence, and significantly negatively correlated with change in dependence that has occurred (see Table 9.19). The question of whether social

satisfaction at t1 predicts change in dependence when other factors are accounted for was further investigated in regression analysis reported below.

9.2.9 Dependence and time

As the specific dates of follow-up were reported, it was possible to compute the time lapse between measurements in order to explore the question of the influence of time as a factor in change. No significant correlations were found between the amount of change in LDQ score and the time that had lapsed to follow-up at either of the follow-up points.

Table 9.19 *Correlations among measures of dependence and social dissatisfaction. Factor 1 refers to dissatisfaction with home life and relationships, factor 2 refers to dissatisfaction with activities external to the home. Spearman's rho correlation coefficients: Sample 6c (n=101).*

social dissatisfaction	LDQ t1	LDQ t2	LDQ t3	LDQ change t1-t2	LDQ change t2-t3	LDQ change t1-t3
t1 factor 1	.04					
t1 factor 2	.19*					
t2 factor 1		.41**		-.3**		
t2 factor 2		.45**		-.35**		
t3 factor 1			.07		-.06	-.03
t3 factor 2			.39**		-.28**	-.28**

* p < .05 (1-tailed)

** p < .01 (1-tailed)

9.3 Independence of the variables

The Leeds Dependence Questionnaire (LDQ) and the rationale for its use were described in Chapter Three; the General Health Questionnaire (GHQ) and the Social Satisfaction Questionnaire (SSQ) were described in Chapter Seven as instruments used in the routine evaluation of outcome at the study agency. The rationale for their use has been the assertion that they measure variables which are different to dependence though correlated with it and that they tap into areas that are of concern in people with addiction problems. Such correlations were thought to be of sufficient significance to merit their inclusion in a model of the potential predictors of change in dependence. The Coping Behaviours Inventory was described in Chapter Six as an instrument capable of

measuring those thoughts and behaviours which, in the main study were hypothesised to shed light on the nature of change in dependence. The Impaired Control Scale, described in Chapter Five, was used in the main study as a measure of concurrent validity for the measurement of dependence. In Principal Components Analysis, the five items forming the first part of this three part scale and named "attempts to control" (ICSAC), were found to form a separate component which was significantly negatively correlated with dependence. The remaining two parts of the scale were significantly positively correlated with dependence and thought to measure a component of the same phenomenon measured by the LDQ. The latter two parts of the Impaired Control Scale were not, therefore, included in the investigation of the independence of the five variables.

In order to test the independence of the variables to be used in the investigation of predictors of dependence, time 1 responses to all items in the Leeds Dependence Questionnaire, the General Health Questionnaire, the Social Satisfaction Questionnaire, the Coping Behaviours Inventory and the first five items of the Impaired Control Scale were subjected to Principal Components Analysis. Varimax Rotation with Kaiser Normalisation produced a five factor solution which clearly distinguished the five scales used (see Appendix 16). Establishing the independence of these five factors eliminated the problem of co-linearity and thus rendered them suitable for inclusion as potential predictor variables in regression analysis which is reported below.

9.4 Predictors of change in dependence

Having demonstrated that dependence as measured by the Leeds Dependence Questionnaire changed over time, the correlates of such change were examined; using bi-variate correlational analysis, the relationships between dependence scores, change in dependence at three months and other measures were described. These were reported in Section 9.2 above. In order to explore the predictors of change in dependence, regression analysis was used. This method of multi-variate analysis is designed to investigate the relationship between a single dependent variable and one or more independent variables. The model for regression analysis was constructed in the following way: the dependent variable, change in dependence was taken as a continuous measure in order to reflect the entire range of change that occurred. Scores for the change in dependence between intake and three months and between three months and twelve months were computed. Nine independent variables were chosen to be entered into the analysis. Three pre-treatment characteristics, namely age, sex and primary drug of misuse (heroin or alcohol) were included as the sample was not balanced in respect of these variables; five pretreatment functioning variables, shown above to be

independent at the pretreatment data collection point, were included: dependence score (LDQ), psychological health score (GHQ), social satisfaction score (SSQ), coping behaviours (CBI) and attempts to control use (ICSAC). Treatment was included as the ninth independent variable due to its importance as the most manipulable variable in this help seeking population. Treatment data were routinely collected by clinical and administrative staff outside the present study and recorded as number of discrete attendances, nature and duration of intervention. Only those sessions which involved a counselling component and occurred after the initial assessment appointment and before the follow-up interview were extracted from the treatment database. Daily attendances at the clinic room for monitoring of withdrawal symptoms or collection of medication were excluded. The number of treatment sessions was included in the model as an independent variable; type or content of treatment were not specified due to the unreliability of the data on the nature of the intervention. The dependent variable, change in dependence, was computed as the difference between total dependence score at intake and at three months and regressed on the nine independent variables in linear regression analysis. The results are presented in Table 9.20.

Table 9.20 *Linear regression analysis for the dependent variable: change in dependence between intake and three months: Sample 6a (n=151)*

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2.03	4.76		-.43	.67
age	.12	.09	.14	1.26	.21
sex	-1.07	1.68	-.05	-.64	.53
substance	-1.49E-02	.02	-.08	-.75	.46
LDQ t1	.47	.11	.40	4.12	.001
GHQ t1	.21	.24	.09	.90	.37
SSQ t1	-.15	.15	-.09	-1.00	.32
ICSAC t1	-8.02E-03	.15	-.01	-.05	.96
CBI t1	-1.52E-02	.04	-.03	-.40	.69
treatment t1 - t2	.28	.31	.07	.90	.37

Total dependence score at intake emerged as the only significant predictor of change in dependence at three months. When the variables were entered into the regression analysis in stages, the first stage consisting of the three demographic variables age, sex and drug, the drug variable was the one with the most significant t value (just below 10%) but any possible significance of this variable disappeared when it was included in the next stage with the five independent baseline psychological, social and behavioural variables, namely dependence, psychological health, social satisfaction, coping and attempts to control.

The change in dependence at twelve months was computed by subtracting the total dependence score at twelve months from the total dependence score derived at three months and regressing this dependent variable on the three intake demographic variables of age, sex and substance, the social and psychological functioning variables at three months and the number of treatments between three months and twelve months. The results of this analysis are presented in Table 9.21.

Table 9.21 *Linear regression analysis for the dependent variable: change in dependence between three months and twelve months: Sample 6c (n=101)*

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2.03	6.53		-.31	.76
age	-3.86E-02	.12	-.04	-.32	.75
sex	.81	2.30	.03	.35	.72
substance	-6.75E-03	.03	-.03	-.23	.81
LDQ t2	.78	.16	.62	4.94	.001
GHQ t2	-.12	.36	-.05	-.34	.73
SSQ t2	-1.14E-02	.19	-.01	-.06	.95
ICSAC t2	-.15	.22	-.06	-.69	.49
CBI t2	-4.55E-02	.05	-.08	-.87	.39
treatment t2 - t3	8.03E-02	.19	.04	.43	.67

Once again, dependence at three months was the only variable shown significantly to predict the change in dependence score between three months and twelve months.

9.4.1 Predicting reliable and significant change in dependence

The sample used for preliminary examination of the potential predictors of reliable and significant change in dependence at three months was Sample 6a (n = 151). This sample consisted of all the participants in Sample 6 who were also seen at three month follow-up (see Chapter 7). On the basis of the change score calculated for each of the participants in this sample by subtracting total dependence score at three months from total dependence score at intake, a statistically reliable change score was calculated using the formula devised by Jacobson and Truax (1991) and described in Section 9.1 above. A dichotomous measure of reliable change was assigned to each participant, with 1 to denote reliable change and 0 to denote the absence of such change. This was used in the analysis as the dependent variable. Independent variables were 3 pretreatment characteristics: age, sex and primary substance, 5 independent variables referring to psychological and social

functioning: dependence score, psychological health score and social satisfaction score, coping and attempts to control at intake and number of treatment events at three months. For the purpose of this group of analyses, Sample 6c, the sample seen at both three months and twelve month follow-up, was used on each occasion. In this analysis, dependence at intake emerged once more as the sole significant predictor of reliable change in dependence at three months (Beta=.0774; S.E.=.0392; $p<.05$; $R=.1248$).

In order to investigate whether different variables predicted clinically significant change in dependence (as defined by Jacobson *et al.* 1999) at three months, a dichotomous measure of clinically significant change was assigned to each participant with 1 denoting change and 0 denoting no change. Participants were deemed to have met the criteria for clinically significant change when their reliable change index was greater than 1.96 and their dependence score at three months was 9 or less. Using the same model, substance group emerged as a significant predictor ($p<.05$) of clinically significant change. The correlation coefficient for age was significant at the .06 level and emerged as the variable most closely approaching significance. Age and substance group are variables which are highly related in the study sample. These data are presented below in Table 9.22.

Predictors of clinically significant change in dependence at twelve months were examined by using functioning variables (dependence, psychological health, social satisfaction, attempts to control use and coping strategies at three months and the number of treatment events between three and twelve months. The only significant predictor of clinically significant change in dependence between three months and twelve months was total dependence score at three months ($B=.0911$; S.E. = .0442; $df\ 1$; $p<.04$; $R=.1456$).

Table 9.22 *Logistic regression analysis for prediction of clinically significant change in dependence at three months :Beta (the correlation coefficient), degrees of freedom (df), R (the amount of variance explained) and levels of significance for 9 independent variables: Sample 6c (n = 101)*

Variable	Beta	S. E.	df	sig	R
age	.06	.03	1	.06	.12
sex	.19	.55	1	.74	.00
substance	-.02	.01	1	.03	-.15
LDQ t1	-.03	.04	1	.42	.00
GHQ t1	.02	.08	1	.85	.00
SSQ t1	-.02	.05	1	.72	.00
ICSAC t1	-.00	.06	1	.97	.00
CBI t1	-.02	.01	1	.11	-.07
treatment t1-t2	.12	.10	1	.22	.00
constant	.86	1.65	1	.60	

Predictors of change in dependence were examined for individuals who had high dependence scores at intake. High dependence was computed as a total LDQ score equal to or greater than 24 at intake. None of the independent variables in the model predicted statistically reliable change in dependence between intake and three months. Nor did they predict clinically significant change in dependence between intake and three months. No further tests were run for this group. However, this was a very small sample of 39 participants: although 48 individuals in the sample seen at three months fulfilled the criteria for high dependence at intake, complete data were not available for 9 of these.

9.5 Predictors of change in substance use

Predictors of change in dependence proved elusive given the measures used in the present study. By way of comparison, predictors of two measures of use were examined; these were the dichotomous dependent variable: abstinent or using during the past seven days and the change, between intake and three months and between three months and twelve months, in the number of days per week using the substance. When abstinence at three months was computed as a

dichotomous dependent variable, number of treatment events between intake and three months emerged as the one significant predictor in logistic regression analysis (see Table 9.23).

Table 9.23 *Logistic regression analysis for the dependent variable: abstinent or not during the past seven days at three month follow-up: Sample 6a (n=151)*

Variable	Beta	Standard error	df	Significance	R
Age	.01	.02	1	.52	.00
Sex	-.82	.47	1	.08	-.07
Substance	-.01	.01	1	.26	.00
LDQ t1	.00	.03	1	.89	.00
GHQ t1	-.02	.06	1	.80	.00
SSQ t1	-.04	.04	1	.37	.00
ICSAC t1	.08	.04	1	.07	.08
CBI t1	.00	.01	1	.92	.00
treatment t1 to t2	.20	.09	1	.02	.14
Constant	.15	1.27	1	.91	

When abstinence or not at twelve month follow-up was the dependent variable regressed on the three demographic variables and functioning variables measured at three months, none of the independent variables had correlations with significance $<.05$ with the dependent variable. Dependence score at three months was the independent variable showing a correlation with abstinence at twelve months which was closest to reaching significance. ($p<.07$, see Table 9.24).

The second variable referring to the use of the substance was the number of days using in the past week. A difference score was computed for the number of days per week using at three months compared to intake (by subtraction) and at twelve months compared to three months. Three of the independent variables emerged as being significantly correlated with this dependent variable when the other independent variables had been accounted for. These were substance group, dependence at intake and the number of treatment events between intake and three months. The data are presented in Table 9.25.

Table 9.24 *Logistic regression analysis for the dependent variable: abstinent or not during the past seven days at twelve month follow-up: Sample 6c (n=101)*

Variable	Beta	Standard error	df	Significance	R
Age	.02	.03	1	.67	.00
Sex	-.28	.53	1	.59	.00
Substance	-.01	.01	1	.37	.00
LDQ t2	-.07	.04	1	.07	-.10
GHQ t2	.13	.08	1	.12	.06
SSQ t2	-.05	.04	1	.22	.00
ICSAC t2	.01	.05	1	.79	.00
CBI t2	.01	.01	1	.54	.00
treatment t2 to t3	-.03	.04	1	.52	.00
Constant	.90	1.51	1	.55	

Table 9.25 *Linear regression analysis for the dependent variable: change in number of days per week using in the past week between intake and three months: Sample 6a (n=151)*

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.08	1.84		-.59	.56
age	2.96E-02	.03	.09	.89	.37
sex	.85	.64	.10	1.32	.19
substance	-1.77E-02	.01	-.24	-2.29	.02
LDQ t1	.12	.04	.26	2.80	.01
GHQ t1	.12	.09	.12	1.30	.19
SSQ t1	-5.29E-02	.06	-.08	-.93	.35
ICSAC t1	-1.88E-02	.06	-.03	-.31	.75
CBI t1	-3.16E-03	.02	-.02	-.21	.83
treatment t1 to t2	.55	.12	.36	4.64	.00

When the change in number of days per week using during the past week was investigated at twelve months with psychological and social functioning variables measured at three months and number of treatments between three months and twelve months as independent variables, dependence at three months emerged as the sole significant predictor variable (see Table 9.26).

Table 9.26 *Linear regression analysis for change in the number of days per week using in the past week between three months and twelve months: Sample 6c (n=101)*

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	1.99	2.18		.91	.36
age	-3.09E-02	.04	-.11	-.77	.44
sex	7.71E-02	.76	.01	.10	.92
substance	-7.23E-03	.01	-.10	-.76	.45
LDQ t2	.11	.05	.27	2.03	.04
GHQ t2	.14	.12	.17	1.14	.26
SSQ t2	4.09E-02	.07	.07	.62	.54
ICSAC t2	-4.61E-02	.07	-.06	-.62	.54
CBI t2	-1.28E-02	.02	-.07	-.73	.46
treatment t2 to t3	-4.34E-02	.06	-.07	-.71	.48

In the regression analyses reported above it was possible to identify more variables which predicted use of the substance than had been shown in the previous analyses for predicting change in dependence.

9.6 Summary

In the foregoing analyses, changes in dependence were shown to occur between intake and three months and in the main these changes were significant and in the direction of improvement. Such changes continued to occur between three months and twelve months, but as dependence diminished for some, it increased for others during the second follow-up period. Two groups seemed to emerge, one which changed during the first three month follow-up period and did not change much thereafter and one which did not change to begin with, whose course of change could be said to be more gradual. The method of data collection used in this study does not allow a precise identification of when these changes occurred.

When the correlates of change were examined with particular reference to the study hypotheses and the relationship between change in dependence and coping strategies, some significant findings emerged. At each of the data collection points, there was a greater frequency of

the use of cognitive compared to behavioural coping but the ratio of cognitive to behavioural coping changed in the high dependence group who showed a significant reduction in their level of substance use. Moreover, there was a significantly greater frequency of use of behavioural coping in the high dependence group in those people who became abstinent compared to those who did not. Such a difference was not found for the frequency of the use of cognitive coping in this high dependence group. On the other hand, in the low dependence group, there was a significantly greater frequency of use of both cognitive and behavioural coping in those who became abstinent at three months compared to those who did not. These findings suggest that behavioural coping may be more important to people with high levels of dependence than are cognitive coping strategies, but they also suggest that both forms of coping are equally used by people with low levels of dependence who change. Furthermore, the difference between the use of coping strategies in the low dependence groups that did and did not become abstinent is greater than in the high dependence group. This finding is at odds with the idea that people with high dependence might need to use more coping in order to change their substance use than people with low dependence. However, these results did suggest that something may be going on in those people who have high dependence and achieve abstinence and also in those who achieve reliable change in their level of dependence with regard to the coping strategies they use; the positive correlation found in the high dependence group between the amount of change in dependence and the frequency of behavioural coping, coupled with the relatively but not absolutely higher ratio of behavioural to cognitive coping in this group are further supportive of this possibility.

The model constructed for the purpose of investigating the variables which were predictive of dependence at three months and at twelve months included scores for coping at intake but this was not found to predict change in dependence either as a continuous variable or as a dichotomous variable. It may be that coping was affected by treatment and treatment had an effect on use which in turn has an effect on dependence. The coping strategies literature described in Chapter 6 was suggestive of a relationship between treatment and an increase in the use of behavioural coping; in the foregoing analysis, treatment was shown to be a predictor variable when abstinence or use was the dichotomous dependent variable, but not when a change in dependence was the dependent variable. Possible implications are discussed in Chapter 10.

Chapter 10

Discussion

10.0 Background to the thesis revisited

The purpose of this thesis was to examine the question of whether dependence changed, to chart and describe the course of change to the extent that it did occur and to identify the factors which influenced the nature of such change. I suggested that much of the research in this subject has focussed on the development of dependence and the measurement of the condition once developed. Little attention has been paid to the course of change and particularly the course of decline. Other researchers have argued that dependence, once established, does not decline, that even in the absence of the use of the substance it endures and immediately manifests itself in its former state once use has resumed. Alternatively, dependence has been ignored by researchers as being irrelevant and use of the substance has been the primary focus of concern.

The reason for exploring the nature of change in dependence was the view that dependence is of central importance in the development of effective treatments, the quality of treatment planning decisions, the design of outcome evaluation and the interpretation of outcome data. Use of the substance has increasingly come to occupy a central place in the determination of treatment outcome goals; politicians and commissioners like to report on how many people no longer use drugs or drink alcohol beyond safe limits. The treatment provider, while concerned with these goals because they are closely associated with physical, psychological and social harm may nonetheless be equally concerned with the question of whether outcomes of abstinence or controlled use are likely to endure in the longer term. Environmental factors are clearly important in determining the longer term future of these outcomes but it has been the view of researchers and clinicians in the field that dependence at the individual level also plays a significant role. It is at the individual level that treatment services operate.

The clinical goal of arresting further deterioration in health, psychological and social functioning means that future behaviour is constantly the focus of intervention. The relationship between use and dependence and the ability of dependence to predict future use is a question of considerable importance.

Rankin and his colleagues emphasised the importance of recognising the role of dependence

in understanding drinking behaviour and deciding drinking goals in treatment. They pointed to the controversy over the possibility of achieving a controlled drinking goal as a debate which was insufficiently informed by insights into the importance of degrees of dependence. They devised a simple behavioural measure of dependence (Rankin *et al.* 1980) and called for the recording of further behavioural manifestations of dependence including those that did not require the consumption of alcohol. The Leeds Dependence Questionnaire (LDQ) is thought to be precisely such a measure, capable of rating severity of dependence in abstinence and detecting change over time. It measures those manifestations of dependence that include thoughts which are beliefs about and attitudes to the use of the substance, and behaviours which characterise the nature of such use.

10.1 The contribution of the thesis to the body of research on dependence

Four hypotheses were stated as null hypotheses at the outset of the study: 1) Dependence, once established, does not diminish over time; as dependence was shown to diminish over time this hypothesis can be rejected. 2) Change in dependence cannot be predicted by pre-treatment demographic characteristics or psychological and social functioning. Significant negative correlations were found between social dissatisfaction and change in dependence at three months and at twelve months; the substance used was the only variable, other than dependence at intake, found to predict change in dependence and the null hypothesis can therefore be rejected. 3) Individuals with high dependence who change (in level of dependence or of use of the substance) use the same coping strategies (cognitive/behavioural) and in the same degree as individuals with low dependence who change. There was evidence that individuals with high dependence who became abstinent used significantly more behavioural coping than those who did not become abstinent, whereas individuals with low dependence who became abstinent used significantly more of all coping strategies than those who did not become abstinent. There was a significant association between behavioural coping and amount of change in level of dependence in those with high dependence, but no such relationship between coping and amount of change in dependence for those with low dependence. This null hypothesis can therefore be rejected. 4) The measurement of impaired control, one component of dependence, has equal predictive validity to the measurement of dependence. While impaired control correlates very highly with dependence, it did not predict change in dependence and it was possibly not the case that dependence at baseline did either. Dependence at baseline did however predict some changes in use which impaired control did not

and on this basis, the null hypothesis can be rejected.

A contribution of this thesis to the body of research on dependence is the measurement of dependence as the principal change measure in a clinic attending population. Preliminary studies investigated further the psychometric properties of the LDQ and demonstrated its ability to measure dependence in abstinence. In the main study, the instrument was shown to be capable of measuring changes over time.

Two instruments, which were developed for measurement in problem drinkers, were adapted for use with heroin users; adaptation and validation of these instruments was also part of the preliminary work in the present thesis. As increasing emphasis is placed upon the commonalities in dependence across the different substances, and treatment agencies begin to combine treatments for dependence on different substances, there is a concurrent need to have available measurement instruments which are capable of measuring the same psychological phenomena across substance using groups.

10.1.1 Dependence declines over time

Dependence as measured by the LDQ was shown to decline over time. A method of determining the extent to which such decline was reliably measured and was clinically significant was applied. Thus it was possible to attribute different levels of meaning to the findings regarding degrees of change in dependence as well as to assert with confidence when such changes had occurred. The application of these criteria contribute to the body of research on outcomes in substance dependence which has tended to focus on measuring change in use and in substance related problems and to which the criteria for reliability and clinical significance have not been applied.

As described in Chapter 1, there are different ways of looking at dependence. Some view dependence as that which determines the nature and pattern of use, while others view use of the substance as that which determines dependence. The relationships between use and dependence were examined and found to be correlated but not perfectly. Dependence was shown to endure once use of the substance had ceased and it may be that it is the endurance of the conditioned responses which constitute the dependent behaviour which are both measured and responsible for the frequency of relapse.

10.1.2 The nature of change

The treatment literature is replete with references to the application of coping strategies for

the extinction of these conditioned responses, suggested above to be manifest in dependent behaviour (reviews of the literature are in Carroll 1997, Miller and Heather 1998). This literature on coping, coupled with clinical observation formed the background to the hypothesis referring to the implication of coping behaviours in the change or reduction of dependence over time and the suggestion of their differential application in high and low dependence people.

The null hypothesis relating to coping stated that there was no difference between high and low dependence individuals in the sort of coping strategies used and the frequency of their use; the reason for investigating whether there was a difference was the possibility that high dependence individuals would find change more difficult and therefore need to use more behavioural coping as these are normally associated with environmental factors, thus providing environmental support for change. It would appear to be the case that the null hypothesis can be rejected, that a difference was found. The high dependence group who changed both dependence and use (became abstinent) used more behavioural coping than those who did not change and the low dependence group who became abstinent used more of all coping.

The specific findings of note were: the negative correlation between intake measures of dependence and coping for the whole sample suggested that the higher the dependence the lower the frequency of coping strategies used. Dependence was significantly reduced over the first three months and the frequency of use of coping strategies significantly increased. While overall, dependence for the entire cohort did not significantly change between three months and twelve months, it was shown to be the case that for some dependence declined and for some it increased during this time. The overall frequency of coping during this nine month period declined.

When the high dependence group was examined separately it appeared that the frequency of the use of coping in this group was different. First, no significant correlation was found between dependence and coping at intake. The two things appeared not to be related. At three months however, people who had shown high dependence at intake and become abstinent at three months were using behavioural coping significantly more frequently than those who had not become abstinent. Furthermore, in the group of those with high dependence at intake whose dependence scores showed reliable change at three months, a significant positive correlation was found between frequency of behavioural coping and amount of change in dependence. This suggests that people with high dependence use behavioural coping in the course of reducing their dependence and becoming abstinent. It also suggests that coping strategies are modified during a period of help-seeking. At three months there was a significant negative correlation between level of dependence and frequency of the use of all coping in those with high dependence at intake. At

twelve months there was a significant difference in the use of cognitive coping but not in behavioural coping between those who had achieved statistically reliable change between three months and twelve months and those who had not in the high dependence group. This may indicate that people who change at different rates also use different coping strategies in the course of such change.

Low dependence individuals who became abstinent used significantly more of all coping than those who did not become abstinent. No significant correlations were found between amount of change in dependence or the level of dependence at three months and the use of each sort or both sorts of coping strategies. This could be because there was far less scope for change on these measures in this group.

A somewhat weaker finding was that, of those who had reliable change at three months, people with high dependence at intake used behavioural coping more frequently relative to cognitive coping at both intake and three months than those with low dependence. This was shown by computing the ratio of cognitive to behavioural coping; cognitive coping scores showed a higher absolute frequency of use at each data collection point and in all groups but the ratio of behavioural to cognitive coping was higher in the high dependence group whose dependence diminished than in the low dependence group.

There is a possibility that findings relating to change in dependence in the low dependence group were limited by the fact that change in low dependence individuals may be more difficult to measure. If it was the case, as discussed in the further investigations of the LDQ reported in Chapter 4, that the instrument was less sensitive at the lower end of the scale, then some difficulties might emerge in investigating changes in the low dependence group.

10.1.3. Predictors of change in dependence

In regression analyses coping as a whole or as separate cognitive and behavioural scores did not emerge as a significant predictor of change in dependence or of substance use. The question of the relationship between changes in coping and in dependence was not able to be answered with the available data or with the model constructed for investigation of the predictors of change in dependence. It is possible that other mediating factors, for instance the role of treatment, were not identified because they were insufficiently described. Treatment did emerge as a significant predictor of abstinence at three months, suggesting the possibility that use of the substance as the target of treatment mediates between treatment and change in dependence. Questions remain on the way coping is used when dependence is reduced, whether dependence is reduced because of the

application of coping strategies, whether the reduction in dependence is tautological with the application of coping or whether the reduction in dependence is affected by some other variable which is associated with the application of coping strategies.

As to the question of the hypothesis regarding pre-treatment variables, the substance emerged as a significant predictor of clinically significant change in dependence at three months. This finding lends support to the potential importance of distinguishing clinically significant change: no significant difference was found in the amount of change in dependence between the two drug groups in preliminary analysis. No other pre-treatment variables, nor social or psychological functioning were found to predict the outcomes of change in dependence in either of the groups of regression analyses.

10.1.4 Predictors of change in substance use

Although it was the central concern of the thesis to elucidate the nature of change in dependence, the predictors of changes in use were also examined as part of the attempt to investigate the nature of the relationship between dependence and use. On the question of whether dependence determines use or use determines dependence, I have suggested that there may be a difference in the direction of the relationship during the period of developing dependence compared with that which occurs once dependence has been established. The level of dependence at intake was shown significantly to predict the change in the number of days using at three months and the level of dependence at three months was shown significantly to predict the change in the number of days using at twelve months. It is, however, difficult to interpret these findings: the correlation in both cases is a positive one and may again be a measurement artefact. This once more highlights the difficulty in using change scores: the people with the highest dependence had the most scope for change both in dependence and in use.

10.2 On the validity of the findings

The validity of the findings are a function of the method of sampling, the reliability of the instruments used and the design of the data analysis; there follows a critical examination of the methodology and analysis, drawing conclusions about the limitations of the findings and some recommendations for the future direction of enquiry in elucidating the nature of change.

10.2.1 The study sample

Since the study was concerned with clinical applicability, it was conducted in a clinical population. The sample, in research of this nature, refers to a subset of the population that is used to gain information about the entire population; according to Henry (1990) it is a model of the population. “A good sample will represent the population well” (p.11) and the extent to which it is able to do this will determine the extent to which findings for the sample can be used to generalise to the target population as a whole. The ability of the study to do this is referred to as its external validity. External validity is a function both of the method of sampling and of the way in which the data are obtained from the sample. The method of sampling has implications not just for the generalisability of the findings but also for their statistical validity. The size of the sample determines the ability to conduct tests that demonstrate relationships and changes in the data; for instance when the sample is of insufficient size for the purpose of crossing the threshold of statistical significance, a Type II error may occur: the null hypothesis cannot be rejected when it is in fact false.

Of central concern to the present study were the implications of the nature of change in dependence for treatment planning and the measurement of outcome; the target population was therefore described as those individuals seeking help for problems of substance misuse and dependence. The study population is the sample chosen to represent the target population, and the quality of the sample selected is determined by its similarity with the target population. A number of methods are available for sample selection. In the present study, a convenience sample was chosen as being able adequately to represent the target population of clinic attenders and the one most likely to yield an adequate number of study participants given the available resources. A convenience sample is described by Henry (1990) as a type of non-probability sample in which cases are selected on the basis of their availability for the study. In a probability sample, every member of the population has a possibility of being included in the sample; this is generally not the case in a non-probability sample where subjective judgements may play a role in the selection of the sample.

Threats to the validity of the study findings result from a number of sources of which sampling bias is one (Henry 1990). The clinical sample selected for the purpose of the present study consisted of consecutive attenders at a specialist agency for the treatment of alcohol and heroin use and dependence. The choice of a single site for recruitment to the study was based upon a calculation of the representativeness of such a sample of the total clinical population of problem alcohol and drug users and the combination of available resources with the availability of cases for

the study.

Although the decision to recruit study participants at the central agency may have resulted in a sample containing smaller numbers of under 16 and over 70 year-olds than could have been selected from the entire clinical population for this agency, inclusion of these age groups may, in the event, be the exception rather than the norm for NHS specialist agencies which are provided as a component of adult psychiatric services.

Once the study sample had been compared with the clinical population from which it derived, the characteristics of the sample, described in Chapter 8 were compared with the characteristics of people with alcohol and drug problems attending treatment agencies elsewhere.

10.2.2 Generalisability of the study sample

The initial sample was 82% of all first time attenders at the study site during the recruitment period and was thought therefore to be a representative sample of this clinic population. The original sample and the ways in which sub-sets of this sample differed from the original were described in detail in Chapter 8.

Comparisons were made between the study sample and other populations of clinic attenders on demographic characteristics: in the study sample, the ratio of men to women in the alcohol group was 3:1 and the ratio of men to women in the heroin group was 4.2:1. The Northern and Yorkshire Substance Misuse Database reported a ratio of 2.6:1 men to women attending agencies for the first time for treatment of alcohol misuse and dependence in the Northern Region (that adjacent to the region of which the study site is part) in the year immediately following the study recruitment period. This ratio was 2.4:1 for the two years preceding and including the year of recruitment in the Northern region and 2.2:1 in the Yorkshire region (Pace 1997). The ratio of men to women attending agencies for the first time for treatment of a drug problem other than alcohol was 3.5:1 in the Northern region and 2.8:1 in the Yorkshire region in the year immediately following the study recruitment period (Pace 1998). The ratio of men to women in the study sample at t1 was slightly higher than that reported for the whole region and the adjacent region but characteristic of the greater proportions of men to women commonly found to attend specialist services. This is likely to be a function of the repeated finding that women drink and take drugs less than men do and experience fewer alcohol and drug problems on all indices than men (Raistrick *et al.* 1999 ch.5; Edwards 1995 ch.1). Also, women with alcohol problems are thought to underutilise treatment services to a greater extent (Schober and Annis 1996; Walitzer and Connors 1997) and for different reasons (Thom 1986) than do men.

The mean age of the alcohol sub-sample of the study sample was 40.4 (SD 12.6) and this concurs with the mean age for first time attenders at specialist agencies in the whole of Yorkshire of which the study site is a part, in the year immediately following the study recruitment period. The mean age for first time attenders with alcohol problems in the Northern region was 39. The mean age of the heroin sub-sample of the study sample was 24; the mean age of first time attenders seeking treatment for drugs other than alcohol in the Northern and Yorkshire regions was 25. Mean age specifically for the heroin help seekers was not reported (Pace 1998). Thus the mean age of the sub-samples in the study population was similar to that of the mean age of agency first time attenders in the wider region and the adjacent region.

Thom (1986) found no differences between men and women in the perceived duration of their alcohol problem prior to attending for specialist treatment; in the present study, no significant differences were found between men and women in their reported duration of either alcohol use or problem alcohol use in the alcohol sub-sample and none were found between men and women in the heroin sub-sample in their reported duration of use and of problem use (see Chapter 8). The reported duration of use and of problem use in the alcohol sub-sample were both far greater than those reported by the heroin users and this difference is consistent with what would be expected given the difference in mean age between the two substance groups.

10.2.3 Non-response bias

A further threat to the validity of the study findings is non-response bias. Attempts are made to minimise this source of bias by maximising the number of respondents contacted at follow-up and by maximising the amount of information available on those who did not participate in follow-up. In the present study, follow-up rates planned for the purpose of conducting statistical analyses of the findings were higher than those actually obtained.

Alcohol and drug misusers are notoriously difficult to trace at follow-up, the more so in the case of drug users than alcohol users (Cottler *et al.* 1996) and this was found to be the case in the present study. A number of reasons are proposed: this is often a highly transient group due to the financial and domestic harms caused by substance misuse; the illicit nature of some of the activities involved mean that people may not be keen to be traced or may be incarcerated in prison, and there is a relatively high mortality rate compared with the general population. Information regarding the study participants who were accounted for but did not participate in follow-up, described in Chapter 7, sections 7.3.3 and 7.3.4, lends support to this picture.

There was little opportunity to verify the address given at intake when individuals were seen

at the central agency and it may be that, of the 38 individuals that it was not possible to trace at three months (see Chapter 7 section 7.3.3), some had given an inaccurate or a false address at the outset. Some attempt could be made to ascertain the stability of the accommodation when seeking consent for follow-up and routine recording of telephone numbers both for study participants and locators could be established. Family members may be the most stable locator and study participants could be more actively encouraged to give consent for them to be contacted.

In the present study, 52% of the 79 participants not seen at three month follow-up were accounted for leaving 38 individuals or 16.5% of the initial sample unaccounted for at this point (see Chapter 7 section 7.3.3). At the twelve month follow-up point, 41 individuals or 17.8% were unaccounted for (see Chapter 7 section 7.3.4) with some overlap between this number and the number not accounted for at 3 months. Thus the proportion of study participants for whom no information at all was available was relatively small. Additional resource for follow-up would have made possible additional attempts to locate people where there was reason to think they were could be found at their address at some time. If prior permission were sought with the initial consent for follow-up, further attempts could be made through locators, through general practice and police records. In Chapter 7 the success of further follow-up attempts was described: there were diminishing returns with the increasing number of attempts made. Improved quality of information collected at intake could improve the results of additional follow-up attempts.

Description of the sub-set of participants who were followed up and comparison with those who were not provides the basis for qualifying the applicability of the study findings. Differences found on baseline measures between those who were and were not seen for follow-up are described in Chapter 8. The overall conclusion from the comparisons of those seen and not seen at three months (t2) and at twelve months (t3) were that women were more likely to be followed up than men and greater proportions of the alcohol group were seen than of the heroin group. Those not seen at t2 and at t3 were significantly younger than those seen. Baseline dependence scores were significantly higher for those not seen at t2 compared with those seen and baseline social satisfaction scores suggested greater social dissatisfaction at t1 in those not seen at twelve months compared with those seen at twelve months. Thus, where significant differences in baseline data were found, the trend was towards greater severity in the participants who were not located or not available for follow-up. There may be a bias in the study findings which operates against younger males and heroin users who have a greater severity of problems and do not engage in treatment.

Incomplete responses to items in the questionnaire battery may render some of the scales unusable for analysis. Those supervising the completion of the questionnaires were instructed to

check completion of each instrument and of each item within each instrument. Nonetheless some questionnaires had missing items and where no more than two items were missing a method of pro-rating, by calculating the mean for the remaining items, was used. On a very few occasions, whole questionnaires were missing and this occurrence was specified in the presentation of the data in the foregoing chapters. This highlights the need for constant vigilance during the process of data collection.

10.3 Reliability of the methods of data collection

In this section, the methods of data collection are described, further possible sources of bias and the reliability of the interview and the self-completion scales are discussed.

10.3.1 Self-report

Sources of bias in self-report were discussed in Chapter 4; the literature on the veracity of self-report in this client group was reviewed and it was concluded that, although this method is by no means completely reliable, there is some doubt that other methods are superior. The relative benefits of using the method of obtaining data by self-report overrode the benefits of other methods of data collection for the purpose of the present study. Two additional considerations were central, one being the resource available for the study and the other being the applicability of the method and findings. The latter consideration necessitated the use of measures which are appropriate for routine use in a busy NHS addiction clinic (Tober *et al.* 2000).

Questions of the reliability of self-report are relevant both in the use of self-completion instruments and in the interview method. Self-completion was the method of choice in the development of the LDQ for reasons of speed of obtaining the data and the finding that the data provided were satisfactorily accurate. The use of interview schedules for ratings of dependence, for example the Edinburgh Alcohol Dependence Scale (EADS) (Chick 1980a) against which the Short-form Alcohol Dependence Data (SADD) was validated, (Davidson and Raistrick 1986) was deemed to be excessively time consuming at twenty-five minutes for routine use. Additionally, though Chick (1980a) reported high inter-rater reliability for the use of the EADS, he also reported that “on some items inadequate information was elicited by the unpractised interviewer” (p.184) suggesting the need for continuing training, practice and monitoring of reliability.

10.3.2 Social desirability bias

The problem of social desirability as a source of bias in questionnaire and interview response was raised in Chapter 3. The under-reporting of drinking in all study participants would be an anticipated result of this source of bias, with perhaps more under-reporting of drinking by women than men, if the suggested greater stigma attached to female excessive drinking compared with male excessive drinking is correct. In her study of barriers to treatment for women, Thom (1986) did not confirm the hypothesis that social stigma was one such barrier. An interesting and unusual finding in the present study was that women reported drinking on more days of the week than men (a mean of 5.8 days for women compared with 4.3 days for men), a mean that is so high as to render the possibility of under-reporting to be unlikely. The suggestion of over-reporting, made in Chapter 3 with reference to heroin users would not have the same rationale for problem drinkers.

The finding of greater frequency of drinking in women is at odds with the epidemiological findings regarding gender differences in patterns of alcohol consumption. Fillmore *et al.* (1997) have noted a universal gender difference which transcends culture and social context (p. 27) wherein “women tend to drink less frequently and in smaller quantities than men”. Could it be that the response bias resulting from social desirability operated for men and resulted in an under-reporting of their drinking, or might this be a true finding? A possible explanation for this finding is that women are also found to enter treatment later in their drinking career and it has been suggested that this too may be due to the greater stigma thought to be attached to problem drinking in women compared to that in men (Walitzer and Connors 1997); although these authors assert that gender differences are insufficiently researched in treatment populations due to the under-representation of women, it may be that population gender differences are cancelled out in clinical populations because women seek help later and therefore when their problems have become more severe.

10.3.3 Reliability of the instruments

In order to enhance the quality of self-report data, various recommendations that were discussed in Chapter 3 were adopted in the present study. Some of these were relevant to the instruments used and some were relevant both to the method of conducting the short interview and to its content.

Midanik (1988) proposed attention to three key areas: the effects of bounded and unbounded reference points on the temporal judgements of respondents, the effects of complex concepts and

the effects of conditioning on responses. In the present study, the reference periods varied for the different self-completion scales used in order to remain faithful to the original scale in its validated form and to preserve consistency with the meaning of the construct. The Leeds Dependence Questionnaire enquires about the past week. The General Health Questionnaire enquires about the past month, a time frame retained from the original validation of the scale. The Social Satisfaction Questionnaire enquires directly about present satisfaction. Instructions for the Coping Behaviours Inventory were also in line with the original scale, enquiring about which method the respondent has used and implying ever. Adhering to the validated form of each scale was considered to be of paramount importance, with one exception. In its validated form the Impaired Control Scale (ICS) enquired about the past six months. As this time scale was twice as long as the first follow-up period in the present study, and because the ICS was thought to measure a component of dependence which was anticipated to be capable of change over a much shorter time scale than this, a change in the time reference was proposed. In a personal communication with N. Heather, the first author of this scale, it was agreed to reduce the six month time reference of the original to three months for the first two parts of the scale (the third part enquires about beliefs about what would happen now). Although it was suggested that it would have been preferable to enquire about the past week in line with the LDQ, Heather felt that three months would be more consistent with the instructions given during the validation studies. A researcher was available to offer assistance during questionnaire completion when requested, and no queries were reported regarding the time-scales in the different questionnaires.

With reference to the complexity of the instructions or the concepts contained in the individual scale items, a small number of respondents (fewer than ten) queried the meaning of items 5 and 8, as was reported in the validation study (Raistrick *et al.* 1994) and thought at that time not to constitute sufficient grounds for altering this item. Item total correlations for these items in the present study were slightly lower than those for other items in the scale (.44 and .39 compared with .49 for the next lowest correlation and .72 for the highest correlation) but the effect of their removal in raising the alpha coefficient was only marginally greater than the effect of the removal of other items. Readability of the LDQ, at the very least achieving scores consistent with 'fairly easy', and 'standard writing', was reported in Chapter 4.

Conditioning did not appear to be a problem given the considerable differences between the individual scales and the three and nine month time lags between completion of these scales. However, a response set was detected in responses to the Impaired Control Scale and discussed in Chapter 5. Such a finding raises the question of response sets in other scales where it was not

detected.

Tests of the reliability of individual instruments used were reported in the chapters in which the instruments were described.

10.3.4 Reliability of the interview method

The implementation of those recommendations made by Babor *et al.* (1987b) and discussed in Chapter 3 which were relevant to the behaviour of the researchers were described in the procedures section 7.2 of Chapter 7. Respondents were guaranteed confidentiality by separation of the research requirements from the clinical process; on no occasion were data collected by the staff member responsible for the treatment of the patient.

As there were three research assistants in addition to myself who collected the data (one at intake and three at three months and twelve months), weekly meetings were conducted during the follow-up periods for discussion of data collection protocols. Checks were made on the wording of interview questions and the recording of information in order to standardise the process and to maximise the reliability of this method of data collection.

The short interview schedule (see Appendix 5) enquired about use of alcohol or heroin in the past week. The decision to enquire about the past week was that this time frame matched that of the main study measure, the Leeds Dependence Questionnaire and the relationships between use and dependence were the ones of greatest interest. A quantity-frequency method was adopted for simplicity and speed of collecting the information in the present study. This latter requirement was considered to be important particularly at the point of initial data collection in order to minimise the intrusiveness of the study procedures; study participants were attending the agency for treatment of their alcohol or drug problem and thus provided an opportunistic sample for the study. Even though their consent was invariably obtained before administration of any of the study procedures, it was deemed important to keep to the minimum the amount of their time these procedures took up. Miller and Del Boca (1994) suggested that this strategy may “significantly underestimate consumption in problem drinkers..... and be insensitive to fluctuations that occur before and after treatment” (Miller and Del Boca 1994 p.113); this consideration was thought to be relevant to treatment outcomes studies in which the quantity and frequency of drinking was a main outcome measure and therefore required maximum accuracy. As this was not the purpose of the present study, it was thought acceptable to sacrifice maximum accuracy for the sake of minimal intrusion, within reason. The simplicity of the two questions about use during the previous week was thought to have the further advantage of greater inter-rater reliability. The sorts of correlations among use

scores and dependence scores that were found in the validation study of the LDQ were replicated in the present study both at intake and at the follow-up points, lending support to the reliability of this method.

10.4 Analysis of the data

Analysis of the data was conducted in a number of steps. In Chapter 7, the participants who were seen for follow-up at three months and at twelve months were described and compared them with those not seen; their scores and results of short interviews at each of the follow-up points were also presented. Differences in mean scores were presented in order to investigate whether any change in these had occurred. There followed a closer examination of the nature of the change and in Chapter 9 the correlates and predictors of change in dependence were explored. Bi-variate correlational analysis was used to examine the relationships between dependence and other variables, followed by regression analyses to examine the effect of these different variables on the outcome of change in dependence when the relationship between the different variables was accounted for. Issues arising from this analysis plan are discussed below.

10.4.1 Problems with the use of difference scores for cohort analytical studies

Cronbach and Furby (1970) warned against the use of change scores on several grounds: change scores have different meanings for different individuals depending upon the starting point or pretest score; measurement errors or the unreliability of the instrument are compounded in change scores. However, Rogosa, Brandt and Zimowski (1982) argued that this is not necessarily the case, claiming that “the difference between two fallible measures can be nearly as reliable as the measures themselves” (p. 744). They used a growth model to show that the difference score can be an accurate and useful measure of individual change, even in situations where reliability is low (p. 730). Their analyses are restricted to the special case of linear growth whereas in the present study differences in dependence scores across the three data collection points are complex and not unidirectional, as described in Chapter 9.

In the present study, individuals with low dependence scores at the outset have less scope for change than individuals who start out with high dependence. Thus people with small change scores may be low dependence individuals who had achieved the maximum possible change for them as measured by the LDQ or high dependence individuals who did not change very much. If an absence of dependence or low dependence is the outcome which is sought, then the dependence

score at the follow-up points would be an acceptable measurement. If the amount of change, or in the case of the present study, the nature of change is the focus of the investigation, the use of change scores would seem to be necessary. The question then is how to interpret change scores.

10.4.2 Criteria for interpreting the significance of changes in dependence

As the purpose of the present study was to examine the nature of change in dependence, some criteria for assessing the question of when meaningful change on the key metric could be said to have occurred were required. In Chapter 9, methods for calculating both statistically reliable and clinically significant change were applied in the analysis of the correlates and the predictors of change. In outlining a method for determining the criteria for statistically reliable change, Jacobson *et al.* (1999) proposed that “the magnitude of the change can be said to be statistically reliable when it exceeds that which could be attributed to chance or measurement error” (Jacobson *et al.* 1999 p. 300). The reliable change index (RCI) proposed by Jacobson and Truax (1991) for establishing whether statistically reliable change had occurred, described briefly in Chapter 9, involved dividing the magnitude of change during the course of therapy (or the measurement period) by the standard error of the difference score and in this way was designed to distinguish real change from change that would result from fluctuations of an imprecise measuring instrument. Reliable change scores were computed for the follow-up samples and applied in analysis of the predictors of change in dependence. Jacobson *et al.* (1999) describe this metric as being capable of determining clinical improvement as well as clinical deterioration.

Clinically significant change, according to Jacobson and his colleagues, can be said to have occurred when clients end up within the range that renders them indistinguishable from well-functioning people (Jacobson *et al.* 1999 p. 300) though they state that depending upon the nature of the condition and how much change it is realistic to expect, this criterion may potentially be excessively stringent. Furthermore, the question of where people end up may be of greater interest as a treatment outcome criterion than a criterion for examining the nature of change as in the case of the present study. However, since the study population was a treatment population, application of this criterion to changes in dependence in the follow-up samples was explored.

Three methods were proposed for demonstrating that clients had moved from the dysfunctional to the functional and these were described in Chapter 9; these methods have differing degrees of stringency and the choice of which one to use may depend upon the availability of normative data. The stringency of these methods is said to be a function of the degree of overlap between the two distributions, the functional or normal and the dysfunctional (Jacobson *et al.* 1999

p. 301). In the first of these three methods, the cut-off point for asserting that a move from the dysfunctional to the functional has occurred is said to be reached with scores that fall outside the range of the dysfunctional behaviour, where the range is described as being two standard deviations in the direction of improvement.

To apply this method in order to meet the criterion “that clients end up within the range that renders them indistinguishable from well-functioning people”, the calculation of clinically significant change would be based upon the mean dependence scores for the study population or a similar clinic attending population. Mean dependence score for the entire study population ($n = 230$) was 20.2 with a standard deviation of 7 (see Chapter 8). When the sample was divided by substance, the heroin group had a mean dependence score of 21.2 with a standard deviation of 6.3 and the alcohol group had a mean dependence score of 18.2 with a standard deviation of 7.8. In a larger sample of people attending both the same agency at a different time and a similar agency in a different geographical population ($n = 1681$, Heather *et al.* submitted), the mean dependence score for the entire sample was found to be 19.7 with a standard deviation of 7.6; the heroin sub-sample had a mean dependence score of 21.6, standard deviation 6.7 and the alcohol sample had a mean dependence score of 18.4, standard deviation 8. The similarity in these sample means justified the use of either as being representative of dysfunctionality in this sort of clinic attending population. The cut-off point calculated for significant change (on the basis of scores for the study sample) would be a mean dependence score of 6.1 for the whole group or 8.5 for individuals with heroin dependence and 2.6 for the individuals with alcohol dependence.

In the second method, the cut-off point is reached when scores fall within the functional range where the range is set at two standard deviations above (in the case of the measurement of dependence) the measurement for the normal population. If the second method were to be used, a general population measure of dependence as measured by the LDQ was required. Such a measure was reported in the validation of the LDQ, albeit in a very small ($n = 14$) general practice sample, to be a mean total score of 3.1 with a standard deviation of 3.2 (Raistrick *et al.* 1994). If this rough measure were used as a bench mark, examination of change would be focussed on those participants whose t_2 and or t_3 scores for dependence were 9.5 and less. Thus, in line with the findings reported by Jacobson *et al.* (1999), the second method was found to be the less stringent of the two.

The third method requires that the individual is statistically significantly more likely to belong to the functioning group than the dysfunctional group, and the sample from which normative dependence data could be derived for this purpose, as described above may not be sufficiently large. Thus one could establish with greater certainty that outcome measures were statistically

significantly different from dysfunctional group scores but the reliability of the mean score for the functioning group is less certain.

Jacobson *et al.* (1999) argue that the method they propose enables them to distinguish, in clinical populations, “the percentage of clients who improved but did not recover, the percentage of clients who recovered and the percentage of clients who remained unchanged or who deteriorated” (p. 300). Kazdin (1999) suggested that the measure of reliable change alone was useful in that the purpose of judging treatment outcomes might be well served by establishing degrees of improvement that do not necessarily render the individual within the range of well functioning people but can be shown to result in improved coping on the everyday level and therefore constitute a realistic and reasonable goal of treatment.

The analyses in Chapter 9 were based on the decision that all change was of interest in the present study, that confining change to that which was clinically significant would exclude those who had change but who, in the words of Jacobson *et al.* were improved but not recovered. In the calculation of clinically significant change, the general population score used was derived from a very small sample, though application of the more stringent of the criteria for clinically significant change, that the end point score would fall outside two standard deviations below the mean dependence score at intake (taken as the norm for the dysfunctional group) produced a very small group for analysis. Nonetheless, application of one and of both the criteria did produce some interesting data: 50% of the cohort seen for follow-up at three months had achieved reliable change in the direction of improvement in level of dependence. A third also had clinically significant change, was made up of equal proportions of each of the substance groups and deteriorated over the next nine months. Another group achieved nearly no change in dependence between intake and three months but clinically significant change between three months and twelve months. Further work is required to look at what distinguishes the two groups. In conclusion, all change is worthy of examination, but the fact of change as suggested by statistically significant differences in mean scores does requires further scrutiny. An amount of change will inevitably occur: referred to as regression to the mean, good scores will get worse and bad scores will improve. Criteria are required to establish when change in scores is due to factors other than such natural regression or to unreliability of the measuring instruments and for interpreting the meaning of such change from individually differing starting points. For future calculations of reliable change, larger general population samples at least are required.

10.4.3 Constructing hypotheses and models to test them

The nature of change in dependence was the subject of this study; measurement of change in dependence was described and exploratory analysis of the correlates of change was conducted. In order further to investigate which factors might be relevant in influencing such change, in determining whether change occurred or not, regression analyses were used. The question of whether change had occurred or not seemed an appropriate outcome in that investigation could proceed along the lines of distinguishing those characteristics which were or were not associated with this outcome. Presenting the outcome as a dichotomous measure addressed one of the issues raised in the investigation of the response choices, reported in Chapter 4; there was a suggestion that the LDQ might be less sensitive at the lower end of the dependence scale, implying that the measure might not be continuous, that the difference between scores at the high end may not be equivalent to the distance between scores at the lower end. Use of the dichotomous measure of change/no change takes account of this possibility. For this reason, logistic regression analysis was used. On the other hand, computation of a dichotomous variable of change and no change collapses the whole range of change in dependence scores into two categories and may restrict the opportunity to explore the nature of such change. Therefore, the amount of change in dependence was also examined and presented as the dependent variable in linear regression analysis.

The model proposed for investigating the role of different variables in predicting such change was implicit in the design of the study and the measures collected. This model was constructed in the following way: pretreatment demographic variables, functioning variables known to be associated with dependence and misuse and number of treatments attended were included for the reasons given below. Differences in patterns of use between the two main substances, coupled with the finding of a significant difference between the mean scores for dependence for each of the substance groups at intake were suggestive that the substance may effect the course of change in dependence. The difference in the age of the two groups was of such a magnitude that it could not be ignored as a potential source of influence on the outcome. Interestingly in this study cohort, women attending the agency (those in Sample 6) were less likely to be abstinent than men in both substance groups and more likely to be using on seven days of the week. They were using smaller quantities of alcohol but similar quantities of heroin to men. It was because of these observed variations that the three pre-treatment variables of substance, age and gender were included in the model for predicting the outcome in dependence.

Problems of psychological health and social functioning are commonly associated with dependence problems and constitute a focus for treatment. There is evidence for the contribution of

dependence in the development of psychological and social problems and the reverse: the development of dependence in people with psychological and social problems (Drummond 1992; Robins 1992). Measures of both psychological health and social functioning are commonly used in treatment outcome studies. In the present study, the measure of psychological health used was the General Health Questionnaire (GHQ) and the measure of social satisfaction used was the Social Satisfaction Questionnaire (SSQ).

Since dependence and change in dependence were the focus of the study, an additional measure of dependence was sought. In the absence of a suitable measure of substance dependence, a measure of one component of dependence, namely impaired control, was used. The latter two parts of the Impaired Control Scale performed very similarly to the LDQ and positive correlations between dependence scores and scores on these items were shown. The first part of the scale, consisting of the attempts to control items, performed differently, showing negative correlations with dependence as measured by the LDQ. The first part of the Impaired Control Scale was therefore included in the model constructed to investigate the predictors of change in dependence.

Coping was the main variable in the hypotheses regarding elucidation of the nature of change. Choice of the CBI to measure coping was described in Chapter 6. The five variables: psychological health and social functioning, dependence at intake, attempts to control and coping were subjected to factor analysis and shown to be independent variables. This justified their inclusion in the model to be used for the purpose of predicting change in dependence. Carr-Hill *et al.* (1987) have described the way that erroneous conclusions can be drawn when variables, assumed to be independent and entered into regression analysis as independent variables, are not in fact independent. They also caution against the arbitrary selection of variables and the making of unfounded assumptions about the direction of the relationship between them which can lead to erroneous conclusions in spite of apparently sound statistical procedures.

In order to examine the predictors of change in dependence, two types of regression analysis were conducted using the model described above. Linear regression analysis was conducted with change in dependence as the dependent variable. This approach was used in order to retain the whole spectrum of change that occurred. The sole significant predictor of change in dependence at both three months and twelve months was dependence at intake. In order to examine the predictors of the dichotomous outcome change/no change independence, based upon the criteria for clinically significant change, logistic regression analysis was conducted. Logistic regression analysis “is especially useful when the distribution of responses on the dependent variable is expected to be nonlinear with one or more of the independent variables” (Tabachnik and Fidell 1996 p. 575).

Substance group emerged as a significant predictor ($p < .05$) at three months and dependence at three months was a significant predictor of clinically significant change at twelve months. Thus in the main, the two types of analysis produced the same predictor variables with the exception of a role identified for substance group in the prediction of change at three months. No significant difference had been found between the mean change scores for the heroin compared to the alcohol group at three months in the entire sample but the mean change score for the heroin group (16.8) was significantly higher ($p < .01$) than the mean change score for the alcohol group (11.6) in those who had achieved clinically significant change at three months.

The question of whether changes in use of the substance are more directly influenced by the independent variables measured was examined. The model constructed for the purpose of examining the predictors of change in dependence was used to examine the predictors of a dichotomous use outcome (abstinence or use at three months and at twelve months) and a continuous use outcome (change in number of days using between intake and three months and between three months and twelve months). Treatment emerged as a significant predictor of abstinence at three months but not at twelve months. The independent variable which accounted for the largest amount of variance in the abstinence outcome at twelve months was dependence at intake but it only reached a level of significance of $< .07$. When predictors of the change in the number of days using between intake and three months was explored, three significant independent variables emerged: drug group ($p < .03$), dependence at intake ($p < .01$) and number of treatments ($p < .001$). Dependence at three months alone emerged as a significant predictor ($p < .05$) of change in number of days using between three months and twelve months.

It may be that the assumptions used in the construction of the model for regression analysis were not well founded or that the measurement points were not appropriate for finding factors predictive of dependence. In constructing the model for examining predictors of change in dependence, the question of how coping itself might have changed and how, in turn, such change might have affected change in dependence emerged. Coping at three months and at twelve months might have thrown light on this question but could not be used in the analyses of predictors of dependence at the same time points due to the possibility of other factors influencing the change in coping at follow-up. The change in coping itself could be subjected to further critical analysis.

10.5 An alternative approach to the design and analysis

From the results of regression analysis it would seem that, of those variables measured in the study, more were found to influence the change in use of the substance than the change in dependence on the substance. This begs a number of questions: is there a different design that might better be able to test the study hypotheses regarding the nature of change in dependence? What other measures might have been useful in elucidating the nature of change in dependence through this sort of analysis? Is the repeated finding of dependence as a predictor of change in dependence more than a statistical artefact? Certainly the higher the initial dependence score the greater the scope there is for change.

That change in dependence occurs over time can be said to have been established. The influences on such change remain less clear; further examination of the data collected in the present study with emphasis on changes in use of the substance and the relationship between use and dependence may shed more light on the course of change in dependence. Of particular importance might be the question of the direction of the influence between use and dependence. In a different design, it would be possible to investigate the relationship between use and dependence by tracking both more closely over time and investigating the questions of whether it is the case that as dependence develops it is driven by use and as it declines it drives use. It may be that the influence of other variables is mediated through use of the substance in the ways suggested above in the discussion of the findings. Treatment was shown to predict changes in use which in turn are associated with changes in dependence. Is the conclusion in either case that use, because of its relative transparency and conceptual simplicity should remain the target of treatment?

10.5.1 *Coping*

That there is a relationship between coping and dependence seems to have been established. The more dependence there is overall, the less coping there is. The two things change and the relationship between them changes. The timing of the respective changes was not identified by the methodology used in this thesis. The design of the analysis was based upon the assumption that coping would influence the level of dependence but it may be that it was the level of dependence which determined the nature of coping, or that the two variables were separately influenced. It was difficult to establish whether change in coping drove change in dependence or that the two changes happened simultaneously. In order further to investigate this relationship, measures of coping, use and dependence might be collected at regular intervals, say one month intervals over a period of

time so that any temporal sequencing could be identified. The relationships between coping and use could be compared more closely with the relationships between coping and dependence and dependence and use. If changes were found to occur simultaneously over these time spans then even closer scrutiny would be indicated in order to elucidate the relationships between them.

It might be the case that the effect of coping on the decline in dependence is mediated through other factors. More accurate data on the extent and nature of treatment, and on the influence of treatment on the application of coping strategies would be useful in the construction of a chain of variables which may be found to act as mediators between coping and dependence. Specifically the hypothesis might be that treatment influenced coping which influenced use which in turn influenced dependence. In an alternative design, a comparison could be made between change in dependence when treatment specifically targeted coping and when it did not. Treatment seeking itself may be a form of coping which affects use of the substance and reductions in use over time lead to reductions in dependence.

10.5.2 The measurement of dependence

Further support for the suitability of the LDQ for routine use was provided in this study. The speed and ease with which respondents were able to complete the scale coupled with the data generated by it commend its use in clinical settings.

The current thesis has highlighted areas for further development of the LDQ: validation in groups of users of drugs other than alcohol and heroin remains to be done; general population norms need to be established on the basis of larger general population samples; sensitivity at the lower end of the dependence spectrum might be improved by the inclusion of an additional response choice and a comparative study of responses to this instrument would need to be conducted to answer this question satisfactorily.

10.6 Is dependence important?

It is my view that dependence is important. Twenty years of clinical practice with problems of substance misuse have persuaded me that the reason that people do not simply give up doing the things that cause them harm is something called dependence. There is no question that dependence, like intelligence, is a complex phenomenon. Like intelligence, its nature is elusive. We think we know what it looks like when it manifests itself. We think it accounts for certain sorts of behaviours and we think people would be better off if they could change it. Dependence seems to me to

account for the nature of the balance between reasons for carrying on and reasons for stopping. These reasons have been termed motivation, and motivation to use or to stop using a substance has proved in itself to be difficult to measure. The approach to its measurement has been the subject of the same sorts of difficulties as the measurement of dependence; is it something people think, something they do, something they feel or something that happens to them, something that they get or have? It was my view that examining coping alongside changes in dependence would help to unravel some of these questions. Finally I have found the concept and its measurement to be meaningful to patients. In the same way I have found to be the case in routine clinical practice, administering the LDQ to participants in all the samples in this study provoked a considerable amount of discussion by way of expansion because of the way that the items were perceived to be meaningful. It is my view that dependence as measured by the LDQ, which taps into the behaviours, thoughts and beliefs of the individual, is the essence of the condition which needs to be the target of intervention in the treatment agency, whether the target is directly or indirectly approached.

If dependence is made up of a set of conditioned responses then procedures such as cue exposure and response prevention would be indicated for its extinction. Treatments based upon these approaches have not met with great success, possibly due to the sheer number of cues to which the dependent behaviour has been conditioned and the difficulty providing a programme of treatment capable of dealing with these. It is unlikely that community, laboratory or clinic based treatments would be able consistently and comprehensively to cover the range of situations which cue dependent substance use. The context of contemporary treatment of dependence is normally the social circumstances in which the dependent individual lives and it is in this context that the behaviour needs to be extinguished. For this reason the teaching of coping strategies has become the focus of treatment. It was therefore one of the aims of the thesis to attempt to elucidate the nature of the relationship between coping and dependence in order better to design such treatments, but that relationship remains unclear.

The sheer amount of theorising on the nature of dependence attests to the complexity of the phenomenon. This thesis has made a small contribution to understanding the course of change in dependence and identifying questions for further research.

Appendix 1

The Leeds Dependence Questionnaire

- ☐ On this page there are questions about the importance of alcohol and/or other drugs in your life.
- ☐ Think about your drinking/other drug use in the **last week** and answer each question ticking the closest answer to how you see yourself.

		Never	Sometimes	Often	Nearly Always
1	Do you find yourself thinking about when you will next be able to have another drink or take more drugs?	.....	.....	.....	.....
2	Is drinking or taking drugs more important than anything else you might do during the day?	.....	.....	.....	.....
3	Do you feel that your need for drink or drugs is too strong to control?	.....	.....	.....	.....
4	Do you plan your days around getting and taking drink or drugs?	.....	.....	.....	.....
5	Do you drink or take drugs in a particular way in order to increase the effect it gives you?	.....	.....	.....	.....
6	Do you take drink or other drugs morning, afternoon and evening?	.....	.....	.....	.....
7	Do you feel you have to carry on drinking or taking drugs once you have started?	.....	.....	.....	.....
8	Is getting the effect you want more important than the particular drink or drug you use?	.....	.....	.....	.....
9	Do you want to take more drink or drugs when the effect starts to wear off?	.....	.....	.....	.....
10	Do you find it difficult to cope with life without drink or drugs?	.....	.....	.....	.....

Appendix 2

Individual item scores in the Leeds Dependence Questionnaire for Sample 2 (n=45) the abstinent sample: Item scores by substance and duration of abstinence.

<i>drug</i>	<i>duration abstinence</i>	<i>item total</i>	<i>item no.</i>									
			1	2	3	4	5	6	7	8	9	10
H	1 wk	16	1	1	2	1	3	1	2	1	2	2
H	2 days	18	1	2	2	2	2	2	1	2	2	2
H	3 mos	0	0	0	0	0	0	0	0	0	0	0
H	11 days	27	3	3	3	3	1	3	3	3	2	3
H	3 days	9	1	1	0	1	1	1	0	0	3	1
H	3 days	27	3	3	3	2	3	2	2	3	3	3
H	3 wks	2	0	0	1	0	0	0	0	0	0	1
H	8 days	11	1	1	1	1	0	0	1	2	2	2
H	3 mos	5	1	0	1	0	0	0	0	3	0	0
H	2 days	0	0	0	0	0	0	0	0	0	0	0
H	3 days	26	3	3	2	3	1	2	3	3	3	3
H	4 wks	13	3	1	0	0	3	3	1	0	1	1
H	3 wks	19	2	3	0	3	2	2	1	1	2	3
H	3 wks	3	0	0	0	0	0	0	3	0	0	0
H	6 wks	0	0	0	0	0	0	0	0	0	0	0
H	2.5 wks	6	1	0	0	0	0	0	1	0	1	3
H	4 days	12	1	0	1	0	0	0	3	3	3	1
H	3 wks	6	1	1	0	1	0	1	1	0	1	0
C	9 wks	10	2	1	2	0	0	0	3	0	0	2
P	4 days	7	0	0	3	0	0	0	3	0	0	1
H	9 mos	9	0	0	0	0	0	0	3	3	3	0
A	4 yrs	1	1	0	0	0	0	0	0	0	0	0
A	16 days	8	1	0	0	0	0	0	2	3	2	0
A	8 mos	1	0	0	1	0	0	0	0	0	0	0
A	34 yrs	0	0	0	0	0	0	0	0	0	0	0
A	7 mos	0	0	0	0	0	0	0	0	0	0	0
A	5 days	19	3	1	3	1	0	1	3	3	1	3
A	2 wks	16	2	1	3	1	0	1	3	1	2	2
A	6 wks	14	3	2	1	0	0	0	1	3	1	3

A	3 wks	8	1	1	1	1	1	1	0	1	1	0
<i>drug</i>	<i>duration</i> <i>abstinence</i>	<i>item</i> <i>total</i>	<i>item</i> <i>no.</i> 1	2	3	4	5	6	7	8	9	10
A	7 mos	9	0	0	0	0	0	0	3	3	3	0
A	16 days	5	0	0	1	0	0	0	3	1	0	0
A	4 mos	6	0	0	0	0	0	0	3	3	0	0
A	2.5 yrs	3	0	0	0	0	0	0	3	0	0	0
H	10 days	2	0	0	0	0	0	0	0	0	0	2
H	6 wks	8	0	0	1	0	0	0	3	0	3	1
H	7 wks	9	1	0	1	1	0	0	1	3	1	1
Am	3 wks	10	2	1	0	1	0	1	1	1	2	1
Am	3 mos	13	1	0	0	0	3	0	3	3	3	0
N	6 yrs	0	0	0	0	0	0	0	0	0	0	0
N	20 yrs	0	0	0	0	0	0	0	0	0	0	0
O	3 mos	12	1	1	1	0	1	1	0	3	1	3
H	1 mo	13	1	1	1	2	3	3	0	0	1	1
H	2 wks	20	1	2	1	1	3	3	3	1	3	2
H	2 mos	0	0	0	0	0	0	0	0	0	0	0
total			42	30	36	25	27	28	63	53	52	47

H = heroin; A = alcohol; C = cocaine; Am = amphetamine; N = nicotine; O = opiates (unspecified);
P = poly drug use

Appendix 3

The Impaired Control Scale (ICS)

Part 1 of three parts

Please tick the alternative that best describes **how often** the following items have applied to you **during the past three months**.

If you have any difficulties filling in this form, please ask the questionnaire administrator to help you.

		Never	Rarely	Sometimes	Often	Always
1	During the past three months, I tried to limit the amount I drank.	.....	.....	.....	.....	.....
2	During the past three months, I tried to resist the opportunity to start drinking.	.....	.....	.....	.....	.....
3	During the past three months, I tried to slow down my drinking.	.....	.....	.....	.....	.....
4	During the past three months, I tried to cut down my drinking (i.e. to drink less).	.....	.....	.....	.....	.....
5	During the past three months, I tried to stop drinking for a period of time.	.....	.....	.....	.....	.....

Appendix 3 (cont.)

The Impaired Control Scale (ICS)

Part 2 of three parts

Tick the alternative which best describes **how often** you have **experienced** the following items **during the past three months**. Please note we are **not** interested in what you **believe** about your drinking, but in what you have **actually done** in the last three months.

Only tick "Never" if you tried to resist drinking but were never able to succeed. If you have not tried to resist drinking at all, just write in "this does not apply to me" at the top of the page. If you have any problems with these instructions, please ask the questionnaire administrator.

		Never Always	Rarely	Sometimes	Often
6	During the last three months, I found it difficult to limit the amount I drank.	..... .....	.....	.....	.....
7	During the last three months, I started drinking even after deciding not to.	..... .....	.....	.....	.....
8	During the last three months, even when I intended having only one or two drinks , I ended up having more.	..... .....	.....	.....	.....
9	During the last three months, I was able to cut down my drinking (ie drink less) when I wanted to.	..... .....	.....	.....	.....
10	During the last three months, I started drinking when I knew it would cause me problems (e.g. problems at work, with family and friends, with the police etc.).	..... .....	.....	.....	.....
11	During the last three months, I was able to stop easily after one or two drinks.	..... .....	.....	.....	.....
12	During the last three months, I was able to stop drinking before getting completely drunk.	..... .....	.....	.....	.....
13	During the last three months, I had an irresistible urge to continue drinking once I had started.	.....	.....	.....	.....

-
- 14 During the last three months, I found it
difficult to resist drinking, even for a
single day.
-
-
- 15 During the last three months, I was able to
slow down my drinking when I wanted to.
-
-
-

Appendix 3 (cont.)

The Impaired Control Scale (ICS)

Part 3 of three parts

In the previous section we asked you about what actually happened with your drinking over the last three months. **In this section we are interested in what would happen to your drinking now**

		Never Always	Rarely	Sometimes	Often
16	I would find it difficult to limit the amount I drink.	..... .....	.....	.....	.....
17	I would start to drink even after deciding not to.	..... .....	.....	.....	.....
18	Even if I intended having only one or two drinks, I would end up having many more.	..... .....	.....	.....	.....
19	I could cut down my drinking (ie drink less) if I wanted to.	..... .....	.....	.....	.....
20	I would start drinking at times when it would cause me problems (e.g. problems at work, with family/friends or with the police ).	..... .....	.....	.....	.....
21	I could stop drinking easily after one or two drinks.	..... .....	.....	.....	.....
22	I could stop drinking before becoming completely drunk.	..... .....	.....	.....	.....
23	I would have an irresistible urge to continue drinking once I had started.	..... .....	.....	.....	.....
24	I would find it difficult to resist drinking, even for a single day.	..... .....	.....	.....	.....

25 I could slow down my drinking if I wanted
to.

.....
.....

Appendix 4

Adapted Impaired Control Scale (ICSdrg): instructions, items and response choices

Part 1 of three parts

Please tick the alternative that best describes **how often** the following items have applied to you **during the past three months**.

If you have any difficulties filling in this form, please ask the questionnaire administrator to help you.

		Never Always	Rarely	Sometimes	Often
1	During the past three months, I tried to limit the amount I used.	..... .....	.....	.....	.....
2	During the past three months, I tried to resist the opportunity to start taking drugs.	..... .....	.....	.....	.....
3	During the past three months, I tried to slow down my drug use.	..... .....	.....	.....	.....
4	During the past three months, I tried to cut down my drug use (i.e. to use less).	..... .....	.....	.....	.....
5	During the past three months, I tried to stop using drugs for a period of time.	..... .....	.....	.....	.....

Appendix 4 (cont)

Adapted Impaired Control Scale (ICSdrg): instructions, items and response choices

Part 2 of three parts

Tick the alternative which best describes **how often** you have **experienced** the following items **during the past three months**. Please note we are **not** interested in what you **believe** about your drug use, but in what you have **actually done** in the last three months.

Only tick "Never" if you tried to resist drug use but were never able to succeed. If you have not tried to resist drug taking at all, just write in "this does not apply to me" at the top of the page. If you have any problems with these instructions, please ask the questionnaire administrator

		Never Always	Rarely	Sometimes	Often
6	During the past three months, I found it difficult to limit the amount I used.	..... .....	.....	.....	.....
7	During the past three months, I started using drugs even after deciding not to.	..... .....	.....	.....	.....
8	During the past three months, even when I intended using only once I ended up having more.	..... .....	.....	.....	.....
9	During the past three months, I was able to cut down (ie use less drugs) when I wanted to.	..... .....	.....	.....	.....
10	During the past three months, I started using drugs when I knew it would cause me problems (e.g. problems at work, with family and friends, with the police etc.).	..... .....	.....	.....	.....
11	During the past three months, I was able to stop easily after one or two hits.	..... .....	.....	.....	.....
12	During the past three months, I was able to stop taking drugs before getting completely stoned.	..... .....	.....	.....	.....
13	During the past three months, I had an irresistible urge to continue using drugs once I had started.	.....	.....	.....	.....

					
14	During the past three months, I found it difficult to resist taking drugs, even for a single day.	.....	.....	.....	.....
					
15	During the past three months, I was able to slow down my drug use when I wanted to.	.....	.....	.....	.....
					

Appendix 4 (cont)

Adapted Impaired Control Scale (ICSdrg): instructions, items and response choices

Part 3 of three parts

In the previous section we asked you about what actually happened with your drug use over the past three months. **In this section we are interested in what would happen to your drug use now.**

		Never Always	Rarely	Sometimes	Often
16	I would find it difficult to limit the amount I use.	..... .....	.....	.....	.....
17	I would start to use even after deciding not to.	..... .....	.....	.....	.....
18	Even if I intended using only once, I would end up doing it much more.	..... .....	.....	.....	.....
19	I could cut down my drug use (ie use less) if I wanted to.	..... .....	.....	.....	.....
20	I would start using at times when it would cause me problems (e.g. problems at work, with family/friends or with the police).	..... .....	.....	.....	.....
21	I could stop taking drugs easily after one or two hits.	..... .....	.....	.....	.....
22	I could stop taking drugs before becoming completely stoned.	..... .....	.....	.....	.....
23	I would have an irresistible urge to continue taking drugs once I had started.	..... .....	.....	.....	.....
24	I would find it difficult to resist taking drugs, even for a single day.	..... .....	.....	.....	.....
25	I could slow down my drug use if I wanted to.	..... .....	.....	.....	.....

Appendix 5

The short interview schedule for measuring quantity and frequency of use

PATIENT DETAILS:-

SUBJECT ID:- LDQ

AGE.....

SEX.....

MAIN SUBSTANCE.....

CURRENT USE:

Number of days per week.....

Amount drunk on heaviest day (alcohol).....

Amount £ spent on heaviest day (heroin).....

HOW LONG USED?.....

HOW LONG PROBLEM USE?.....

ATTEMPTING ABSTINENCE?.....

IF SO HOW LONG ABSTINENT?.....

DATE.....

UNIT NUMBER.....

Appendix 6

Item analysis of the three parts of the adapted Impaired Control Scale (AC, FC, PC): Item total correlations and coefficient alpha; Sample 4 (n=118)

SCALE ITEM	Item total correlation with item deleted	Alpha if item deleted	Alpha
AC*			.88
ICS1	.66	.87	
ICS2	.65	.87	
ICS3	.81	.84	
ICS4	.78	.84	
ICS5	.72	.86	
FC**			.82
ICS6	.48	.80	
ICS7	.49	.80	
ICS8	.58	.79	
ICS9	.61	.79	
ICS10	.31	.82	
ICS11	.46	.80	
ICS12	.40	.81	
ICS13	.60	.79	
ICS14	.48	.80	
ICS15	.56	.79	
PC***			.86
ICS16	.68	.84	
ICS17	.62	.84	
ICS18	.74	.83	
ICS19	.49	.85	
ICS20	.55	.85	
ICS21	.44	.86	
ICS22	.43	.86	
ICS23	.49	.85	
ICS24	.71	.83	
ICS25	.56	.85	

* = attempted control; ** = failed control; *** = perceived control

Appendix 7

Item analysis of the complete Impaired Control Scale : Item total correlations and coefficient alpha: Sample 4 (n=118)

SCALE ITEM	Item total correlation with item deleted	Alpha if item deleted
ICS1	-.28	.82
ICS2	-.37	.83
ICS3	-.34	.83
ICS4	-.26	.82
ICS5	-.28	.83
ICS6	.50	.79
ICS7	.46	.79
ICS8	.56	.79
ICS9	.55	.79
ICS10	.34	.80
ICS11	.37	.80
ICS12	.37	.80
ICS13	.58	.79
ICS14	.46	.79
ICS15	.54	.79
ICS16	.58	.79
ICS17	.61	.79
ICS18	.63	.79
ICS19	.46	.79
ICS20	.48	.79
ICS21	.41	.80
ICS22	.36	.80
ICS23	.51	.79
ICS24	.66	.78
ICS25	.51	.79

Appendix 8

The adapted Impaired Control Scale (ICSdrg): Principal Components Analysis

Sample 4 (n=118; data available for 111)

Part 1: items 1-5 Factors and eigenvalues

Factor	Eigenvalue	% of variance	cumulative %
1	3.43	68.7	68.7
2	.56	11.1	79.8
3	.46	9.3	89.1
4	.33	6.6	95.7
5	.22	4.3	100

Part 1: items 1-5 item loadings on Factor 1

item	Factor 1
1	.78
2	.77
3	.89
4	.87
5	.82

Appendix 8 (cont.)

Part 2: items 6-15 Factors (with eigenvalues over 1) and eigenvalues

Factor	Eigenvalue	% of variance	cumulative %
1	3.84	38.4	38.4
2	1.81	18.2	56.5

Part 2: items 6-15 item loadings on Factors 1 and 2

item	factor 1	factor 2
6	.60	.37
7	.60	.39
8	.68	.31
9	.72	-.47
10	.42	.30
11	.58	-.43
12	.53	-.62
13	.71	.34
14	.61	.40
15	.68	-.52

Appendix 8 (cont.)

Part 3: items 16-25 Factors (with eigenvalues over 1) and eigenvalues

Factor	Eigenvalue	% of variance	cumulative%
1	4.53	45.3	45.3
2	1.94	19.4	64.7

Part 3: items 16-25 item loadings on Factors 1 and 2

item	factor 1	factor 2
16	.79	-.21
17	.74	-.29
18	.82	-.15
19	.57	.51
20	.67	-.38
21	.50	.65
22	.49	.63
23	.61	-.45
24	.82	-.27
25	.63	.53

Appendix 9

THE COPING BEHAVIOURS INVENTORY (ALCOHOL): Instructions and items

INSTRUCTIONS:- If there are times when you want to start drinking again, how do you try to stop yourself? Here is a list of ways some people have tried to stop themselves. Which of these ways have you tried? There are four boxes 'Usually, often, sometimes and never'. Please tick the box that comes closest to how *often* you have used these ways to stop yourself from starting to drink again. There are no right or wrong answers or trick questions. We want to know what *you* have tried.*

- 1 Thinking about how much better off I am without drink
- 2 Telephoning a friend
- 3 Keeping in the company of non drinkers
- 4 Thinking positively
- 5 Thinking of the mess I've got myself into through drinking
- 6 Stopping to examine my motives and eliminating the false ones
- 7 Thinking of the promises I've made to others
- 8 Staying indoors - hiding
- 9 Pausing and really thinking the whole alcoholic cycle through
- 10 Leaving my money at home
- 11 Recognising that life is no bed of roses but drink is not the answer
- 12 Going to AA meeting
- 13 Knowing that by not drinking I can show my face again without fear of what others will think
- 14 Cheering myself up by buying myself something special instead
- 15 Facing up to my bad feelings instead of trying to drown them
- 16 Working harder
- 17 Realising its just not worth it
- 18 Waiting it out until everything is shut
- 19 Remembering how I've let friends and family down in the past
- 20 Keeping away from people who drink
- 21 Going for a walk
- 22 Looking on the bright side and trying to stop making excuses for myself
- 23 Realising it's affecting my health
- 24 Start doing something in the house
- 25 Considering the effect it will have on my family
- 26 Reminding myself of the good life I can have without drink
- 27 Getting in touch with old drinking friends who are better now
- 28 Making up my mind that I'm going to stop playing games with myself
- 29 Eating a good meal
- 30 Avoiding places where I drank
- 31 Thinking about all the people who have helped me
- 32 Saying I am well and wish to stay so
- 33 Going to sleep
- 34 Remembering how it has affected my family
- 35 Forcing myself to go to work
- 36 Trying to face life instead of avoiding it

* Response choices are:- Usually - Often - Sometimes - Never

Appendix 10

COPING STRATEGIES: THE RESULTS OF INTERVIEWS

BEHAVIOURAL STRATEGIES

1. I stay in the house
2. I avoid people who use
3. I don't get any money for drugs/alcohol
4. I give all my money to someone else
5. I spend time with my parents
6. I spend time with people who do not use
7. I avoid looking for drugs/alcohol
8. I avoid situations that make me feel like taking drugs /alcohol
9. I exercise a lot
10. I spend time with my family
11. I try to fill my days with other things
12. I take methadone /naltrexone / antabuse/ a drug that stops me wanting to use
13. I let people know I'm not drinking / using
14. I tell friends not to come round
15. I only go out with people who do not use
16. I got a job
17. I go to AA / NA meetings I talk to people / to a special person about not using / not drinking
18. I plan what I am going to do each day
19. I use substitutes (other drugs that I am not dependent on)
20. I avoid things that remind me of drinking / using drugs

COGNITIVE STRATEGIES

21. I think of the bad things that would happen if I started drinking / taking drugs again
22. I think about the bad things that have happened in the past
23. I think about what I was like when I was using / drinking
24. I think about the things that I have lost
25. I think of the good things that will happen if I stay off
26. I think about all the other things I could do with my time / money
27. I think about my mother / parents
28. I think about my children / partner
29. I think I'm an addict / alcoholic and I cannot use/ drink without getting into trouble
30. I think negative thoughts about people who use / drink
31. I think that I am a better person now
32. I pray
33. I think of the AA / NA principles
34. I think that I am in control of my life
35. I try not to think about drinking / taking drugs
36. I think that I have no personality when I use.
37. I think that I would die if I started again
38. I think about the things that I enjoy when I am not using drugs / drinking
39. I think that I can stay off
40. I feel ashamed / embarrassed about doing it

Appendix 11

THE ADAPTED COPING BEHAVIOURS INVENTORY (CBIdrg): Instructions and items

INSTRUCTIONS:-

If there are times when you want to start using drugs again, how do you try to stop yourself? Here is a list of ways some people have tried to stop themselves. Which of these ways have you tried? There are four boxes 'Usually, often, sometimes and never'. Please tick the box that comes closest to how *often* you have used these ways to stop yourself from starting to use drugs again. There are no right or wrong answers or trick questions. We want to know what *you* have tried.*

- 1 Thinking about how much better off I am without drugs
- 2 Telephoning a friend
- 3 Keeping in the company of non users
- 4 Thinking positively
- 5 Thinking of the mess I've got myself into through my drug use
- 6 Stopping to examine my motives and eliminating the false ones
- 7 Thinking of the promises I've made to others
- 8 Staying indoors - hiding
- 9 Pausing and really thinking the whole addiction cycle through
- 10 Leaving my money at home
- 11 Recognising that life is no bed of roses but drugs are not the answer
- 12 Going to NA meeting
- 13 Knowing that by not using drugs I can show my face again without fear of what others will think
- 14 Cheering myself up by buying myself something special instead
- 15 Facing up to my bad feelings instead of trying to blank them out
- 16 Working harder
- 17 Realising its just not worth it
- 18 Waiting it out until everything is shut
- 19 Remembering how I've let friends and family down in the past
- 20 Keeping away from people who use drugs
- 21 Going for a walk
- 22 Looking on the bright side and trying to stop making excuses for myself
- 23 Realising it's affecting my health
- 24 Start doing something in the house
- 25 Considering the effect it will have on my family
- 26 Reminding myself of the good life I can have without drugs
- 27 Getting in touch with old friends who do not use drugs
- 28 Making up my mind that I'm going to stop playing games with myself
- 29 Eating a good meal
- 30 Avoiding places where I used drugs
- 31 Thinking about all the people who have helped me
- 32 Saying I am well and wish to stay so
- 33 Going to sleep
- 34 Remembering how it has affected my family
- 35 Forcing myself to go to work
- 36 Trying to face life instead of avoiding it
- 37 Using antabuse / naltrexone / methadone / another substitute
- 38 Doing exercise

* Response choices are:- Usually - Often - Sometimes - Never

Appendix 12

Reliability Analysis of the adapted Coping Behaviours Inventory (CBIdrg)

Item	Item total correlation	Alpha if item deleted
1. Thinking about how much better off I am without drugs	.41	.92
2. Telephoning a friend	.26	.92
3. Keeping in the company of non users	.54	.92
4. Thinking positively	.55	.92
5. Thinking of the mess I've got myself into through my drug use	.54	.92
6. Stopping to examine my motives and eliminating the false ones	.52	.92
7. Thinking of the promises I've made to others	.45	.92
8. Staying indoors - hiding	.20	.92
9. Pausing and really thinking the whole addiction cycle through	.50	.92
10. Leaving my money at home	.31	.92
11. Recognising that life is no bed of roses but drugs are not the answer	.47	.92
12. Going to NA meeting	.19	.92
13. Knowing that by not using drugs I can show my face without fear of what others will think	.57	.91
14. Cheering myself up by buying something special instead	.38	.92
15. Facing up to my bad feelings instead of trying to blank them out	.48	.92
16. Working harder	.50	.92
17. Realising its just not worth it	.57	.91
18. Waiting it out until everything is shut	.47	.92
19. Remembering how I've let my friends and family down in the past	.58	.91
20. Keeping away from people who use drugs	.55	.92
21. Going for a walk	.36	.92

22.	Looking on the bright side and trying to stop making excuses for myself	.57	.92
23.	Realising its affecting my health	.34	.92
24.	Start doing something in the house	.43	.92
25.	Considering the effect it will have on my family	.51	.92
26.	Reminding myself of the good life I can have without drugs	.49	.92
27.	Getting in touch with old friends who do not use drugs	.53	.92
28.	Making up my mind that I'm going to stop playing games with myself	.45	.92
29.	Eating a good meal	.50	.92
30.	Avoiding places where I used drugs	.55	.92
31.	Thinking about all the people who have helped me	.60	.91
32.	Saying I am well and wish to stay so	.68	.91
33.	Going to sleep	.17	.92
34.	Remembering how it has affected my family	.56	.92
35.	Forcing myself to go to work	.36	.92
36.	Trying to face life instead of avoiding it	.56	.92
37.	Using antabuse/naltrexone/methadone/another substitute	.30	.92
38.	Doing exercise	.42	.92

Appendix 13

Separate inventories of cognitive and behavioural coping strategies and the scale item number

Cognitive coping items

- 1 Thinking about how much better off I am without drink / drugs
- 4 Thinking positively
- 5 Thinking of the mess I've got myself into through drinking / my drug use
- 6 Stopping to examine my motives and eliminating the false ones
- 7 Thinking of the promises I've made to others
- 9 Pausing and really thinking the whole alcoholic / addiction cycle through
- 11 Recognising that life is no bed of roses but drugs are not the answer
- 13 Knowing that by not drinking / using drugs I can show my face again without fear of what others will think
- 15 Facing up to my bad feelings instead of trying to blank them out
- 17 Realising its just not worth it
- 19 Remembering how I've let friends and family down in the past
- 22 Looking on the bright side and trying to stop making excuses for myself
- 23 Realising it's affecting my health
- 25 Considering the effect it will have on my family
- 26 Reminding myself of the good life I can have without drink / drugs
- 28 Making up my mind that I'm going to stop playing games with myself
- 31 Thinking about all the people who have helped me
- 34 Remembering how it has affected my family
- 36 Trying to face life instead of avoiding it

Behavioural coping items

- 2 Telephoning a friend
- 3 Keeping in the company of non drinkers / users
- 8 Staying indoors - hiding
- 10 Leaving my money at home
- 12 Going to AA / NA meeting
- 14 Cheering myself up by buying myself something special instead
- 16 Working harder
- 18 Waiting it out until everything is shut
- 20 Keeping away from people who drink / use drugs
- 21 Going for a walk
- 24 Start doing something in the house
- 27 Getting in touch with old friends who do not drink / use drugs
- 29 Eating a good meal
- 30 Avoiding places where I drank / used drugs
- 32 Saying I am well and wish to stay so
- 33 Going to sleep
- 35 Forcing myself to go to work

Appendix 14

The General Health Questionnaire (12 items)

Instructions: On this page there are questions about your psychological well being.
Think about how you have felt in the **last month** and answer each question by circling the closest answer to how you have felt.

Have you recently been able to concentrate on whatever you're doing?	Better than usual	Same as usual	Less than usual	Much less than usual
Have you recently lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
Have you recently felt that you are playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less than usual
Have you recently felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
Have you recently felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
Have you recently felt you can't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual
Have you recently been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
Have you recently been able to face up to your problems?	More so than usual	Same as usual	Less able than usual	Much less able
Have you recently been feeling unhappy and depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
Have you recently been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
Have you recently been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
Have you recently been feeling reasonably happy, all things considered?	Much more than usual	Rather more than usual	No more than usual	Not at all

Appendix 15

The Social Satisfaction Questionnaire

- ☐ On this page the questions are to do with your social circumstances
- ☐ Think about how satisfied you are with your present social situation and place a tick beneath the word that most closely describes you

	Satisfied	Slightly dissatisfied	Dissatisfied	Very Dissatisfied
How satisfied are you with your present accommodation?				
How satisfied are you with your present living arrangements, ie who you live with? (Please answer this question whether you are living with other people or alone)				
How satisfied are you with your present employment situation? (Please answer this question even if you are unemployed or a full-time home-maker).				
How satisfied are you with your financial position?				
How satisfied are you with the amount of time you are able to go out?				
How satisfied are you with the amount of time you see your friends?				
How satisfied are you with your closest relationship in life? (e.g. spouse, partner, lover, parent, best friend).				
How satisfied are you with your relationship with your family? (Include children and other relatives).				

Appendix 16

Factor analysis of the five scales: the Leeds Dependence Questionnaire (LDQ), the General Health Questionnaire (GHQ), the Social Satisfaction Questionnaire (SSQ), the Impaired Control Scale, attempts to control section (ICSAC) and the Coping Behaviours Inventory (CBI): item loadings > .4 (in bold) on five factors extracted in Principal Components Analysis using Varimax rotation with Kaiser Normalisation: rotation converged in 6 iterations.

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
LDQ1		.77			
LDQ2		.72			
LDQ3		.65			
LDQ4		.78			
LDQ5		.46			
LDQ6		.72			
LDQ7		.64			
LDQ8		.40			
LDQ9		.74			
LDQ10		.58			
GHQ1			.57		
GHQ2			.38		
GHQ3			.59		
GHQ4			.56		
GHQ5			.51		
GHQ6			.42		
GHQ7			.64		
GHQ8			.53		
GHQ9			.66		
GHQ10			.56		
GHQ11			.57		
GHQ12					
SSQ1					.71
SSQ2					.75
SSQ3			.37		
SSQ4			.32		
SSQ5					.40
SSQ6					.49
SSQ7					.66
SSQ8					.65

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
ICS1				.73	
ICS2				.75	
ICS3				.83	
ICS4				.81	
ICS5				.72	
CBI1	.48				
CBI2	.29				
CBI3	.45				
CBI4	.63				
CBI5	.38				
CBI6	.64				
CBI7	.58				
CBI8	.25				
CBI9	.57				
CBI10	.32				
CBI11	.66				
CBI12	.12				
CBI13	.52				
CBI14	.53				
CBI15	.72				
CBI16	.44				
CBI17	.55				
CBI18	.43				
CBI19	.47				
CBI20	.31				
CBI21	.53				
CBI22	.72				
CBI23	.63				
CBI24	.59				
CBI25	.47				
CBI26	.46				
CBI27	.54				
CBI28	.73				
CBI29	.66				
CBI30	.46				
CBI31	.65				

CBI32	.63				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
CBI33	.47				
CBI34	.54				
CBI35	.36				
CBI36	.66				

Appendix 17

Consent form - main study

CONSENT FORM

In order to evaluate the effectiveness of the treatment you receive at the Unit, we will need to contact you after three months and then again after twelve months in order to repeat the questionnaires we have given you today.

We would be most grateful if you would give your consent for us to contact you for this purpose.

All the information you give us will be treated in the strictest confidence.

In the event that you have moved to a different address by the time we need to follow you up, we would be grateful if you could supply us with the name and address of someone with whom you are likely to keep in touch. Any contact we make with them will be strictly about your whereabouts and nothing else.

I give my consent for.....

Of (address).....

To provide information regarding my whereabouts so that I can participate in the follow-up to this study.

Signed.....

Name.....

Date.....

Appendix 18

Consent form - reliability study

CONSENT FORM

We are currently looking at the usefulness of the questionnaires which we ask you to complete when you come to the Addiction Unit.

We are very grateful to you for agreeing to take part in this study by completing these

questionnaires.

Would you give us your consent to contact you again within a week to repeat the questionnaires you have done today?

If yes, please sign below

Signature

.....

I UNDERSTAND THAT THIS INFORMATION IS KEPT ANONYMOUSLY AND
CONFIDENTIALLY AND HAS NO EFFECT ON MY TREATMENT PLANS.

Thank you

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