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ALCOHOL DEPENDENCE SYNDROME

Measurement of Altered Behavioural, Subjective and Psychobiological States

BY

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ABSTRACT

The aim of this thesis is to improve the validation of the Alcohol Dependence Syndrome construct. It is argued that the way ahead in the validation process and the one that the thesis explores is by the creation of better measurement of the individual elements of the syndrome and by assessing how they relate to each other. The study was carried out in two stages. The first was based on an extensive pilot study for the creation of new instruments to assess the ADS elements. The second stage was a data collection procedure in which the objective was to have sufficient subjects to assess the factor structure of each questionnaire and the correlations between them.

Four of the elements of the ADS were measured, three of them by the creation of new instruments. The assessment of the element subjective awareness of compulsion to drink was accomplished by the design of a new questionnaire (Subjective Severity of Alcohol Dependence Questionnaire - SSADQ). The element narrowing of drinking repertoire was assessed by means of a new semi-structured interview (Drinking Repertoire Interview - DRI) and a new questionnaire (Inventory of Drinking Repertoire - IDR). The element salience of drink-seeking behaviour was also assessed by a new questionnaire (Modifiers of Drinking Behaviour Questionnaire - MDBQ). The alcohol withdrawal symptoms, on the other hand, were assessed by an adaptation of a previously used set of items (Alcohol Withdrawal Scale - AWS). The Severity of Alcohol Dependence Questionnaire (SADQ) was used as a general standard for the measurement of dependence.

An important finding in terms of the validation of the ADS was that each of the elements measured varied along a continuum of severity. Moreover each questionnaire, despite small differences in terms of its structure, had one main factor in its Principal Component Analysis that accounted for most of the variance. Further evidence for the validation of the ADS was provided by a correlational analysis of the five questionnaires. This showed that all the new questionnaires had high correlations with the SADQ. When a more theoretically derived correlational analysis was performed, in which the cognitive element of the ADS (represented by the SSADQ) was compared with the behavioural element (represented by the IDR) and the physiological element (in the form of the AWS), it showed that they were highly inter-correlated.

This thesis, by providing a better description of the elements of the ADS and by contributing to the evidence of the theory supporting it, has strengthened the validation of the ADS construct. This will help future studies by providing a more precise measurement of the ADS and may also help the classification systems that have adopted the ADS construct as a diagnostic category.

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Summary**Chapter 1 - Introduction**

The chapter starts with a discussion of the concept of validity in contemporary psychopathology. It argues that despite their different traditions of measurement, psychiatry and psychology use similar concepts of validation, although with different emphasis. Moreover, there seems to have been a convergence between the two disciplines towards common strategies of validation. This has had a decisive influence on the Alcohol Dependence Syndrome (ADS) and on its validation. The body of evidence supporting the ADS which has been assembled over the past seventeen years is impressive, with the majority of these studies concerned with identifying the internal structure of the ADS. Studies with both clinical and general populations as well as cross-cultural studies have presented overwhelming support for the identification of the syndrome. Studies of the criterion-related validity of the ADS offer a variety of support for the syndrome in the form of correlational studies (alcohol related problems, health, alcohol consumption), experimental studies (cues reactivity), and outcome studies (treated clinical populations).

Analysis of all these studies support the conclusion that the validation of the ADS has progressed remarkably since its description in 1976, in particular in the identification of its structure and dimensionality. It is argued that one possible way ahead in the validation process of the syndrome is to study its internal validity, which requires better measurement of its individual elements and assessment of their correlations with each other. The approach of measuring the elements of the syndrome by a single item is particularly criticised and a multiple-item method that could show the complexity of the elements is proposed. In order to achieve this improvement in the construct validation of the syndrome, the thesis aims to create or adapt questionnaires to measure four of the elements of the ADS: subjective awareness of compulsion to drink, narrowing of drinking repertoire, salience of drink-seeking behaviour, and alcohol withdrawal symptoms. The next four chapters describe the development of these questionnaires.

Chapter 2 - Measurement of Subjective Altered State

The first part of the chapter presents an historical account of the subjective component involved in excessive drinking over the past two centuries. During the nineteenth and in most of the twentieth century the majority of authors proposing new diagnostic concepts related to excessive drinking included the characterization of some sort of subjective component. However, throughout this period no objective criteria were offered for the measurement of this component. Attempts to measure the subjective component involved in drinking with objective criteria started with behavioural studies in the sixties, but a sound theory and measurement of this phenomenon have remained a challenge. In the original ADS description the subjective awareness of compulsion to drink is proposed as one of its elements. However, its description and measurement have remained unsatisfactory. The main criticism in terms of measurement is that most previous attempts have relied on a single item for its description and assessment. The consequence of this dubious approach is shown in the main classification systems in psychiatry (DSM-IV and ICD-10) which diverge on whether to consider subjective experience as a diagnostic criterion. In order to advance the measurement of this element and evaluate its relation with the other elements of the ADS, a model of subjective altered state based on the concept of expectancies is proposed. A new questionnaire (Subjective Severity of Alcohol Dependence Questionnaire - SSADQ) with seven areas and 100 items was created.

Chapter 3 - Measurement of Drinking Repertoire

The first part of this chapter presents an historical account of the description of drinking behaviour in the eighteenth century, when authors reported in great detail the gradation and progression of drinking behaviour in certain individuals. Drinking behaviour during the nineteenth century and for most of the twentieth century was used as a diagnostic criterion by the majority of authors studying excessive drinking, although there was scant empirical evidence on which to base these criteria. The ADS theory proposed that drinking behaviour should be considered as a phenomenon that

Summary

varies along a continuum of severity in the form of a drinking repertoire. Despite a better theoretical approach to the description of drinking behaviour, the concept of a drinking repertoire became one of the most controversial elements of the syndrome, with very few attempts at measurement. This difficulty is reflected in both the DSM-IV and ICD-10 which do not use it as a criterion for dependence.

In order to facilitate the measurement of the drinking repertoire a model is proposed in which the mechanism involved is the relief and avoidance of withdrawal and that can be measured by four variables: frequency and quantity of drinking during a given period of time, frequency of morning drinking, and the spread of drinking throughout the day. After an extensive pilot study two forms of assessment were proposed to measure drinking repertoire. One form used a structured interview (Drinking Repertoire Interview - DRI), in which a period of 26 weeks is evaluated. The second form of assessment is a set of five questionnaires (Inventory of Drinking Repertoire - IDR), in which each questionnaire measures aspects of drinking in a specific period of time (Typical Drinking Day, Typical Month of Drinking, Last Six Months of Drinking, After Two Days Completely Dry, and After Two Weeks Completely Dry).

Chapter 4 - Measurement of the Modifiers of Drinking Behaviour

The strategy used to measure the element salience of drink-seeking behaviour focused on the factors that influence and modify the plasticity of drinking behaviour. The ADS theory maintains that drinking behaviour always has some degree of plasticity; however as the syndrome progresses there will be a readiness to ignore constraints. The chapter presents a comprehensive literature review of the factors that modify and decrease drinking behaviour under various circumstances. Five groups of factors were identified: 'environmental demand', 'social pressure', 'personal coping', 'intoxication-physical symptoms', and 'availability'. After an extensive pilot study, a questionnaire (Modifiers of Drinking Behaviour Questionnaire - MDBQ) was created covering these five areas.

Chapter 5 - Measurement of Alcohol Withdrawal Symptoms and Severity of Alcohol Dependence

The first part of this chapter describes the development in the identification of the alcohol withdrawal symptoms from the eighteenth century until today. It describes in detail studies of the past twenty years which have used objective criteria to identify these symptoms. Emphasis is given to the disagreement among several authors concerning the factor structure of the withdrawal symptoms. The list of symptoms chosen for use in the present study was adapted from Hershon (1977) and consisted of 32 items (Alcohol Withdrawal Scale - AWS) representing a comprehensive range of symptoms. The second part of the chapter discusses the need for a well-established questionnaire to measure the degree of alcohol dependence in this study. The choice was the Severity of Alcohol Dependence Questionnaire (SADQ) because it is based conceptually on the ADS, it has been extensively used, its factor structure and reliability have been established across several studies, and it is easy to administer.

Chapter 6 - Sampling and Data Collection

The aim of the sampling for this study was to achieve a balanced group of alcohol dependent individuals based on criteria of socio-demographic status, drinking history and severity of alcohol dependence. As one of the new questionnaires (SSADQ) needed a larger number of respondents than the other four instruments, a two-tier system of data collection was adopted. Four hundred and twenty individuals were interviewed for the study in six clinics in the London area. One group of 218 individuals completed only the SSADQ and the SADQ, and another group of 202 individuals responded to all five questionnaires. As the project in part relied on information from interviews and two researchers were responsible for the data collection, a reliability study was designed. The data from this reliability study showed high consistency between the researchers in terms of eliciting and assessing drinking behaviour throughout the study.

Chapter 7 - Results

The first section describes the total sample of 420 respondents who participated in the study. It shows that they had an adequate range of variation on such key variables as socio-demographic characteristics, previous involvement with treatment, chronicity of heavy drinking, recent drinking history and SADQ scores. The second section presents the item selection and statistical analysis of the SSADQ. Principal Component Analysis shows that a one-factor solution accounted for 45.5% of the variance. The total SSADQ score correlated with the SADQ at .73. The next two sections present the analysis of the measurement of drinking repertoire based on the interview (DRI) and on the questionnaires (IDR). The data from the interviews were analyzed using a new approach in which the categories of the scores of each week's drinking were transformed into continuous values by means of canonical correlation. Following this new scoring analysis, a cluster analysis was carried out on the four variables given to each week and six clusters were identified. The sequence of these clusters showed that they represented drinking patterns from a narrow to a wide repertoire, and from high to low dependence. The data from the questionnaires showed that each of the five scales had a one-factor solution accounting for between 41% and 47% of the variance. This factor represented drinking behaviour along a continuum of flexibility/rigidity. The five scales created a total score of the Inventory of Drinking Repertoire (IDR) that correlated highly with the other questionnaires.

The fifth section describes the analysis of the Modifiers of Drinking Behaviour Questionnaire (MDBQ). It shows that the items had a great variation in terms of their frequency of occurrence and their impact on modifying drinking behaviour. The factor structure of the MDBQ revealed a four-factor solution that was readily interpretable. All items loaded heavily on the first factor of a PCA and therefore a total score for the questionnaire was created, adding up the scores of all the items selected. The MDBQ correlated to a moderate degree with the other questionnaires. The sixth section describes the analysis of the Alcohol Withdrawal Scale (AWS). The factor structure revealed a four-factor solution that was also readily interpretable. Each factor was transformed into a separate scale. As the final aim of the analysis was to assess how

the elements of the ADS represented by each of the five questionnaires correlated with each other, a correlation analysis was carried out among all the questionnaires. It revealed that there was moderate to high correlation between the elements.

Chapter 8 - Discussion

The structure of this discussion chapter follows six main headings. The first section discusses the sample used in the study and compares the socio-demographic and drinking behaviour characteristics with previous clinical studies of alcohol dependent patients. The second section discusses the method used to assess the element subjective awareness of compulsion to drink. The statistical analysis of the SSADQ provides convincing evidence that it measures a unidimensional construct representing the cognitive component of the ADS. It is argued that the improvement in the description of this element associated with the evaluation of its association with the other elements have contributed to the validation of the ADS. In the third section the two methods used to measure drinking repertoire are evaluated in terms of their methodology, and improvement on the description of the behavioural component of the ADS. Both methods support the idea that drinking repertoire can be measured along a continuum of severity and that it is associated with the cognitive and physiological component of the ADS. In the fourth section the method used to measure salience of drink-seeking behaviour in the form of modifiers of drinking behaviour is assessed in terms of its structure and contribution to the validation of the ADS. In the fifth section the element alcohol withdrawal symptoms is assessed in terms of its factor structure and its correlation with the other elements of the ADS. The sixth section summarises and discusses the contributions of the present study to validation of the construct and to the diagnosis and classification of the ADS. It is argued that the improvement on the validation of the ADS was achieved by a more precise phenomenological description of four of the elements and by the strengthening of the theory behind the ADS construct.

Chapter 1 - Introduction

Chapter 1 - Introduction

1.1 - Contemporary Changes in Psychopathology

In the last three decades Psychiatry has undergone a major change in its approach to psychopathology. Psychopathological classifications used to reflect belief systems that were based on impressionistic clinical similarities. Most were not grounded in quantifiable data, used unrepresentative populations, and were devoid of a coherent theory (Millon, 1987,1991). The validity of the classifications rested on the personal authority of their originators, which often was limited to a single country (Kendler, 1990). During the sixties there was a growing awareness among clinicians and researchers that the absence of an objective and reliable system for describing psychopathology and for making psychiatric diagnoses was limiting scientific progress (Klerman, 1986). The development of quantitative techniques for measuring psychopathology (i.e. psychometrics) and the refining of standardised diagnostic criteria have led to a transformation of this science.

Psychopathology no longer depends on the intuitive artistry of brilliant clinicians and theoreticians who formulated dazzling but unfalsifiable insights. Psychopathology has acquired a solid footing in the empirical methodologies and quantitative techniques used in psychology (Blashfield, 1986; Millon, 1987). A major innovation was the use of diagnostic criteria that were intended to provide operational definitions of the psychiatric diagnosis. Many instruments were developed in response to the need for a better descriptive diagnosis. These new instruments drew upon existing psychometric methodologies, particularly those for educational testing, with multivariate statistics methods (Blashfield, 1986). The term psychopathology was synonymous with descriptive symptomatology; now, according to Millon (1991), can be justly employed to represent 'the science of abnormal behaviour and mental disorder'.

When investigators evaluate how well a new classification system performs, they rely on the concepts of reliability and validity, concepts that are also used to transform the empirical data collected on psychological processes into psychometric tests. The use of these concepts in this context suggests that a classification system is developed in a similar way to a psychological test. Blashfield and Livesley (1991) proposed that the psychiatric classification resembles a psychological test with both structural and analytical parallels. Table 1.1 summarizes these similarities. As can be seen the general goal of a psychiatric classification system and a psychological test is the same - the measurement of a person by the use of scales and criteria that are designed to represent a construct. According to Blashfield and Livesley (1991) the profitability of this analogy is reflected in the profusion of psychometric literature on measurement issues.

Table 1.1 - Similarities between a Psychological Test and a Psychiatric Classification

	Psychological Test	Psychiatric Classification
Structure	<p>-a test is composed of one or more scales that are intended to measure underlying constructs.</p> <p>-each scale contains a number of scorable items, which are the fundamental measurement units of the test.</p>	<p>-diagnostic categories are structural equivalents to scales.</p> <p>-diagnostic criteria are like test items; the basic unit of measurement that are combined to form a diagnostic category</p>
Analytical	<p>Reliability assess the degree of measurement error in both systems.</p> <p>Validity in both systems must have some correlational or causal relations with other variables if the scales or categories are to be useful in improving scientific understanding</p>	

1.2 - Different Traditions of Measurement in Psychiatry and Psychology

Although there are similarities between a psychiatric diagnosis and a psychological test the models of understanding and measurement of psychopathology in psychiatry and clinical psychology have evolved from different traditions. In psychiatry the unstructured clinical interview is the standard method of assessing the patient's presenting

problems, history, and mental state. An important goal is to collect information from which a diagnosis can be made. Classification systems specify the type of information that must be elicited during the interview. In clinical psychology the traditional approach to measurement has been the use of psychological tests. Although many items used in psychological tests have been derived from unstructured interviews, tests differ from interviews in that the items are constant for each patient, quantitative scores are generated, and test norms can be developed to compare individual scores (Blashfield and Livesley, 1991).

However, the general goal of psychiatric classification and psychological testing is the same - the measurement of persons by constructs that scales or categories are designed to represent. Traditionally psychiatry has adopted the categorial model of assessment whereas psychology has opted for a dimensional approach. The categorial view of psychopathology is often linked to an etiological model in which the categories are assumed to represent underlying disease processes that have caused the psychological manifestations (Kendell, 1975; Millon, 1987, 1991). It assumes that the various mental disorders are qualitatively different (McReynolds, 1989). The dimensional model on the other hand, is associated with a continuum view of psychopathology that assumes there is no clear boundary between normal and abnormal (McReynolds, 1989). The debate between dimensional and categorial models has an extensive literature (Kendell, 1975; Frances, 1982; Millon, 1987; Carson, 1991; Widiger and Trull, 1991; Millon, 1991), as well as an often contentious history. Indeed, authors such as Eysenck (1983, 1986) have proposed the abolition of categorial diagnoses altogether.

There are several advantages to the dimensional model (Frances, 1982; Millon, 1991; Widiger and Trull, 1991): 1 - it is associated with a continuum view of psychopathology that suggests there is no clear boundary between the normal and the abnormal; 2 - it combines several clinical attributes in a single configuration; 3 - it reduces the halo effect; 4 - single attributes are not given special significance; 5 - dimensional judgements are more reliable than categorial ones (Heumann and Morey 1990); 6 - it has more flexibility, having different cut-off points for different purposes; 7 - superiority in evaluating change; 8 - it is less restrictive than the categorial model

because it is associated with a higher level of data scaling. Despite these advantages, dimensional diagnoses have not fared well in everyday clinical practice. Numerous complications and limitations have been noted in the literature, in particular the lack of agreement among theorists concerning the number of dimensions necessary to represent a psychopathological phenomenon. Moreover a dimensional diagnosis is a less tangible concept than a categorical one and its meaning more difficult to communicate in a clinical setting.

The advantages of the categorical model are also many (Millon, 1991; Widiger and Trull, 1991): 1 - its ease of use for clinicians; 2 - a categorical diagnosis restores unity by integrating the seemingly diverse elements of a patient's psychopathology into a single configuration; 3 - as a concept a categorical diagnosis is easier to communicate than a dimensional one; 4 - it is easier to remember and to report; 5 - like all class concepts it provides directions for practical behaviour. However a major disadvantage is that categorical diagnoses contribute to the fallacious belief that collections of psychopathological processes comprise discrete entities or even diseases, when in fact, they are merely concepts that help to focus and coordinate our observations (Millon, 1991). Furthermore the process of categorization can distort the data, exaggerating both the homogeneity within groups and the heterogeneity between them (Millon, 1991).

Categorical and dimensional models need not be framed in opposition, or be considered mutually exclusive. Assessments can be formulated that include features of both. Qualitative (i.e. categorical) distinctions can be used to assess those features which best characterize a patient's condition, whilst lists of individual features and measurements of their severity are quantitative (i.e. dimensional) techniques. Dimensions can also be transformed into categories by using different cut-off points. Skinner (1986) elaborated several hybrid models that integrate elements of normally divergent schema. In what he termed the class-quantitative approach, efforts were made to synthesize quantitative dimensions and discrete categories. But which model is more useful or more appropriate? The answer will vary depending on the objective one has in mind. It may also depend on the stage of development that the subject material has reached (Kendell, 1975). As Hempel (1961) pointed out, most sciences start with a typology

and dichotomous present/absent distinctions, but later these are replaced by dimensions as more accurate measurement becomes available.

1.3 - Two Traditions of Validation in Psychiatry and Psychology

As evidence was mounting during the 1960s and 1970s that the reliability of psychiatric diagnoses was unacceptably low, much of the emphasis on research in psychiatry during this period promoted the reliability of the psychiatric diagnoses (Blashfield, 1986). There was a belief that if a psychiatric classification was not reliable, the development of a science about mental disorders was not possible. Spitzer and Fleiss (1974) believed that reliability was a constraint on the validity of the psychiatric classification and that high reliability was a necessary prerequisite to attempts at improving the validity. This led to the development and implementation of operational criteria which significantly improved reliability. Recently, many authors have criticised what they called an excessive concern with reliability which leads to increased interdiagnostician agreement but has not led to an enhancement in the rate of scientific progress in the fundamental issues of psychopathology (Grayson et al, 1990; Carson, 1991). Consensus between expert psychiatrists has been used as the criterion to validate the concept of a case; yet validity should be established by evidence, not by agreement (Eysenck, 1986). These criticisms have contributed to the demand that all concepts constituting a nosology should be empirically anchored. Spitzer and Williams (1989) proposed that 'the way to improve classification is on a broader empirical basis'.

The ideas of validity used in the psychiatric literature have developed around two main topics. On the one side the introduction of structured interviews made it necessary to validate both the diagnostic instruments and the underlying constructs. A valid diagnostic instrument is one that accurately measures the condition it is designed to measure; Spitzer (1983) called this procedural validity. The other more substantive topic of validity has developed according to several different theoretical assumptions about the nature of the psychiatric diagnosis. One important aspect of these influences

was in considering the psychiatric diagnosis as a category that has a common etiology and outcome. In an influential paper Robins and Guze (1970) proposed a method for achieving diagnostic validity with five phases: clinical description, laboratory study, exclusion of other disorders, follow-up study, and family study. The goal was to develop a set of mutually exclusive, discrete syndromes with established empirical validity (Widiger and Trull, 1991). This approach sees a clinical syndrome as consisting of two elements: a group of correlated symptoms and a more or less distinctive natural history. This paper is considered by many as a landmark in the history of psychiatry (Cloninger, 1989). Its importance to the conceptualization and validation of diagnosis has been compared to the impact of Cronbach and Meehl (1955) on assessment (Widiger and Trull, 1991).

The influence of this paper on the ideas about validation of the psychiatric diagnosis can still be found in the views expressed more recently by several authors which emphasise the aspects of the validity of the delimitation of one disorder from another, the elucidation of the etiology and specific outcomes. Feighner and Herbstein (1987) state that validity refers to the accuracy with which diagnostic criteria define and differentiate a disease from other diseases. Robins and Guze (1970) considered 'delimitations from other disorders' as an important aspect in the validation process because this method could establish the unity of a categorial model of psychopathology. Kendell (1989) in a review of the validation of the psychiatric diagnosis proposes that the most effective way of establishing the validity of a clinical syndrome is to elucidate its etiology. He suggests four kinds of clinical research to help clarify validity issues: prospective follow-up studies, therapeutic trials, family studies and twin studies. The emphasis is on the importance of the outcome and therefore on predictive validity, where 'in the context of clinical psychiatry, statements about diagnostic validity are essentially statements about predictive power, and hence about practical utility'.

As the aim of this view of validation was to achieve well-established categories of diagnosis several authors proposed that an implicit goal of the process of validation of a diagnosis was to create definitions with high content validity (Blashfield, 1986).

Applied to psychiatric diagnosis, content validity refers to the extent that the criteria of a disorder represent the domain of the symptoms associated with that disorder. Blashfield and Livesley (1991) argued that content validity is the most fundamental type of validity when applied to psychiatric classification. It can be viewed as a method of assessing how well a psychiatric classification represents the consensus of opinion among mental health professionals. These ideas and strategies of validation have usually been associated with a categorical system of classification, which assumes that psychopathology comprises discrete disorders (Cloninger, 1989). One important limitation of this approach to validation issues is that by eschewing any explicit theoretical model of psychiatric disorders, it ignores the hypothetical-deductive method of construct validation (Cloninger, 1989).

In the psychological literature the importance of the concept of validity started earlier than in psychiatry and has changed substantially over the years (Anastasi, 1986; Angoff, 1988; Messick, 1989). An early focus during the 1940s was on defined validity in purely operational terms, where the prediction of specific criteria were the most important, 'in a very general sense, a test is valid for anything with which it correlates' (Messick, 1989). In 1954 there was a major effort to introduce some kind of order into the chaotic state of test construction procedures by the American Psychological Association (Messick, 1989). There was a recommendation that validity be broken into four types: content, predictive, concurrent, and construct validity. In 1966 the APA reduced these to three types by amalgamation of the predictive and concurrent into criterion-related validities. Both editions of the APA Technical Recommendations drew a link between the type of validity to be used and the aims of the particular test. The 1974 edition re-emphasized this link, but also saw the different types of validity as 'interdependent kinds of inferential interpretation' and 'aspects of validity...inter-related operationally and logically' (Messick, 1989).

These three types of validity were widely accepted until the late 1970s when several authors started to criticise the tendency of the studies to use only one category of evidence as sufficient for the validity of a particular test (Angoff, 1988; Messick, 1989). At the same time the work of Anastasi (1986) and Cronbach (1988, 1990)

moved towards the recognition of validity as a unitary concept where an ideal validation includes several types of evidence, which span all three of the traditional categories, obtaining the combinations of evidence that optimally reflect the value of a test. Cronbach (1988) summarized this view when he said that 'all validation is one'. The 1985 Standards and Recommendations stated that validity was a unitary concept and referred to the 'appropriateness, meaningfulness, and usefulness of the specific inferences made from test scores'. The APA text no longer refers to types of validity but to categories of validatory evidence: content, criterion, and construct.

The logic of this unitary view of validity in psychology is that because content and criterion validity contribute to the score meaning, they have come to be recognized as aspects of construct validity. In a sense this leaves only one category of validity: construct. Construct validation requires many lines of evidence, such that as a process it can never be completed (Cronbach, 1990). Validation of the construct framework is a form of hypothesis testing and uses all the philosophical and empirical means by which scientific theories are evaluated including statistical, experimental, and rational methods of marshalling evidence. Validation requires a hypothetical-deductive approach; it is a scientific enquiry (Messick, 1989). Validity is an overall evaluative judgment, founded on empirical evidence and theoretical rationales (Messick, 1989).

The unitary view of validity maintains that it is necessary to build the precursors of validity into the system from the outset. Construct validation has focused attention on the role of psychological theory in test construction and on the need to formulate hypotheses that can be proved or disproved in the validation process. Psychometricians have agreed that validating a psychological test cannot be viewed as an enterprise separate from exploring the validity of the psychological theory associated with the test. Attempts to create atheoretical tests have proved fruitless. Central to the process of construct validation is a sound construct theory. This theory should specify the internal structure of the construct, how it manifests itself in other indicators, and how it relates to other variables. Cronbach and Meehl (1955) maintained that when we examine a psychological trait or construct, presumed to be measured by a test, we bring about an interaction between the scores obtained on the test and the theory underlying the

construct. In this way the theoretical conception of the construct dictates the nature of the data that are collected both to validate the scores and to interpret the results. In turn, the data resulting from the test administration are used to validate, reject or revise the theory itself. Viewed this way, we see that all data flowing from the theory, including concurrent and predictive data, are useful for construct validity.

Messick (1989) reviewed the state of the art of the ideas of validity in psychology. The dominant idea is that validity of a concept is an evolving property and validation is a continuing process. Because evidence is always incomplete, validation is essentially a matter of making the most reasonable base from which to guide the current use of the concept and research into advancing its understanding. Indeed, there is an appeal to multiple perspectives with respect to validity theory and validation methods. It is not the type of validity but the relation between the evidence and the inferences drawn that should determine the validation focus. The major concern of validity is not to explain any single isolated event, behaviour, or item response, because they almost certainly reflect a confounding of multiple determinants. Rather, the intent is to account for consistency in behaviour, which frequently reflects distinguishable determinants. To validate a concept is to ascertain the degree to which multiple lines of evidence are consonant with the inference, while establishing that alternative inferences are less well supported. An important aspect of the unified view of validity is the shift from prediction to explanation as the fundamental validity focus. The idea being that utility and relevance of the prediction cannot be appraised in the absence of sound empirically grounded interpretation of the concept being measured (Messick, 1989).

Although validation in psychiatry and psychology has evolved from different traditions and is at different stages of development there is a tendency towards a common ground. For example, the idea of different categories of validity has been absorbed in relation to the validation of the psychiatric diagnosis (Spitzer and Williams, 1985; Blashfield, 1986; Nelson-Gray, 1991). However, despite the fact that it has become the norm to look at psychiatric diagnosis considering three classical 'types' of validity and in particular content validity, there seems to be a different emphasis rather than a

different view of validity between these two traditions. These differences are related to the different strategies of the focus of the validation process. On the psychiatric side there is, as discussed before, a tendency of focus on etiology and outcome (Kendell, 1989). The unified view of validation in psychology, on the other hand, has its emphasis on the explanatory power of the construct validation and takes a strong stand against the notion of validity types: 'the implication that validities come in different types leads to confusion and, in the face of confusion, oversimplification' (Pedhazur and Schmelkin, 1992).

1.4 - Influence of Psychiatry and Psychology on the Alcohol Dependence Syndrome (ADS) and its validation

The alcohol dependence syndrome, as described by Edwards and Gross (1976), follows traditions from both psychiatry and psychology. Recurring sets of symptoms are seen in a number of patients which have a medical component represented by the clinical syndrome. The notion that the presence of covarying symptoms might signify 'disease entities' can be traced to the seventeenth century writings of Thomas Sydenham (Blashfield, 1984; Millon, 1987). He argued that a careful observer of patients would note that certain sets of symptoms tended to co-occur. If these co-occurring sets of symptoms were seen in a large enough number of patients, this observation would suggest that the syndrome may represent more than a chance collection of symptoms. These ideas have been assimilated in the psychiatric literature. Millon (1987) summarised the characteristics of a syndrome in psychiatry as the clustering of a set of signs or symptoms that frequently co-occur and covary. Not all the signs and symptoms are likely to be immediately observed but the presence of a subset suggests that other features may be uncovered on closer examination. Not only is there a waxing and waning in the salience of its components, but only a few of its typical indices are likely to be manifest at any one time. Kendell (1989) similarly described a clinical syndrome as consisting of a cluster of related symptoms which in a psychiatric context may be abnormal behaviours, abnormal or distressing subjective

experiences or a mixture of the two. For him a psychiatric syndrome has also a characteristic time course.

When Edwards (1977) described the Alcohol Dependence Syndrome he specifically stated the meaning of the word syndrome as an observable coincidence of phenomena and that not all of them need always be present. Moreover, the early description of the ADS (Edwards and Gross, 1976; Edwards, 1977) specify that there was logic and evidence for believing that there was some altered behavioral, subjective and psychobiological state represented by the elements of the ADS clustered together (Table 1.2). That is, the elements not only covary frequently, but make sense as a coherently organized and reasonably distinctive group of characteristics. The ADS was proposed as an idea to be tested, where its diverse phenomena must be subject to formal identification, differentiation and quantification procedures. Justification for the syndrome was mainly pragmatic and communicative and it was hoped that future research would give a more detailed understanding of the 'latent' processes at work that produced the covariance of signs, symptoms, course, prognosis, and response to treatment. For Edwards (1977): 'The obvious challenge however is to get beyond the stage of observation to that of explanation.'

Table 1.2 - Elements of the Alcohol Dependence Syndrome

Narrowing of drinking repertoire Saliency of drink-seeking behaviour Increase tolerance to alcohol Repeated withdrawal symptoms Relief-avoidance of withdrawal Subjective awareness of compulsion to drink Reinstatement after abstinence

The influence of psychology can be found in several levels of the ADS. One important aspect is that the syndrome was proposed as a dimensional diagnosis, varying in quantitative severity from person to person and in time within the same person. The more explicit influence from psychology came from learning theory where the ADS was proposed as a synthesis of both general learning theory and specific conditioning models of dependence (Edwards, 1986; Babor et al, 1987a). The ADS has also

benefited from the methodological principles of psychology, in particular in its measurement and at the experimental level which attempts to define the construct in behavioural terms using well-controlled experimental situations (Hodgson and Stockwell, 1985).

One of the most important aspects of the ADS was the theoretical accuracy which characterized the description of its elements. It was not only a group of symptoms but a description of a series of elements that were theoretically bound. Unlike previous models of alcoholism that had observational elements but no theoretical input the elements of the ADS have a precise theoretical meaning. One example is the description of drinking behaviour known as 'narrowing of drinking repertoire'. The emphasis here is not only on the description of the quantity of alcohol consumed, but how drinking behaviour related to the severity of dependence and the need to pace the drinks at regular and predictable intervals throughout the day so as to avoid withdrawal symptoms.

Discussing theoretical accuracy Hempel (1965) wrote that the characteristic that distinguishes a latent scientific classification is its success in grouping its elements according to theoretically consonant propositions. He also argued that in the course of scientific development a classification system defined by reference to manifest, observable characteristics will tend to give way to systems based on theoretical concepts:

"the development of a scientific discipline may often be said to proceed from an initial 'natural history' stage...to subsequent more and more 'theoretical' stages... The vocabulary required in the early stages of this development will be largely observational...The shift toward theoretical systematization is marked by the introduction of new, 'theoretical' systematization is marked by the introduction of new, 'theoretical' terms...more or less removed from the level of directly observable things and events... These terms have a distinct meaning and function only in the context of a corresponding theory. (pp. 139-140)"

The ADS was proposed as a conceptual model, which attempts to set forth the relationships among factors that influence excessive drinking. This has to be distinguished from its later use in the form of definitions used in the internationally used classification systems ICD-10 (WHO, 1992), DSM-III-R (APA, 1987) and DSM-

IV (APA, 1993) which are essentially operational definitions (Jaffe, 1992). The purpose of the model was not only identification but mainly conceptualization. Bridgman (1927) pointed out that the meaning of an operationally defined concept becomes synonymous with how we measure it, not with what we say about it. Burdock (1961) referred to the process of conceptual definition as involving a process of abstraction (in Zubin, 1961):

"There are two kinds of abstractions: abstractions from actuality, and abstraction from possibility. When we refer to something as highly abstract, it is usually the latter that we mean. Abstraction from actuality is what we mean by an operational definition; whereas abstraction from possibility describes inference of necessary properties from a model."

There has been a substantial body of evidence supporting the concept of the ADS, summarised by Edwards (1986). The strategies that have been used in the validation process of the ADS have relied on an array of methods and procedures that reflects the influences of different views of the syndrome and its validation. There are many ways in which the analyses of this evidence can clarify the stage of the validation. The difficulty that arises is that there is not a single research program testing the ADS and its validation but a diversity of ideas and influences that represent the heterogeneity of the professionals involved. The positive side is that this diversity of research reveals that the ADS construct has been accepted by a large number of experts and as a consequence it is open to a rather different interpretation of the original version and to a different emphasis on its validation. The next sections will discuss the evidence of the ADS using the general framework of an unified view of the validation process. Each section will group the evidences according to similar analysis and methodology used by several studies which have relied for their design on the ADS construct. At the end of the chapter one particular aspects of the validation process that will be examined further in the thesis will be proposed.

1.5 - Content Validity and Internal Consistency Analysis of the ADS

In the unified view of validity, content validity is inseparable from the validation of the construct itself (Messick, 1989; Pedhazur and Schmelkin, 1992). From the perspective

of classical test theory the items in a test are assumed to be a sample of all possible items that could be used to measure the construct under investigation. Thus, content validity can be defined in terms of the sampling adequacy of the items representing the construct. The more representative of the target behaviour a sample of items is, the more the instrument lends itself to inferential analysis. Two approaches have been used to study the content validity of the ADS. One strategy has been the creation of several questionnaires specifically designed to measure the syndrome; the second has been the adoption of the operational definition of the ADS used by the main psychiatric classification systems (DSM-III-R, DSM-IV and ICD-10) to make standardized diagnoses.

The studies shown in Table 1.3 used several similar operational definition of the ADS and provide strong evidence that it has what, in psychometric terms, is called domain clarity. Domain clarity is said to occur when different researchers working independently choose items to measure a construct, from the same general pool of domain specifications, which when tested produce comparable results (Messick, 1989). There seems to have been an agreement about a core group of behaviours that represents the ADS. However, going a little further in this examination of the construct, Messick (1989) argues that there are many ways in which the measurement of a construct or a test may be imprecise. Measurements are not only imprecise by virtue of random errors but also because the items chosen to make up the construct can never be a perfect sample. Items that should have been included may be omitted ('construct underrepresentation') or included when they should have been left out ('construct irrelevant test variance'), or both. When compared with the original description of Edwards and Gross (1976) the studies in Table 1.3 have used groups of items with different levels of 'construct underrepresentation' and 'construct irrelevant test variance'. For example on the side of underrepresentation, the SADQ (Stockwell et al, 1979) has only items related to alcohol withdrawal, relief drinking, level of consumption and reinstatement. On the side of irrelevancy to the original version of the ADS the SADD (Davidson et al, 1989) has an item representing black-outs that was not in the original version.

Table 1.3 - Studies with clinical population measuring the factor structure of the Alcohol Dependence Syndrome (ADS)

Instrument /Author	Item Content	Analysis	Variance
SADQ/ Stockwell et al (1979)	Physical withdrawal symptoms; affective symptoms of withdrawal; relief drinking; level of alcohol consumption and rapidity of reinstatement after withdrawal	Factor Analysis	53%
EADS/ Chick (1980a)	Withdrawal symptoms; subjective need; aspects of salience; relief drinking; awareness of compulsion to drink; increased tolerance	Principal Component Analysis	24.6%
Rand Report/ Polich et al (1981)	Tremors; morning drinking; loss of control; black-outs; missing meals; continuous drinking	Principal Component Analysis	52%
ADS/ Skinner (1981)	Loss of behavioural control; psychoperceptual and psychophysical withdrawal symptoms; obsessive compulsive drinking style	Factor Analysis	28%
LSMDQ/ Hesselbrook et al (1983)	Salience of drink-seeking behaviour; increase tolerance to alcohol; repeated withdrawal symptoms; relief-avoidance of withdrawal; compulsion to drink	Factor Analysis	23%
DSM-III-R/ Kosten et al (1987)	Relief use; withdrawal; preoccupation; rapid restart; continue despite problems; give up non-alcohol activities; impaired in daily activity; tolerance; inability to cut down use; use more than intended	Factor Analysis	56%
SADD/ Davidson et al (1989)	Salience of drink-seeking behaviour; narrowing of drinking repertoire; relief drinking; continue use despite problems; inability to stop; withdrawal symptoms; black-outs; subjective awareness of a need for alcohol	Factor Analysis	44%

A systematic way to assess the content related evidence of a construct is by means of Internal Consistency Analysis (George et al, 1989; Messick, 1989). It refers to the degree of intercorrelation between a set of indicators intended to measure the same phenomenon. The analysis tells us if the relationship among indicators is sufficiently strong to suggest that they are tapping the same underlying phenomenon. In terms of psychopathology, internal consistency is the degree to which symptoms cluster to form empirically, theoretically, and clinically meaningful syndromes (George et al, 1989). This is relevant because the degree of homogeneity in a construct should be commensurate with the degree of homogeneity theoretically expected. The logic of internal consistency analysis is that a set of indicators proposed to measure one diagnostic construct are examined in terms of dimensionality, distinctiveness, and/or homogeneity. Not every relevant indicator must be included in the measurement tool, rather the total universe of indicators must be representatively sampled.

A wide variety of correlation analyses are used to measure internal consistency (Messick, 1989); the two leading methods are Factor Analysis/Principal Component Analysis and Internal Consistency Reliability (Cronbach's alpha). Traditionally, internal consistency was treated as one form of reliability assessment, with reliability referring to the degree to which measurement is free from random error. More recently, however, psychometricians are increasingly viewing reliability and validity in a less rigid way. Reliability and validity are now seen as inseparable. Because internal consistency analysis is based on issues of sampling content homogeneity, and the dimensional structure of sets of indicators, it is relevant to validity assessment and hypothesis testing, as well as to estimating reliability (George et al, 1989). The next three sections describe the evidence of internal consistency of the ADS in different populations.

1.5A - Clinical Population Studies

The study of the internal consistency of the ADS in clinical population is the area of the validation process that has been most extensively studied. The reason for this was that the clinical identification of the syndrome and its delimitation from other disorders

was an important theoretical issue just after the description of the ADS in 1976 and remains important today. From the early operational description by Stockwell et al (1979) to a more recent version of the DSM-IV and ICD-10 there has been a remarkable similarity amongst the studies showing a unidimensional structure. Most of the studies used Exploratory Factor Analysis or Principal Component Analysis to analyze the item contents of an interview or a questionnaire measuring the ADS. Table 1.3 shows the main instruments used, their item contents and factor structure. All these studies showed that one factor was responsible for the largest single amount of variance. These studies had different levels of 'construct underrepresentation' and 'construct irrelevant test variance', but their similarity in terms of factor structure is a robust finding that suggests the dependence construct has a consistent unidimensional structure.

Several other studies have used these same instruments in different populations and settings and found similar results in terms of the factor structure (Meehan et al, 1985; Kivlahan et al, 1989; Drummond, 1991; Stockwell et al, 1994). One important aspect of all these studies evaluating the ADS is that besides having used different diagnostic criteria they also used different methods of data collection (questionnaires and structure interviews). This diversity of criteria and data collection techniques demonstrate that the ADS construct is not uniquely tied to any particular method of measurement and that the different measures show convergence. The consistency of these findings has recently been confirmed by a study of Rounsaville et al (1993) who compared the DSM-III-R, DSM-IV and ICD-10 and assessed the factor structure of the three systems using interviews based on the Composite International Diagnostic Interview (CIDI). All three exploratory factor analyses yielded a one-factor solution with loadings of 0.84 or above for all items related to alcohol dependence.

Studies using Cronbach's alpha coefficient as a measure of internal consistency have recently received more attention (Table 1.4). There has been an impressive agreement between studies, with very high levels of Cronbach's alpha in different versions of the ADS. These studies have used different populations and methods of data collection. Skinner & Allen (1982), Hesselbrock et al (1983), Kivlahan et al (1989), Caetano

(1992a), Stockwell et al (1994); Raistrick et al (in press) used questionnaires in clinical populations. Kosten et al (1987), Babor et al (1987a), Rounsaville et al (1993) and Hall et al (1993) used interviews with clinical populations, whilst Grant et al (1992) used interviews with a sample of the general population. They have also used differed item contents, with studies using diagnostic criteria based on DSM-III-R, DSM-IV and ICD-10. Babor et al (1988), Caetano (1992b) and Rounsaville et al (1993) compared two or more sets of items assessing a slightly different version of the ADS and found practically the same values of alpha.

Table 1.4 - Internal Consistency Analyses of the ADS using Cronbach's alpha.

Studies	Cronbach's alpha
Skinner & Allen (1982)	0.92
Hesselbrock et al (1983)	0.82
Kosten et al (1987)	0.91
Babor et al (1987b)	0.91
Babor (1988)	0.62 to 0.91
Kivlahan et al (1989)	0.85
Grant et al (1992)	0.82
Caetano (1992)	0.95, 0.96
Rounsaville et al (1993)	0.85, 0.82, 0.76
Hall et al (1993)	0.63 to 0.95
Stockwell et al (1994)	0.98
Raistrick et al (in press)	0.94

1.5B - General Population Studies

Patients in treatment tend to have symptoms that are relatively coherent and persistent over time, but that is not always the case in the general population. Fillmore and Midanik (1984) found that some symptoms of alcohol dependence had much lower correlations in community survey data. Therefore, studies of the ADS using data from community surveys can be used as a stringent test of the coherence of the construct.

Several recent studies have relied on data from a sample of 43,809 respondents of a nationwide representative survey of the noninstitutionalized population of the United

States aged 18 years and older, the National Health Interview Survey (NHIS88). In the first study of the series which analyzed the coherence of the syndrome Grant et al (1992) studied the degree of heterogeneity of the DSM-III-R alcohol dependence criteria observed in this population. The DSM-III-R has nine criteria for alcohol dependence and at least three are needed in order to make a diagnosis. The diagnosis can be achieved by a combination of any three or more of these criteria, so that theoretically there are 466 permutations. They found that in the general population only 189 subtypes (40.6%) were observed. This indicates that the alcohol dependence syndrome, as seen in the general population, is heterogeneous but not as heterogeneous as is theoretically possible. Symptoms of physiological dependence and impaired control over drinking were identified as playing a key role, appearing in over 80% of all reported subtypes regardless of age, race or sex.

Multhen et al (1993a) used the ICD-10 dependence syndrome criteria, with 20 symptom items, in order to test the dimensionality of the ADS. Factor analysis was performed on the results from 17,465 individuals who were current drinkers. The large number of current drinkers in the sample enabled the researchers to use two subsamples, obtained by random division of the full sample, in order to analyze the results by cross-validation. Impaired control, tolerance and withdrawal were identified as being part of one dimension. In another study based on the same sample but using DSM-III-R and DSM-IV dependence and abuse criteria Muthen et al (1993b) assessed whether more than one dimension was necessary to identify abuse and dependence. They found by means of Factor Analysis a two factors one representing abuse and the other dependence. The alcohol dependence factor contained items of tolerance, withdrawal and relief drinking.

Hasin et al (1993) based their study on a previous national survey of alcohol problems in the USA with a sample that consisted of 3212 adults who had consumed any alcoholic beverages during the twelve months preceding the interview. The items used represented several of the elements of the ADS and also of a complex of alcohol related problems (narrowing of repertoire, salience, tolerance, withdrawal, withdrawal avoidance, compulsion, and several problems related to the use of alcohol). They

found, using confirmatory and exploratory factor analysis, that a single factor explained the structure of the data better than a two-factor model.

Few studies have compared general and clinical populations in relation to the structure of the ADS. Caetano (1991) compared a general population and a treatment sample from the same state in the USA and found that alcohol dependent individuals in the treatment sample were more severely dependent than their counterparts in the general population. The definition of ADS was based on a series of 18 items covering 8 of the 9 indicators of dependence from DSM-III-R. The number of dependence indicators reported by respondents in the two samples varied substantially, although the results from the regression analysis suggested that differences in severity of dependence between the two populations were due to differences in sociodemographic characteristics of the sample. Two studies compared the structure of the ADS between the two populations and found different results. Mohan et al (1992) used DSM-III-R criteria to compare the dimensional differences between a sample of patients from a treatment centre and another from the community. They found a one factor solution for the treatment sample but a two factors solution ('withdrawal' and 'social') for the community data. Stockwell et al (1994) compared the factor structure of a form of the SADQ for community samples of drinkers (SADQ-C) in a large sample of attenders at a controlled drinking clinic and a random survey of Western Australian households. Both samples revealed a single major factor identified by Principal Component Analysis, accounting for 71.7% and 69.1% of the variance, respectively.

1.5C - Cross-cultural Studies

One important aspect of the validation of the ADS is whether or not it shows constancy across cultures. Some of the critics of the ADS concept argues that it is a culturally specific expression of alcohol-related problems that arises in Anglo-Saxon societies in which the disease model of the Alcoholics Anonymous has been influential (Hall, 1993). Several studies have compared the structure of the ADS between two or three countries. Babor, Lauerman and Cooney (1987c) compared the responses of alcoholics in treatment in the USA and France on a common set of items dealing with dependence

and the consequences of drinking. Analysis of the internal consistency of the dependency scales for both samples gave high Chronbach's alphas. Factor analysis of each sample revealed two orthogonal dimensions, distinguishing dependence symptoms from adverse consequences of drinking. In another study Babor et al (1988) made a secondary analysis of measures of dependency in patients from USA, Britain, and France which produced Cronbach's alpha ranging from 0.62 to 0.91. Allen et al (1993) using items from the Composite International Diagnostic Interview tested the dimensionality of the ADS in clinical samples in the United States and Russia. The Confirmatory Factor Analysis showed in the two groups that a single-factor model provided a high degree of goodness of fit. In another study comparing the same american and russian samples Allen et al (1994) found that the Alcohol Dependence Scale had a single dimension in both samples.

More recently a large WHO Collaborative study (Hall et al, 1993) tested the cross-cultural validity of the ADS in six countries (Australia, Bulgaria, Kenya, Mexico, Norway, and the United States). Cronbach's alpha varied from 0.63 to 0.95. Principal Components Analyses were performed on the 13 symptoms of alcohol dependence in each centre, and the degree of agreement between the results was assessed by calculating coefficients of congruence between the item loadings on the first principal component. The evidence for the unidimensionality was strong and consistent with all the centres having one first factor accounting for most of the variance. The Coefficients of Congruence all had values of 0.98 or more while the Root Mean Square differences ranged between 0.08 and 0.18, with an overall average difference of 0.13 between item loadings.

1.5D - Conclusion of the Internal Consistency Studies

The study of the internal consistency of the ADS is the area of the validation process that has received stronger support over the past two decades. Three main aspects contribute to the strength of the evidences in favour of the unidimensionality of the syndrome. Firstly, the ADS has been studied in a considerable variety of different populations and settings. The majority of the early studies with the ADS were with

clinical populations, but over the years the syndrome started to be identified also in the general population and across several different cultures. Secondly, there has been a great diversity of methods of measurement (questionnaires and interviews) using slightly different operational criteria. This diversity of methods shows that the ADS can be independently defined by independent researchers and keeping its internal structure in terms of homogeneity of the sample content of the concept. Thirdly, several methods of analysis have been employed in the assessment of the structure of the ADS. Principal Component Analysis and Exploratory Factor Analysis have been the procedure more commonly used over the years, but more recently Cronbach's alpha and Confirmatory Factor Analysis have also contributed to the methods used.

Despite the strong support for the unidimensional structure of most of the operational definitions of the ADS some inconsistencies have been found. Chick (1980a) found that 'Impaired Control', 'Narrowed Repertoire' and 'Salience' loaded in different small factors, presenting a challenge to the measurement of the syndrome. Caetano (1990), using exploratory factor analysis, found a four factor structure for items from DSM-III-R and for the ICD-10 a four factor solution among men and a three factor solution among women. In another study Caetano (1992a) also found when using different operational definition based on DSM-III-R that 2 to 5 factors represented the structure, depending on the operational definition used. Mohan et al (1992) also found a one factor solution for the treatment sample but a two factors for the community data.

These discordant results reveal important discrepancies that have yet to be explained. One possible explanation could lie with the relative impurity of some of the symptoms used to form the ADS construct. Some of the elements of the syndrome are difficult to operationalize and could be subject to idiosyncratic interpretation on the part of both researcher and subjects (Davidson, 1987). It is quite possible that additional dimensions could be a function of variance introduced by the nature of the inquiry rather than a confirmation of the multifactorial nature of the syndrome. Such anomalies should be followed up empirically because they are frequently the source of new insights into construct validation (Messick, 1989). The repeated occurrence of discordant loadings on a factor might indicate that the construct is broader than

originally conceived; that ostensibly separate constructs should be unified or that a higher order construct should be invoked to systematize the findings (Messick, 1989; Pedhazur and Schmelkin, 1992).

1.6 - Convergent and Discriminant Evidence of the Measurement of the ADS - Cross-Structural Analysis

Internal Structure Analysis is necessary to determine whether there is a relationship between the structure of a set of indicators and the construct they are supposed to reflect. However, evidence from internal structural analysis is necessary, but in itself is insufficient to lend support to the validity of the construct. The reason is that a given internal structure may be consistent with different definitions of the construct (Messick, 1989). Moreover, any method of measurement can be distorted by a host of variables related to the subject, the researcher, and the setting in which the measurements are made. When a single method is used to measure a construct, it is not possible to determine to what extent subjects' responses are influenced by factors such as: response set, avoidance of extreme responses, giving socially desirable responses and reactivity to researcher's expectations (Messick, 1989).

In order to overcome these problems of bias in the measurement of a construct, various authors have advocated the use of multiple methods of measurement (Campbell and Fiske, 1959; Messick, 1989; Pedhazur & Schmelkin, 1991). The idea is to use several different forms of measurement (questionnaires and/or interviews) answered simultaneously by the same group of patients and assess their inter-correlation. Campbell and Fiske (1959) proposed the concept of convergent and discriminant validity. Convergent validity refers to a convergence among different methods designed to measure the same construct. Discriminant validity refers to the distinctiveness of constructs, demonstrated by the divergence of methods designed to measure different constructs (Pedhazur and Schmelkin, 1991). Messick (1980) supported the idea that convergent and discriminant validity were not a special form of validity. They should be considered data collection and data analysis strategies to

be used for testing the conceptual connections between different forms of measurement and the construct.

Several studies have evaluated simultaneously different methods of measuring alcohol dependence. Stockwell et al (1979) compared an independent rating of alcohol dependence with the total score of the SADQ and found a Pearson correlation coefficient of 0.84. Meehan et al (1985) and Drummond and Chalmers (1986) also found high levels of concordance among a rater and the SADQ. Davidson and Raistrick (1986) compared the scores of the SADD with other questionnaire (SADQ) and a standardized interview (EADS). They found that the total scores of the SADQ and SADD had a $\rho=0.83$ ($p < .01$) and between the SADD and EADS a $\rho=.51$ ($p < .05$). Cooney et al (1986) studied four scales that measured the ADS: the Rand Dependence scale, the Severity of Alcohol Dependence Questionnaire (SADQ), the Last Month of Drinking Withdrawal Scale, and the Last Six Months of Drinking Impaired Control and Dependence scale. Using a Factor Analysis all four scale scores loaded on one factor, indicating that the four scores were highly inter-correlated. Alcohol consumption and psychosocial problems scales did not load on the dependence factor, but each did load on two other factors.

Two studies explored the correlation between the ability of two questionnaires to identify alcohol dependence and its the degree of severity. Jorge et al (1986) compared the SADD and the ADS, and found a significant correlation between the scores obtained on the two scales ($r=0.61$, $p < 0.01$). However, analysis of how patients were classified in terms of severity of dependence, revealed a lack of agreement between the two questionnaires ($Kappa = 0.20$). In a sample of problem drinkers on an in-patient unit, Doherty and Webb (1989) found a strong correlation between the SADQ and SADD scores ($r=0.806$). Further analysis revealed a strong agreement between the two questionnaires in respect of the assessment of low, middle range and high levels of dependence ($Chi-Square=92.23$, $p < 0.0001$).

More recently greater emphasis has been given to the assessment of the different operational criteria of the ADS used in the psychiatric classification (DSM-III-R, DSM-

IV and ICD-10). In a study that explored the correlation between two questionnaires measuring alcohol dependence, Caetano (1990) found a Pearson product-moment correlation of 0.93 between an index with 20 items, representing the DSM-III-R concept, and an index composed of 16 items, representing the ICD-10 concept. In a later study, Caetano (1992) assessed the impact of two different operationalizations of the ADS according to DSM-III-R. He created two sets of measures, one using traditional items to define the various elements of the concept and a second using questions worded as closely as possible to those used in DSM-III-R. He found low Phi correlations among individual items, with 60% of these correlations being between 0.21 and 0.40. However, when these two sets of items were transformed into scales the Pearson correlation coefficient between the two measures rose to 0.68 ($p < .01$).

Cottler et al (1991) used the Composite International Diagnostic Interview (CIDI), a standardised diagnostic interview for the assessment of psychiatric disorder which allows classification according to DSM-III-R and ICD-10 criteria. They interviewed 590 patients from 18 sites around the world in a field trial designed to test the cross-cultural acceptability and reliability of the questions. The Kappa value for overall agreement between the two classifications of the alcohol dependence category was 0.81. Rounsaville et al (1993) studied the cross system agreement of 3 sets of criteria for Substance Dependence (DSM-IV, DSM-III-R and ICD-10) in a heterogeneous sample of 521 adults. Agreement for dependence was generally high with Kappa values above 0.85 for all substances (alcohol, cocaine, opiate, stimulant, sedative, marijuana) and 0.84 for alcohol dependence alone. Rapaport, Tipp and Schuckit (1993) as part of the DSM-IV field trials interviewed 100 patients to ascertain substance use diagnosis according to ICD-10 and DSM-III-R. The Kappa values comparing the concordance of diagnosis between the two systems for alcohol dependence was .79. Cottler et al (1993) compared DSM-III-R and two versions of the ICD-10 in a study from the DSM-IV Substance Use Disorders Field Trials. She found that these three versions of the ADS gave similar rates of prevalence in a 887 subjects from the general population. Grant (1993) using a representative sample of the United States general population compared the DSM-III-R and the DSM-IV formulations of alcohol dependence. The 1-year prevalence rates of alcohol abuse and dependence for each classification were

remarkably similar. Concordance between diagnostic categories of dependence presented a Kappa value of 0.76.

Only one study was found that used discriminant analysis to compare the ADS with other related constructs (Gorman et al, 1989). Two questionnaires measuring dependence (SADQ and SADD), one measuring alcoholism (MAST), and one problem drinking (ARP) were compared. There was substantial agreement between the two measures of alcohol dependence with an intraclass correlation coefficient of 0.81. There was rather less agreement between the MAST and the SADQ and SADD with coefficients of 0.52 and 0.49 respectively. Even lower correlations were found between the ARP and the SADQ and SADD (0.26 and 0.38 respectively).

In summary, studies of cross-structural analysis of the ADS have provided evidence that similar operational criteria of the construct are conceptually connected. Similarly to the studies of internal consistency the studies of convergent analysis have used a variety of data collection and statistical analyses that contributes to the strength of the findings. These studies have used several forms of measurement (interviews and questionnaires), with several operational definitions (DSM-III-R, DSM-IV, ICD-10, SADQ, SADD, etc), with several types of population (clinical, general) and several different statistical analyses (correlation, factor analysis, kappa, intra-class correlation).

1.7 - Distribution of the Severity of the ADS

The internal structure and the cross-structure analysis of the ADS have been consistently found to represent a single dimension. In the original description of the ADS emphasis was also given to the fact that the syndrome existed along a continuum of degree of severity (Edwards and Gross, 1976). Empirically there is considerable evidence that individuals who are misusing alcohol can be ordered along a dimension of severity. The severity of the ADS has been assessed in different populations.

Skinner (1982, 1990) showed that patients attending an alcohol clinic had scores on the ADS that conform quite closely to a normal distribution. Meehan et al (1985) analyzed the total scores of the SADQ and found that it varied along a continuum. They could not identify a normal distribution of the total scores but there were two groups of patients identified around a cut-off point of 23 points in the SADQ. Davidson and Raistrick (1986) compared the SADQ and the SADD and found that the SADQ had total scores skewed to the left indicating that it may have been somewhat less able to discriminate between individuals in the mild to moderate range of dependence. However, the SADD was able to identify with a good degree of spread with Shapiro-Weisberg normality statistic approaching significance, indicating a good spread of responses. Doherty and Webb (1989) studied in-patients that were assessed by the SADQ and SADD. They showed that both questionnaires had their scores unimodally distributed along a degree of severity.

Woody et al (1993) in a study of the DSM-IV field trials studied the severity of dependence on alcohol using the CIDI-SAM in a sample of 1100 subjects from the general and clinical population. The severity ratings were defined by the number of positive DSM-IV criteria (version used during the Spring of 1992) reported: mild 3-4, moderate 5-6, and severe 7-9. Severity correlated reasonably well with measures of quantity and frequency of use. A study of general population has also provided support for the identification of the severity of the ADS. Using data from a US national survey, Hasin & Glick (1992) studied 4000 respondents who met criteria for DSM-III-R alcohol dependence, in terms of severity of dependence. Severity was defined by the number of positive DSM-III-R criteria reported: mild 3-4, moderate 5-6, and severe 7-9. They found a gradient of severity with 73.7% classified as mild, 17% as moderate and 9% as severe.

1.8 - Test-Retest Reliability and Temporal Stability of the ADS

The studies discussed in the previous sections have showed that there is evidence for an internal consistency, cross-structure and degree of severity of the ADS. Another

aspect that was implied in the original description of the ADS is that it is a condition that has its clinical course presented with a consistent clinical patterns over a reasonable period of time. Temporal stability is sometimes evoked to assess the validity of psychiatric diagnoses (Beiser, Iacono and Erickson, 1989; Blashfield and Livesley, 1991; Nelson-Gray, 1991). Short-term stability must be expected if a diagnosis is to be clinically significant. The assumption is that, the more stable the diagnosis, the more likely it is to reflect a psychopathological process. However, temporal stability is expected for the diagnostic criteria of some diagnostic categories but not for others (Blashfield and Livesley, 1991). For the ADS, temporal stability of the diagnosis is expected to be stable over at least the short term.

One way of assessing temporal stability is through the consistency of diagnosis over a period of time. Inconsistency in diagnosis across time can be attributed to either poor reliability of the instrument or poor validity of the construct. Rice et al (1992) discussed the sources of disagreement between ratings in test-retest reliability studies and maintained that they were either due to error in the measuring instruments or to true change in the state itself. In the temporal stability paradigm, it is assumed that some of the error components will be uncorrelated between assessments, and this reflects true change in the state. Accordingly, we use the term stability rather than long term reliability to indicate this. Thus, there is a distinction between assessing the repeatability of the diagnostic instrument (reliability) and the use of multiple measures to assess the validity of the underlying constructs (stability).

Several studies have showed evidence of the stability of the diagnosis of alcohol dependence. Stockwell et al (1979) asked 45 subjects to complete the SADQ and then to do so again 2 weeks later. They found a Pearson correlation coefficient of 0.85 between the overall total scores. McMurrin and Hollin (1989) re-administrated the SADD from 19 to 40 days later and found a correlation of 0.88 ($p < 0.001$). Cottler et al (1989) using the CIDI-SAM interviewed patients twice, one week apart. For the alcohol dependence diagnosis, using DSM-III-R criteria, they found a kappa value of 0.92 and Yule's Y of 0.89. Williams et al (1992) used the Structured Clinical Interview (SCID) in a multi-site test-retest reliability study, with the second interview

administered between one day and two weeks later. The diagnosis of alcohol dependence had a Kappa of 0.75 for the whole sample and 0.83 for a group of patients in the researchers' own Substance Abuse Treatment Unit. Raistrick et al (in press) using a new questionnaire, the Leeds Dependence Questionnaire (LDQ), calculated a test-retest reliability over an interval of 2 to 5 days with a total score retest reliability of 0.95

In summary, although the studies discussed in this section have not been designed to assess temporal stability but rather to assess test-retest reliability, they are able to show that the diagnosis of the ADS is stable over short periods of time. The advantage of using the emphasis of the temporal stability paradigm is that it seems that it is less prone to error of measurement because it assumes that agreement reflects the component corresponding to true clinical state (Rice et al, 1992) and in the context of the ADS it offers more important information in terms of its validation.

1.9 - Criterion-related Validity and the ADS

Validity always requires one or more external criteria that can be applied to the issue under study. The external component of validity refers to the extent to which the measures of the construct relate to other indicators implied by the underlying theory. Criterion-related validity is the evidence that demonstrates that scores on a test are related to some defined criterion measure of interest, not just any criterion, but those that make most sense on theoretical grounds (Messick, 1989; Suen, 1990). A distinction used to be made between two types of criterion-related validity: predictive and concurrent. There is little substantive difference between these two types of criterion-related validity. The only difference is in the exact time when the criterion measurement is made (Suen, 1990). Predictive validity is the extent to which the test score can be used to predict the score from a criterion measurement procedure that will take place at some future point in time. Concurrent validity is the relationship between the scores on the test and the criterion measure taken at the same time. The selection of a specific criterion is determined largely by the values and goals of a particular study.

Three main groups of studies can be identified in relation to the approach used in criterion-related validity research of the ADS construct. The first group of studies assess behaviour that occurs in association with alcohol dependence over a period of time in clinical and general population settings. The second group of studies assess behaviours associated with alcohol dependence under laboratory conditions. The third and larger group of studies assess the outcome of patients after treatment for drinking problems and its association with the severity of alcohol dependence. These three groups of studies are discussed in the following sections.

1.9A - Correlational Studies

Research in clinical populations have shown that alcohol dependence is associated with a number of medical and social consequences. One important area of study has been the relationship between alcohol dependence and alcohol related problems. Implicit in the concept of the alcohol dependence syndrome is the view that alcohol-related problems constitute a dimension which is conceptually separate from dependence. Drummond (1990) found a positive correlation ($r=0.63$; $p<0.001$) between problems caused by drinking, as measured by the Alcohol Problems Questionnaire (APQ), and the severity of dependence, measured by the SADQ. Dependence was particularly associated with problems related to friends, as well as physical, affective, financial, marital and work problems. Furthermore, this correlation existed independently of the average quantity of alcohol consumed. Allan (1991) also found, in a sample of clients attending counselling for alcohol problems, that psychological symptoms measured by the General Health Questionnaire (GHQ) and total SADQ scores correlated at 0.4 ($p<0.001$).

Caetano (1993) found that severity of dependence, measured using DSM-III-R indicators, was one of the most powerful predictors of medical consequences in a sample of alcoholic patients. Clients reporting 7-9 indicators had a higher prevalence of medical and social consequences compared to clients reporting 3-6 or 0-2 indicators. The predictive power of the number of dependence indicators on the number of medical consequences reported was independent of sociodemographic characteristics. Multiple

regression showed that the number of dependence indicators were one of the most powerful predictors of all medical consequences.

Another important criterion related to the ADS is the amount of alcohol consumed over a period of time. Grant and Harford (1990) evaluated the risk of alcohol dependence at different levels of alcohol intake. The data used were drawn from a multistage probability survey designed to yield a representative sample of 5,221 adults from the U.S.A. Using linear logistic regression analyses to separate the association between average daily alcohol consumption and DSM-III-R alcohol dependence, they found that the risk of dependence increased with higher consumption. Frequency of heavy drinking has also been associated with degree of dependence. Caetano (1991) in a general population study and using multiple linear regression found that frequency of drinking 5 or more drinks per occasion was the only significant predictor of alcohol dependence. He also found similar results in a clinical population. Dawson and Archer (1993) in a study based on the NHIS88 also found that the relative frequency of heavy drinking had a strong positive association with the risk of past-year alcohol dependence, even after adjusting for the potentially confounding effect of average daily ethanol intake.

1.9B - Experimental Studies

Several studies have looked at dependence using experimental procedures, including ones that have measured the response of an alcohol dependent subjects to a challenge dose of alcohol (Rankin et al, 1979; Hodgson et al, 1979; Stockwell et al, 1982; and Kaplan, 1983). These studies have changed previous ideas about the influence of cognitive factors. The results of these papers suggested that alcohol dependent subjects were more disposed to drink after alcoholic drinks than after soft drinks, irrespective of whether they believed that the priming drink contained alcohol. Cognitive factors assumed greater importance in the drinking behaviour of less dependent subjects.

Dependence has been found to be related to cue reactivity in several studies (Kaplan, 1983; Monti et al, 1987). Alcoholics with a greater urge to drink in response to a

series of alcohol related role-play scenes drank more alcohol during the six months following treatment (Rohsenow et al, 1991). Rohsenow (1992) tested the factors that predicted an increase in the urge of alcoholics to drink in high risk situations, such as exposure to their customary alcoholic beverage. In two studies she found that cue reactivity was greatest among those with more severe alcohol dependent histories. Changes in salivation and urge to drink were both significantly associated with higher ADS scores ($r=0.65$, $p<0.01$).

In a recent study Glautier and Drummond (in press) studied a group of 35 severely dependent alcoholic patients undergoing a cue exposure treatment programme. Their approach to the magnitude of cue reactivity was to examine the relationship between individual elements of the dependence construct and responsiveness to cues. They created a measure of responsiveness based on physiological and subjective responses to drinking cues which were measured on the first day of the exposure programme. Principal component loadings were used to construct a single measure of responsivity. This multivariate measure of responsiveness was found to correlate significantly with SADQ scores, but was independent of levels of alcohol consumption. In particular, experience of affective withdrawal symptoms, craving for alcohol and drinking to relieve withdrawal symptoms were most strongly correlated with cue responsiveness ($R=0.56$, $p=0.001$).

1.9C - Outcome Studies

Outcome studies have proved to be one of the most important and widely applicable methods for assessing the criterion of validity in psychiatry (Kendell, 1989). This happened because the ability to predict the future course of events, and to alter them if necessary, has been a primary function of medicine (Kendell, 1989). Indeed, a more or less distinctive natural history has always been inherent to the concept of a syndrome. The outcome studies of the ADS have showed that it has predictive utility in terms of the natural history of drinking (Chick, 1985). These studies have however, evolved over the years to show the exact role of dependence in the patterning of the outcome.

Early outcome studies reported that there was a relationship between dependence and outcome in terms of drinking behaviour in groups of treated patients. Orford, Oppenheimer and Edwards (1976a) reported on the progress of 100 problem drinkers two years after attendance in a treatment trial. A seven-item scale, concerned with morning drinking, tremors, nausea, loss of control, passing out when drunk and hallucinations given prior to attendance predicted very closely the type of drinking outcomes. Polich et al (1980) also studied the relationship between patients achieving good outcome and levels of dependence. They found that the ability to maintain non-problem drinking decreased as the severity of dependence increased. In terms of the overall outcome, alcohol dependence symptoms related to an unfavourable prognosis, being associated with adverse consequences of drinking, continued dependence, and alcohol-related death. The analysis, using logit analysis, revealed several variables that affected relapse rates, including severity of dependence, age and marital status. Osejo (1981) reported a 15 year longitudinal study of a community sample of 96 alcoholic men from Sweden. Symptoms of dependence were found to have predictive power in terms of remission. At fifteen years 51% of 'abusers' were in remission compared to only 14% of 'addicts' (62% were still dependent). Similar results have been obtained in other studies using different populations (Vaillant et al, 1982).

More recently outcome studies have started to examine the importance of dependence in association with other variables in the patterning of the outcome. This happened because evidence was accumulating that outcome could not be conceived as a simple unitary dimension, but as a process in which the alcohol dependence variable had an important role in association with other variables. McLellan et al (1983) evaluated male alcoholics six months after treatment in rehabilitation programmes. They found that both severity of dependence and psychiatric symptoms were good predictors of outcome, but that psychiatric symptoms alone were more robust as outcome criteria. Rounsaville et al (1987) performed a one-year follow-up study of 266 alcoholics who had received extensive psychiatric assessment using DSM-III criteria. Degree of dependence, measured at intake, was significantly correlated with a poorer one-year outcome for 10 out of 13 ratings for men. Two other factors were also found to

predict outcome: psychiatric diagnosis and a global assessment of psychopathology as measured by the MMPI.

Taylor et al (1986) in a ten year follow-up study collected information on 68 male alcoholics as a basis for exploring patterns of outcome using multivariate analysis. A Principal Component Analysis of several outcome variables showed that degree of dependence was intrinsic to the pattern of outcome but that there were several possible relationships between dependence and outcome. Outcome was represented by two factors that accounted for 40% of the variance. Dependence, measured by the SADQ, had a 0.38 loading on the first factor and 0.72 on the second. The authors described that dependence had a 'Janus' effect, whereby high dependence was related to both good and bad outcome in different circumstances. Babor et al (1987b), in an effort to find the most efficient way to measure treatment response, evaluated the relationships between a large variety of outcome variables using factor analysis. They followed up 321 alcoholics, with DSM-III-R criteria for alcohol dependence, for one year after discharge. The analysis of the structure of follow-up variables revealed one factor that was most clearly defined in terms of intensity of drinking (average ounces per drinking day), alcohol dependence and alcohol-related problems. A second factor was defined by measures of psychological and social functioning and frequency of drinking.

Using a different approach, Babor et al (1992) initially studied an empirically derived typology of alcoholism and later tested response to treatment. A clustering technique was applied to data obtained from 321 male and female alcoholics to identify homogeneous subtypes. One group, designated type A alcoholics, was characterized by later onset, fewer childhood risk factors, less severe dependence, fewer alcohol related problems, and less psychopathological dysfunction. The other group, termed type B alcoholics, was characterized by childhood risk factors, familial alcoholism, early onset of alcohol-related problems, greater severity of dependence, more chronic involvement in treatment, and greater psychopathological dysfunction. In a development of the previous study Litt et al (1992) assessed the outcome of seventy nine male alcoholics (of both A and B types) that were randomly assigned two different kinds of treatment (coping or interactional therapy). Analysis of outcome indicated that type

A alcoholics fared better in interactional treatment, whilst type B alcoholics had better outcomes with the coping- skills treatment. Differences in treatment response were maintained for two years.

In a recent longitudinal study of a sample of the general population, Hasin et al (1990) used criteria of dependence based on DSM-III-R to explore the differentiation of alcohol abuse from dependence in terms of natural history. A 4-year follow-up of the 71 men who initially had only initial indicators of alcohol abuse, 50 (70%) continued to report only indicators of alcohol abuse (N=17) or remission (N=33), and the remaining 30% (N=21) reported indicators of alcohol dependence. In contrast, of the 109 men with initial indicators of alcohol dependence, 50 (46%) still reported indicators of dependence 4 years later, and 59 (54%) reported indicators of abuse only (N=16) or were in remission (N=43). The differences in outcome between the two groups of abusers and dependent drinkers were statistically significant (Chi-Square=4.12, df=1, $p < 0.05$).

In summary, the criterion related validation of the ADS offers a multifaceted quantity of evidence supporting the construct. The most unequivocal evidence concerns the correlational studies which showed that alcohol dependence is associated with different measures of alcohol related problems in different populations. The laboratory studies have also showed clearly that alcohol dependence is associated with different forms of cue reactivity. The results of the outcome studies are less obvious to interpret. There has been an evolution in these studies from the early days when dependence was expected to determine the outcome, to a more recent focus where dependence is considered as one of the variables that influence outcome. However, there is still much to be explored in the interaction of dependence with other variables in the patterning of outcome. The utility and relevance of outcomes cannot be fully appraised in the absence of a sound empirically grounded interpretation of the concept of ADS and other variables (Messick, 1989). The unified view of validation has shifted the focus from prediction to explanation. It can be argued that a better prediction of the role of the ADS in the outcome will only be achieved with a better measurement of its relationship with the other variables.

1.10 - Measurement of dependence on other drugs

In 1980 a WHO Scientific Group (Edwards et al, 1981) suggested the possibility of extending the dimensional dependence model of the ADS to a spectrum of other drugs. This extension makes information related to studies of these drugs theoretically relevant to the validation of the ADS construct. In the last seven years most of the studies of the more general drug dependence syndrome have examined its dimensionality. In one of the first of these studies Skinner & Goldberg (1986) assessed 105 polydrug users with the Drug Abuse Screening Test (DAST). This instrument has items covering perceptions of a drug abuse problem, dependence symptoms, and various consequences related to drug abuse. They found a five factor Varimax solution which accounted for 55% of the variance. One of the factors was related to the dependence syndrome with three items loading very highly : inability to stop drug use, inability to get through the week without drugs, and withdrawal symptoms when drug use stopped. These items loaded on a factor distinct from other factors relating to problems associated with drug abuse.

A more recent strategy has been to assess the dimensionality of the syndrome in respect of specific drug. One group of drugs that has been extensively studied is the opiates. Previous work with the SADQ was the starting point for early studies of drug dependence in opiate users. Several studies (Sutherland 1986, Phillips 1987, Sutherland 1988, Burgess 1989) using different populations (outpatients in New York, DDU patients in London and Australia) contributed to the development of the Severity of Opiate Dependence Questionnaire (SODQ). It was designed to be comparable with the SADQ and bears a close resemblance to that instrument. A high degree of stability has been found for the psychometric properties of the SODQ across the different samples studied. The factor structure has shown a strong first factor accounting for 40% of the variance, with items conceptually related to a dimensional model of the opiate dependence syndrome. In another study of opiate users, Stripp et al (1990) used DSM-III-R criteria to investigate the unidimensionality of the syndrome. They used a latent trait modelling framework to analyze the data and the findings also supported a unidimensional concept of the drug dependence syndrome.

Bryant et al (1991) evaluated in great detail the dependence syndrome for cocaine in terms of syndrome coherence and the continuum of severity. They based the diagnosis on DSM-III-R criteria derived from structured clinical interviews with 399 cocaine users and analyzed the data using confirmatory factor analysis. They showed that a single factor provided a good representation for most of the nine criteria (as measured by a coefficient of fit). Amphetamine dependence has been studied by Churchill et al (1993) who created a questionnaire similar to the SADQ and the SODQ. They found, using factor analysis, a unidimensional structure similar to the studies with alcohol and opiates.

Two studies used DSM-III-R criteria for substance abuse in a population of drug users without a drug-specific diagnosis. Kosten et al (1987) examined the structure of the dependence syndrome for various substances in a group of predominantly polydrug users. Factor analyses indicated support for the unidimensional concept for opiates, cocaine, and alcohol, but not for sedatives, hallucinogens, stimulants and cannabis. However, Cronbach's alpha was higher than 0.83 for all drugs studied. Hasin et al (1988) studied drug-using subjects from an alcohol rehabilitation unit and explored the unidimensionality of the drug dependence syndrome. Principal Component Analysis showed that for cocaine, opiates, tranquilizers, barbiturates, and stimulants one factor represented the items very well, accounting for between 30% and 50% of the variance. Feelings of dependence on a drug, unsuccessful attempts to cut down, and tolerance, loaded highly on each of the drug factors.

Cross-structure analysis of the drug dependence syndrome was studied by Rousanville et al (1993) in a sample of 521 subjects from different treatment settings. They assessed the measures of internal consistency of the dependence criteria from DSM-III-R, DSM-IV and ICD-10 using the structured interview CIDI for cocaine, opiates, alcohol, marijuana, stimulants and sedatives. High levels of agreement were found across the three diagnostic systems and across most categories of drugs ($> .80$), with marijuana consistently associated with lowest levels (.70 - .81). Exploratory factor analysis was employed to assess the factor structure of the three diagnostic systems and

across all drug types. All factor analyses yielded a one-factor solution with loadings of 0.64 or above for all items.

There has also been evidence in terms of the criterion-related validity of the drug dependence syndrome. Gossop et al (1992) investigated the relation of severity of dependence upon heroin, cocaine and amphetamines and a series of criteria. Route of administration of the drug, dose and duration of drug use and previous attendance at a drug treatment agency were associated with severity of dependence measured by the Severity of Dependence Scale (SDS). Kosten et al (1992) in a 1-year follow-up found that dependence syndrome severity predicted treatment success for a group of users.

In summary, there is strong evidence that the concept of the dependence syndrome can be extended to others drugs of abuse. The process of validation of the drug dependence syndrome is following a similar pattern and showing similar strengths than the ADS. The evidence for a unidimensional structure is quite convincing for most of the drugs. Others aspects of validation have not yet been so thoroughly examined but they seem to be comparable to the ADS.

1.11 - Conclusion and objectives of the thesis

The process of validation of the Alcohol Dependence Syndrome has progressed steadily over the past seventeen years. The situation is now far advanced compared to the early days following the ADS description, when even its existence as a construct had to be justified and defended (Hodgson, 1980). Over the years one aspect of the ADS that has been particularly studied is its internal structure. These studies have followed a hidden research programme which considered the verification of the dimensionality of the syndrome as the main goal. They have shown a remarkable similarity in terms of the coherence and dimensionality of the syndrome. The findings are particularly impressive because of the diversity of methods and populations examined. Other areas of the validation process have received proportionally less attention, but the evidence

seems to suggest that the ADS has become a sound construct. Therefore, the question arises : how should the validation of the ADS be carried forward ?

One possible answer is to make progress in the direction of improving the relationships with others related constructs. In the psychological literature Cronbach and Meehl (1955) pointed out that the meaning of a construct increases when its relation with other constructs improves in a meaningful way. They stated that a construct is defined by the network of associations that they called a nomological network. The basic notion of nomological validity is that the theory of the construct being measured provides a rational basis for deriving empirically testable links between the measurement of the construct and measures of other constructs. Construct validation ultimately rests on studying relations between the construct in question and other constructs or variables in a theoretical context (Pedhazur and Schmelkin, 1992). Very few studies discussed before in this chapter could be said to have increased the nomological validity of the ADS. The studies that have looked at the association of the ADS and alcohol-related problems, and in many respect the studies of outcome of treatment and ADS increased the nomological network because they improved the theoretical relation between the two concepts. However, the difficulty with this approach to the improvement of the validation of a construct is that it needs a mature construct, a construct with a well advanced level of measurement. Messick (1989) recommended that for this reason testing a nomological network is more appropriate in a mature construct validation program than in a beginning one.

The other more feasible option is to improve the internal validity of the ADS. Internal validity in this context is related to the ways the different elements of the syndrome relate to each other. It is different from internal consistency, which relies on the sample adequacy of the items of a construct. The idea behind internal validity is that high indicators on the construct should score highly on other presumed indicators of that construct. This leads one to expect a 'convergence of indicators' across the several aspects of the construct being measured (Messick, 1989). Babor (1986) has also specifically suggested that the validity of the ADS would benefit from clarification of the relationship between cognitive, behavioural and physiological elements.

Very few studies have looked at the internal validity of the ADS. Stockwell et al (1983) examined the correlation between an interview that measured what they defined as narrowing of drinking repertoire and the SADQ score. Using multiple analysis of variance, with the SADQ score as the dependent variable, they found that narrowness, both in terms of limited variability between and within heavy drinking days, contributed significantly to the variance ($p < 0.001$) in each instance. In their categories of drinking: 'mainly continuous' and 'mainly binge', drinkers tended to have higher SADQ scores than 'occasional abstainers'.

Two studies have looked specifically at the speed of reinstatement in relation to the severity of dependence. Topham (1983) in a prospective study of 48 patients undergoing treatment for alcoholism found that, after six months, 19 of these patients had by their own definition relapsed. Symptoms such as sweating, shaking and craving were related to the degree of dependence at $p < 0.001$ level, and to the length of time it took for morning drinking to return ($p < 0.01$). Babor et al (1987a) studied the reinstatement of dependence following a period of abstinence in a group of 321 alcoholic patients. They tested the hypothesis that the greater the degree of dependence at admission, the more likely the syndrome would be reinstated once drinking was initiated following a period of abstinence. They found that among alcoholic patients, both recent and lifetime alcohol dependence measures were moderately predictive of reinstatement of alcohol dependence at 1-year follow-up. Furthermore the severity of dependence, as measured by the Last 6 Months of Drinking Questionnaire, correlated with reinstatement in males (coefficient = 0.47, $p < 0.01$).

The main aim of the thesis is to develop measurements of several elements of the ADS and assess their relationship. Four elements of the ADS were chosen to be measured: narrowing of drinking repertoire, subjective awareness of compulsion to drink, salience of drink-seeking behaviour and repeated withdrawal symptoms. Except for the repeated withdrawal symptoms which already has a questionnaire suitable for its measurement, the other three elements had new forms of assessment especially created for the project.

The structure of the thesis is as follows: the next four chapters describe the development of the questionnaires designed to measure elements of the ADS. In chapter 2 the evolution of ideas related to the subjective aspects of drinking is discussed and a new questionnaire specifically designed to measure the subjective awareness of a compulsion to drink is proposed. In chapter 3 the evolution of the ideas of the description and classification of patterns of drinking behaviour is discussed and a new method of measuring drinking repertoire, based on a structured interview and on a series of questionnaires, is proposed. In chapter 4 the factors that reduce or stop drinking will be reviewed and a questionnaire designed to measure salience of drink-seeking behaviour in the form of modifiers of drinking behaviour will be presented. In chapter 5 the ideas contributing to the measurement of the alcohol withdrawal symptoms are presented; it also describes a questionnaire widely used to measure the ADS, the Severity of Alcohol Dependence Questionnaire (SADQ). The structure of these chapters is very similar, they start with a historical evolution of the main ideas that contributed to the identification and measurement of the element, discuss in more detail its importance in terms of the ADS construct and propose a model on which its measurement will be based. In chapter 6 the design of the survey of a group of patients attending clinical facilities for treatment of drinking problems is described. In chapter 7 the results of the whole survey are presented followed by a statistical analysis of each questionnaire. In chapter 8 a general discussion of the contribution of these new questionnaires for the validation of the ADS is presented.

Chapter 2 - Measurement of Subjective Altered State

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2.1 - Early ideas of Subjective Experience with Alcohol

Although the idea of excessive drinking being associated with a subjective influence was a product of the nineteenth century, elements of this idea were to be found in the eighteenth century and before. For Levine (1978) the American literature on alcohol in the 17th century and for most of the 18th century seemed to assume that people drank because they wanted to and not because they 'had' to. During this period, there was a widespread view that alcohol did not permanently disable the will, was not addictive, and that habitual drunkenness was not a disease. The word compulsion was not used in relation to the consumption of alcoholic beverages. Instead, the most commonly used words were love and affection. The drunkard's sin was the love of excess drink to the point of drunkenness. Drinking was regarded as something over which the individual had final control; if he chose to drink to excess, that was an individual choice, not an inherent compulsion. Thus, Increase Mather in 1653 (in Levine, 1978) distinguished between one who is 'merely drunke' and a drunkard:

"He that abhors the sin of Drunkenness, yet may be overtaken with it, and so drunken; but that one Act is not enough to denominate him a Drunkard; and he that loveth to drink Wine to Excess, though he should seldom be overcome thereby, is one of those Drunkards."

This was an important characteristic of early ideas on excessive drinking and radically different from contemporary notions. Insofar as the traditional view raised the question of the drunkard's experience or feelings, it was to describe the drunkard as one who loved to drink to excess, who loved to drink and get drunk. Drunkenness was a choice, albeit a sinful one, which some individuals made. In this period there was no difference between 'desire' and 'will'. Levine (1978) attributes the later change of attitude to the philosophical influence of Locke, who stated that it was possible to differentiate between 'desire' and 'will'. This distinction is important to much modern thought and is at the heart of the concept of addiction (Berridge, 1990). Authors such

as Jonathan Edwards in 1754 (in Levine, 1978) reacted against Locke's ideas; to him desire and will were identical. He rejected the idea that the drunkard could be compelled by appetite or desire to do something against his will. In Edwards's view people chose things which 'appear good to the mind', by which he meant 'appear agreeable, or seem pleasing to the mind' and also that 'A man never, in any instance, wills any thing contrary to his desires'. He chooses the drunkard to illustrate his view:

"Thus, when a drunkard has his liquor before him, and he has to choose whether to drink or no... if he wills to drink, then drinking is the proper object of the act of his Will; and drinking, on some account or other, now appears more agreeable to him, and suits him best. If he chooses to refrain, then refraining is the immediate object of his Will and is most pleasing to him."

In England, Porter (1985) has shown that many Georgian doctors had already described situations in which drinking was motivated by an overwhelming subjective desire. These doctors had a quite sophisticated awareness of the interplay between psyche, habit and alcohol dependence. George Cheyne in 1724 expressed ideas on how old soaks eventually succumbed to alcohol 'cravings' (Porter, 1985). He saw drinking as establishing 'Necessity upon necessity' (Porter, 1985). Lettsom, writing in 1787, had offered a comparable vision of the fatal downward spiral, leading from tipping for stimulus, relief or exhalation, to low spirits, which were its inevitable after effects; which in turn could be obliterated only by further bouts of yet heavier drinking:

"...those of delicate habit, who have endeavoured to overcome their nervous debility by the aid of spirits; many of these have begun the use of these poisons from persuasion of their utility, rather than from love of them; the relief, however, being temporary, to keep up their effects, frequent access is had to the same delusion, *till at length what was taken by compulsion, gains attachment and a little drop of brandy, or gin and water, becomes as necessary as food.*" (in Porter, 1985)

2.2 - First Half of the Nineteenth Century: The 'Emergence' of Addiction

If there are differences of opinion about when authors started to use subjective words to describe the effect of alcohol, few would disagree that the idea of addiction became established in the early nineteenth century. Terms like 'overwhelming', 'overpowering' and 'irresistible' started to be widely used to describe the desire for liquor. Most of the descriptions of drinking behaviour at that time were made by doctors, whose orientation led them to look for behaviour or symptoms beyond the control of the will. They emphasized a certain element of irrationality and subjectivity to the desire to drink.

Trotter (1804) in England wrote vivid accounts of the subjective experience of excessive drinking. He used expressions such as 'addicted to ebriety' to describe how the element of irrational need for alcohol was very much present. He maintained that the mind received impressions that were in conflict with the free will:

"It is to be remembered that a bodily infirmity is not the only thing to be corrected. The habit of drunkenness is a disease of the mind. The soul itself has received impressions that are incompatible with its reasoning powers...; *for the cravings of the appetite for the poisonous draught are to the intemperate drinker as much as the inclinations of nature for the time, as a draught of cold water to a traveller panting with thirst in a desert.*" (italics added)

Benjamin Rush (1791) in America called chronic drunkenness a 'disease' or a 'derangement of the will', and emphasised the evolution of the motivation for drinking: "Drinking began as an act of free will, descended into a habit and finally sank to a necessity." He stressed that drunkards were 'addicted' to alcohol and that the drunkard could no more control his drinking impulses than he could control a convulsive movement of his arm or foot which took place in spite of his will. When describing one of his patients, the element of irrationality and need involved in the disposition to drink is clear:

"[an habitual drunkard] said. 'Were a keg of rum in one corner of a room, and were a cannon constantly discharging balls between me and it, I could not refrain from passing before that cannon, in order to get at the rum.'"

Even authors who believed that excessive drinking was only a symptom of a specific disorder stressed the subjective experience of the patients. Bruhl-Cramer in 1819 argued that habitual drunkenness was the result of a disease of the nervous system which produced an irresistible craving for alcohol, which he called 'dipsomania'. For him the desire for intoxicating beverages "appears to consist of an actual stimulated condition of the whole nervous system, but in which the prevailing manifestation is in the region of the stomach" (cited in Bynum, 1968). However, he defined dipsomania simply as an abnormal, involuntary craving for alcoholic beverages (Bynum, 1968). He thought that an attack of dipsomania - a sudden desire and even need for alcoholic beverages - was entirely analogous to an acute attack of chronic gout. "Dipsomania consists of an increased impulse, or an involuntary desire for the use of ardent spirits. Since we cannot make such an impulse into an actual concept, but rather at best only into a symbolic representation, we must take into consideration other analogous specific impulses." (cited in Bynum, 1968)

Esquirol (1772-1840) assimilated habitual drunkenness into his category of monomania. He called alcoholism an impulsive monomania and thought of it as a symptom but not a disease (Bynum, 1968). In his view just as some people, sane in other respects, had deluded perceptions and ungovernable appetites (e.g. sex), others were possessed by irresistible impulses to drink. Alcoholism was:

"a lesion of the will. The patient is drawn away from his accustomed course to the commission of acts, to which neither reason nor sentiment determine, which conscience rebukes, and which the will has no longer the power to restrain. The actions are involuntary, instinctive, irresponsible. This is monomania without delirium." (in Bynum, 1968).

2.3 - Second Half of the Nineteenth and Early Twentieth Century

Babor and Lauerman (1986) comprehensively reviewed the literature on typologies of drinking behaviour from the late 19th and early 20th centuries and found 39 different classifications of alcoholics published in the world literature between 1850 and 1941. The number of classifications found in this period shows that the literature on alcohol was embedded in a rich tradition of speculation, theory, and clinical observation. The French suggested hereditary causes, the Americans suggested psychological ones, the Germans emphasized both, and the British stressed criteria of dependence. Despite these apparent differences in classification criteria there are a number of common themes running through these typologies. In particular the presence, absence or scheduling of craving is frequently cited to differentiate patterns of consumption and types of addiction. Babor and Lauerman (1986) found that subjective experience of a need for alcohol, described in terms of craving, was among the four most frequent criteria that appeared in almost all typologies.

Thomas Crothers (1893) in America proposed a typology organized around two concepts; inebriety and dipsomania (Babor and Lauerman, 1986). Inebriety for him was a more general term referring to habitual drunkenness, but dipsomania was used to describe a large and special class of inebriates "in which the drink impulse comes on suddenly and after a time dies out, and is succeeded by a free interval". In England, Hugh Wingfield (1919) proposed two types of chronic alcoholics and two types of dipsomania (Babor and Lauerman, 1986). In chronic sober alcoholics the patient regularly drinks to excess but is never intoxicated, except by accident. Craving occurs in these patients only if alcohol is cut off. A second type, chronic inebriate alcoholism, resembles the first except that the patient is never sober. The third type, pseudodipsomania craving, appears only after alcohol is consumed. The final type, true dipsomania, is where craving occurs spontaneously.

By the early 20th century a new and distinct idea about the subjective influence on drinking can be recognised in the writings of authors influenced by Freud and other

European theorists exploring the dynamic unconscious and the use of alcohol. Nicoll (1920) expressed this new views:

"...the need for alcohol does not become imperative unless there is a great discrepancy between the conscious and the unconscious - that is, when there is a large amount of psychological energy lying in the unconscious under a symbol that is far removed from the possibility of conscious application."

Several authors linked habitual excessive drinking with the subjective need for drinking as part of the concept of obsessive compulsive neurosis. Chambers (1937) proposed that in some individuals drinking alcohol could be a symptom of an underlying "alcoholic compulsion neurosis". Later in 1951 Wexberg, in a review of the causes for uncontrolled drinking, raised the possibility that such drinking was "a compulsion comparable to those in obsessive-compulsive neurosis".

2.4 - Influence of Jellinek and Alcoholics Anonymous

In the writings of Jellinek (1946, 1952, 1960) there is a recognition that there is an element of subjective need in the drinking behaviour of the alcoholic. This element is comprehensively described in all the literature of the period under different concepts and observations. In his early work Jellinek (1946) shows the strong influence of early psychoanalytical ideas when, in the description of the drinking history of alcoholics, he identified what he called an 'acute compulsive phase' and a 'chronic compulsive phase'. But it was with the two concepts of 'craving' and 'loss of control' that were at the heart of his ideas that the subjective influence in the drinking behaviour can best be exemplified. These concepts were given a slightly different emphasis in some of Jellinek's writings but were always of fundamental importance. In Jellinek's (1952) paper on the phases of alcohol addiction he gave one of the first definitions of the loss of control phenomenon. He stated:

"Loss of control means that any drinking of alcohol starts a chain reaction which *is felt by the drinker* as a physical demand for alcohol. This state,

possibly a conversion phenomenon, may take hours or weeks for its full development; it last until the drinker is too intoxicated, or sick to ingest more alcohol." (*italics added*)

For Jellinek, craving was central to the notion of alcoholism, being the affective component both of the physical withdrawal syndrome and also of the expectation of psychological relief. Craving or 'a compulsion to drink regardless of the consequences' appears as the subjective accompaniment of an objectively observable loss of control over drinking. In his book Jellinek (1960) clearly emphasized the subjective element:

"the obsessive belief that ultimately a sufficient amount of alcohol will bring about the tension reduction which, before the loss of control, was achieved quite easily." and added that "the demand for alcohol gives rise to the idea of 'craving'".

The concept of craving was also at the centre of the idea of alcoholism for Alcoholics Anonymous (AA). For William Silkworth (1950): "These men were not drinking to escape; they were drinking to overcome a craving beyond their mental control." In the AA Big Book (AA, 1939) it is explained that "alcoholics have one symptom in common; they cannot start drinking without developing the phenomenon of craving. The effect of alcohol on the alcoholic is the manifestation of an allergy, and only alcoholics experience a craving for alcohol". Excessive drinking during a bout was attributed to an inexorable craving that the alcoholic experiences once he has ingested alcohol (thus the statement 'one drink away from a drunk'). This craving was described as the manifestation of a physical allergy. The AA model is unidimensional in that loss of control over drinking is hypothesized as being a physiological response to the ingestion of alcohol.

2.5 - The World Health Organization and the Need for Definition of Craving

The idea of craving became so pervasive amongst professionals and was used with so many different connotations that it needed clarification. A meeting was sponsored by the WHO in 1955 at which scientists from many countries discussed 'The craving for alcohol' (Jellinek et al, 1955). They reached the consensus that "a term such as 'craving' with its everyday connotations should not be used in the scientific literature.... if confusion is to be avoided." Despite that final consensus, the word 'craving' was used throughout the whole report, including the final conclusion. A distinction was made between two processes involved in the subjective experience in excessive drinking. One process, which is operative immediately after withdrawal from alcohol, and in which the distressing withdrawal symptoms provoke the alcoholic to seek relief by the use of more alcohol, they considered to be a physical craving. The other process, that leads to a resumption of drinking after the disappearance of withdrawal symptoms, or the building up of psychological tension which provokes a 'pathological desire' for alcohol was viewed as psychological dependence on alcohol. Another important consensus of this meeting was that the participants clearly linked craving and loss of control with the manifest drinking behaviour of patients:

"The onset of the excessive use of alcohol, the drinking pattern displayed within an acute drinking bout, relapse into a new drinking after days or weeks of abstinence, continuous daily excessive drinking and loss of control are all behaviours which have been claimed to be manifestation of 'craving' of the same order."

2.6 - Behavioural Measurement of Subjective States

Since it was assumed that craving mediated between initial consumption and subsequent loss of control, the absence of such a pattern to drinking cast doubt upon this conceptualization of craving. In order to test the presence of these subjective states, studies were conducted in which the concepts of craving and loss of control were transformed into their equivalents in terms of drinking behaviour. Most of these

studies, which started with Mendelson (1964), adopted an operant paradigm and studied the drinking behaviour of alcoholics under laboratory conditions. Authors such as Mello (1974), argued that the concept of craving should be omitted from any description of addiction. These early behaviourists regarded craving and loss of control in the same way that they regarded other subjective states; as unobservable epiphenomena, the presence or absence of which could be assessed only through their effects on behaviour and were therefore redundant in the scientific explanation of human behaviour. Because craving, in particular focused upon the subjective /behavioral dichotomy, it was argued that it was an intervening variable and had no place in a science of behaviour which should be concerned only with observable responses, such as drinking behaviour.

A series of studies reviewed by Pattison, Sobell and Sobell (1977) showed that within a laboratory or hospital inpatient setting the drinking of chronic alcoholics was a function of environmental contingencies. These experiments showed that alcoholics could display social drinking for long periods of time; that a priming dose of alcohol, with the taste disguised, did not lead to an increase in reported craving; and that only a small proportion of alcoholics gave craving as their reason for starting to drink again after a dry period.

In the late seventies there was a resurgence of interest in the role of subjective states in addictive behaviour. One contributory factor was the relative decline in the influence of radical behavioural theories and the corresponding ascendancy of social cognitive models. These newer approaches were more accepting of the possibility that a hypothetical phenomenon, such as craving, might be of use in the conceptualization of addictive processes. One of the consequences was that the concept of craving became increasingly fragmented as individual researchers developed particular theoretical interpretations. These discrepancies between different interpretations of craving had an effect on the way that researchers operationalised and measured subjective states in the following years.

Most of these new studies used a combination of a self-report for measuring craving, based on a single item rating, and some sort of behavioural measure. Two main behavioural measures for craving were used in association with self-report; amount of work and speed of drinking. In terms of amount of work (lever presses) Ludwig and Wikler (1974) examined the effect of a single 'low' and 'high' dose of alcohol, administered during different situations, on reported craving and alcohol acquisition behaviour. A 'craving meter', that was a scale ranging from 0 to 100, was located on the work panel to measure intensity of craving. The behavioural measure was a five-minute work period based on the number of lever presses to the button that delivered alcoholic beverages. Kaplan et al. (1983) measured desire for a beer on a 1 to 5 scale (1 being no desire at all; 5 being an almost uncontrollable desire) and a progressive-ratio operant task designed as a behavioural measure of desire to drink. A higher rate of responding resulted in the reward (drink or lottery ticket) being given sooner.

In terms of speed of drinking (Hodgson et al, 1979; Rankin et al, 1979; Stockwell et al, 1982) craving tests took place three hours after consuming a morning primer drink. Measures consisted of a five-point rating scale for 'desire for a drink' and a speed of drinking test which measured the time taken to consume the first of five drinks available to the subject, and the total amount consumed. The authors told subjects (of whom ten were severely dependent and ten moderately dependent on alcohol) that they were exploring the effect of alcohol on mood and physiological responses, and accordingly took measures of both prior to giving the subjects a 'priming' beverage, which they were told was 'alcohol' or 'soft drink'. In either case, half the time this information was correct and half incorrect. All subjects were asked to predict how they would feel, fifteen and sixty minutes after the test drink, in terms of affective state, 'pleasant glow from alcohol' or 'desire to drink'. Assessments were carried out at these times, following which subjects were presented with two glasses of vodka and tonic and asked to drink them at their own speed prior to describing the effects they produced. The speed with which these test drinks were actually consumed was recorded. The moderately dependent group's speed of drinking was strongly increased by the belief that the priming beverage was alcoholic, regardless of the actual content. With the severely dependent group, however, this information had no effect on the

drinking speed, but a strong positive effect was found in relation to the actual alcohol content. The study shows that there may be a qualitative change in the processes underlying drinking behaviour as addiction progresses, with increasing dependence being associated with greater reactivity to the pharmacological content of a drink and with relatively less reactivity to cognition.

2.7 - Alcohol Dependence Syndrome and Subjective Experience

Subjective experience has a significant place within the construct of the Alcohol Dependence Syndrome, but its importance has varied according to the version of the concept that is being considered. In the original description of the syndrome, Edwards and Gross (1976) included one element called subjective awareness of a compulsion to drink (Table 1.2). This element was proposed as a more accurate representation of the patient's subjective experience than those descriptions based on the idea of loss of control and craving. Loss of control was criticized on the grounds that control over drinking is probably best seen as variably and intermittently impaired rather than lost. Craving was regarded as being too subject to environmental influences to be precisely described and used as a characteristic of the syndrome. Edwards and Gross (1976) pointed out that 'compulsion to drink' would better describe this subjective experience:

"Perhaps the key experience can best be described as a compulsion to drink, and though the analogy between alcohol dependence and compulsive disorder has not been considered very satisfactory in the past, the subjective experience of dependence may come close to fulfilling the classic conditions for a diagnosis of compulsion."

A slight change in emphasis concerning the 'compulsion to drink' occurs in the WHO publication of the Summary of the Consensus of the WHO Group of Investigators on Criteria for Identifying and Classifying Disabilities Related to Alcohol Consumption (Edwards et al, 1976). As far as the altered subjective state was concerned it was presented as an important part of the syndrome, but the compulsive characteristic was not underlined. Instead, the subjective state was described in terms of three compo-

nents: i) the awareness of the difficulty in keeping a wide repertoire of drinking, and the subjective report by the patients of 'impairment of control' over drinking as a better description of the previous 'loss of control' phenomenon; ii) the craving concept is considered as important but cautioned that it may hide a very considerable complexities; iii) the third aspect described 'drink centredness' as one element of the subjective report given by patients that is close to craving but not identical: "The individual reports that images of drinking may repeatedly enter his mind, that planning his drinking has acquired special salience and takes precedence over other goals". At this WHO meeting the researchers agreed that the subjective report is something difficult to use as a basis for scientific inquiry, but also agreed that the patient's description of the subjective experience should not be ignored.

Regarding 'compulsion for drink', Caetano (1985) convincingly argued that the dependent person's need for drink can qualify for the diagnosis of compulsion only on an extended definition of compulsion. But when examined in the light of the phenomenological characteristics of classical psychiatry, it fails to meet the requirements of an obsession or a compulsion:

"The subjective experience of the need to drink does not seem to occur in the presence of free will; it is not an impediment to effective action; its content cannot be seen as genuinely senseless; it is perceived as expressing a need of the self which is not present in obsessed patients; and the internal resistance it triggers does not lead to defensive compulsive rituals."

As shown on Table 1.3 the subjective element of the ADS has been part of most questionnaires measuring dependence and in all of them there is at least one item representing subjective need. Stockwell (1979) found that craving was part of the structure of the SADQ. Polich et al (1981) using a questionnaire from the Rand Report found that loss of control was part of the syndrome. Skinner (1981) found that 'loss of behaviour control' and 'preoccupation or compulsion with drinking' were core components of the dependence syndrome as measured by the ADS. Hesselbrock et al (1983) found 'compulsion to drink' to be an important aspect of the syndrome as measured by the LSMDQ. Davidson et al (1989) found that 'inability to stop' and

'subjective awareness of a need for alcohol' as part of the SADD. Kosten et al (1987) found that 'inability to cut down use' and 'use more than intended' were part of the syndrome using DSM-III-R criteria. The Edinburgh Alcohol Dependence Scale, developed by Chick (1980a), revealed that 'subjective need' was one of the components of the unidimensional syndrome, but 'impaired control' formed a dimension on its own right.

All of the above studies have used a single item in order to measure subjective states. The methodological difficulties of this approach will be discussed in more detail in section 2.8. However, Chick (1980b) had pointed out that of the elements of the ADS subjective awareness of compulsion to drink was the most difficult to operationalise. More recently one study used a multi-item scale to assess subjective experience. Heather et al (1983) compared objective and subjective measures of alcohol dependence as predictors of relapse following treatment. They used a ten item questionnaire to measure subjective dependence and compared it with the SADQ. They concluded that relapse following treatment was better predicted by the subjective measure than by the SADQ. However, the comparison between the SADQ and this new measure of subjective dependence is difficult to estimate because the psychometric properties of this ten item questionnaire have not been evaluated.

2.8 - Subjective Experience and the Classification Systems (DSM-IV and ICD-10)

The ADS concept has assumed a position of increasing importance in psychiatric classification systems and has been included in the WHO 10th Revision of the International Classification of Diseases (ICD-10) and the DSM-IV (Rousaville et al, 1989; Nathan, 1991; Grant and Towle, 1991; Schuckit et al, 1991). Although there has been some convergence between these two systems, they particularly differ in the importance of the subjectively altered states. The ICD-10 relies much more on the presence of subjective symptoms than the DSM-IV. In the ICD-10 introductory comments there is an assertion that a central descriptive characteristic of the dependence syndrome is the desire (often strong, sometimes overpowering) to take

psychoactive drugs. It is regarded as an essential characteristic of the dependence syndrome that either taking a psychoactive substance or a desire to take a particular substance should be present; and it is clearly specified that the subjective awareness of a compulsion to use is most commonly seen during attempts to stop or control substance use. Unlike the ICD-10 the DSM-IV makes no assumption about any central descriptive characteristics of the syndrome and gives the same importance to all elements.

Table 2.1 shows the criteria for the diagnosis of dependence in these two classification systems. The diagnostic criteria of ICD-10 are more broadly defined and it relies more on subjective experiences than DSM-IV, which chooses a more behavioural description of the elements of the syndrome. Moreover, there is one item in the ICD-10 concerning subjective symptoms that is not present in the DSM-IV: 'a strong desire or sense of compulsion to take the substance'. This ICD-10 criterion emphasizes the 'difficulties in controlling substance-taking behaviour in terms of its onset, termination, or levels of use'. The DSM-IV criterion on the other hand, emphasizes the behavioural concomitant of this phenomenon: 'the substance is often taken in larger amount or over a longer period than was intended', and 'a persistent desire or unsuccessful effort to cut down or control substance use'.

This tendency of classification systems in psychiatry to rely more on specific behaviours and exclude most of the subjective symptoms has been criticized. In a recent paper Van Praag (1992) has condemned what he called the excessive preoccupation with the 'objective' in the modern psychiatric classification systems, where only well defined and easily demonstrable symptoms are used and there is a disregard for the subjective constituents of the psychopathological spectrum. For him the DSM system and the psychometric instruments in use provide no more than rough-draft diagnoses, lacking not only detail and finesse but also disregarding elements essential for proper diagnosis, namely those that are subjective. The so-called 'subjective' is not seen as territory still to be conquered; it has become synonymous with non-operationable, non-measurable, non-quantifiable, non-scientific - at best a symbol of soft science.

Table 2.1 - Substance use disorders criteria of the DSM-IV and ICD-10

DSM-IV	ICD-10
(1) tolerance (2) withdrawal (3) the substance is often taken in larger amount, or over a longer period than was intended (4) a persistent desire or unsuccessful effort to cut down or control alcohol use (5) a great deal of time is spent in activities necessary to obtain the substance (e.g. visiting multiple doctors or driving long distances), use the substance, or recover from its effects (6) important social, occupational or recreational activities given up or reduced because of substance use (7) continued substance use despite knowledge of having had a persistent or recurrent physical or psychological problem that was likely to have been caused or exacerbated by the substance	(1) a strong desire or sense of compulsion to take the substance (2) difficulties in controlling substance-taking behaviour in terms of its onset, termination or levels of use (3) a physiological withdrawal state when substance use has ceased or been reduced, as evidenced by: the characteristic withdrawal syndrome for the substance; or use of the same substance with the intention of relieving or avoiding withdrawal symptoms (4) evidence of tolerance such that increased doses of the substance are required in order to achieve effects originally produced by lower doses (5) progressive neglect of alternative pleasures or interest because of psychoactive substance use; increased amount of time necessary to obtain or take the substance or to recover from its effects (6) persisting with substance use despite clear evidence of overtly harmful consequences

Van Praag (1992) argues that in the process of arriving at a diagnosis one cannot with impunity ignore important domains of psychopathology. He considers the realm of subjective psychopathology to be of crucial, not marginal, diagnostic importance. He emphasises that subjective psychopathology is not by definition unmeasurable and unverifiable, although certified instruments for that purpose are lacking. The subjective symptoms are no less 'objective' or more 'subjective' than many symptoms which are officially authorised. Other authors have also stressed the importance of the subjective symptoms in psychopathology (Straus, 1986; Millon, 1986). They argue that in spite of the difficulties in measuring subjective symptoms, psychiatry cannot afford the luxury of bypassing them because they lie at the very heart of all psychopathologic inquiries. The events they portray are far richer in scope and diversity than concrete observables. The best way to improve this state would be through a sustained attempt to expand and refine diagnostic concepts and the corresponding psychometric instruments. Self-report inventories in particular offer a major psychological tool for assessing clinical attributes (Straus, 1986). Otherwise we

end up with a severely coarsened psychiatry obsessed with the obvious, detached from the experimental and oblivious to nuance and detail (Van Praag, 1992).

These criticisms seem most appropriate to the subjectively altered states of the Alcohol Dependence Syndrome and its representation in particular in the DSM-IV. No serious attempt has been made to measure the subjective part of the syndrome or provide any understanding of how this subjective part relates to the whole of the syndrome. The next section discusses the methodological difficulties and alternatives in measuring subjective states.

2.9 - Methodological Limitations of the Measurement of Subjective States

The proper basis for the development of a phenomenological description of the subjective states lies in the construction of a sound psychometric instruments. Most of the studies so far have relied on single items to measure subjective states. In the experimental studies of craving, despite using different behavioural methods to measure craving, they also used single item scales to measure self-reported craving (Ludwig and Stark, 1974; Hodgson et al, 1979; Rankin et al, 1979; Stockwell et al, 1982; Kaplan et al, 1983). Additionally most of the clinical studies, in particular those studies using questionnaires and scales, also employed instruments which only assessed the subjective states by use of a single item (Stockwell et al, 1979; Chick, 1980a; Polich et al, 1981; Skinner, 1981; Hesselbrook et al, 1983; Davidson et al, 1989; Kosten et al, 1987).

There are several reasons why multiple-item scales are superior to single-item scales (Spector, 1992). Firstly, a single item scale cannot fully represent a complex theoretical concept. For example, no single item in a clinical rating evaluating will allow a researcher accurately and validly to measure a person's level of anxiety. Secondly, single-item measures lack precision because they cannot discriminate between the finer degrees of an attribute. Thirdly, from a measurement perspective, a single indicant is inadequate because it is impossible to estimate its reliability.

Moreover, even if the reliability of a single indicant can be obtained, it is usually inferior to combined multiple indicants because it is more affected by random error. McIver and Carmines (1981) observed that the most fundamental problem with single-item measures is that, because they provide only a single measurement, the researcher rarely has sufficient information to estimate their measurement properties. Thus their degree of validity, accuracy and reliability are often unknowable. The absence of this vital information can sometimes lead us to overlook the serious deficiencies of single-item measures. Blalock (1974) summarise the importance of multiple-items in measurement:

"With a single measure of each variable, one can remain blissfully unaware of the possibility of measurement [error], but in no sense will this make his inference more valid...In the absence of better theory about our measurement procedures, I see no substitute for the use of multiple measures of our most important variables."

Recently, there has been criticism in the alcohol and drugs literature of the way that subjective states are measured (Kozlowski and Wilkinson, 1987; Tiffany, 1992; Pickens and Johanson, 1992). Tiffany (1992) in particular has explicitly criticised the placing of excessive trust in a single item to measure such complex phenomena. Pickens and Johanson (1992), when summarizing the consensus and agenda for future research about craving, stressed the importance of having a psychometrically sound instrument to measure the phenomenon.

There have been a few studies measuring subjective states using multiple-items with opiates and nicotine. A common ground amongst these studies is that they were measuring a particular theoretical approach to the subjective variable. Powell et al (1992) tested two proposed models, classical conditioning (CC) and outcome expectancies (OE), in terms of measurement of craving for opiates. They exposed detoxified addicts to drug-related stimuli and analyzed the correlations between craving responses and the hypothesized explanatory variables. On the measurement of the outcome expectancy variables they developed a 'Motivational Checklist' with 31 items. It assessed the reinforcing value of opiates for each individual by listing an extensive

range of potentially attractive drug effects (the 'Pros' scale) and potentially aversive consequences (the 'Cons' scale). Using factor analysis they found that five and six factors respectively represented the data. In the nicotine literature Tiffany and Drobes (1991) created a 32-item questionnaire on 'smoking urges' that was administered to 230 daily cigarette smokers to test the cognitive concepts of automatic and non-automatic processing in addictive behaviour. Items for the questionnaire were generated to represent four theoretically and clinically distinct conceptualizations of smoking urges: desire to smoke; anticipation of relief from nicotine withdrawal; withdrawal-associated negative affect; and intention to smoke. Factor analyses showed that a two-factor solution best described the item structure and accounted for 78 and 10% of the common variance.

2.10 - Developing a Model for Measurement of Subjective Altered State

The difficulty in operationalising and therefore measuring subjective aspects involved in drinking behaviour explain the lack of studies using a multiple-item approach. However, despite these difficulties other areas in the alcohol field have evolved from a one item to a multiple-item assessment. Recently, an important series of articles has focused on strategies to measure expectancies of alcohol effects. The term expectancy refers to cognitive representations of an individual's direct and indirect experiences with alcohol, representations of which are hypothesized to determine one's anticipated outcome regarding the use of alcohol.

In the social psychological literature, the terms attitudes, beliefs, attributions, and expectancies have often been used interchangeably. But as Goldman (1989) pointed out, expectancy, rather than attitude or belief, is usually invoked when the author refers to the anticipation of a systematic relationship between events or objects in some future. Expectancy and attribution may be viewed as reciprocal; that is, when one holds an expectancy one must have previously attributed a causal relationship (inferred from high observed correlations) to the events in question, and when one attributes a relationship one ends up holding an expectancy. Other authors have proposed that

expectancy affects behaviour indirectly through its effect on attitude - which in turn indirectly affects behaviour through intention (Stacy, Widaman & Marlatt, 1990).

Until the late seventies most studies with alcoholic patients investigated the capacity of a single alcohol expectancy to produce a single behavioural effect in terms of craving and loss of control. In an attempt to distinguish pharmacological from non-pharmacological sources of craving, Merry (1966) administered alcohol to inpatient alcoholics without their knowledge. Each morning for approximately two weeks each patient was given a fruit-flavoured beverage. On alternate days the beverage was either completely non-alcoholic or included one ounce of vodka (apparently non-detectable). Patients were then asked to rate their level of alcohol craving later each day, as part of the routine treatment programme. These ratings were not affected by the beverage consumed, and therefore a non-pharmacological basis for craving was indicated. Engle and Williams (1972) followed with a similar study but with a placebo control group. Subjects rated their degree of craving for alcohol the day before, forty minutes after, and five hours after receiving the beverage. Subjects were told they were receiving either alcohol or a vitamin drink, and were actually given alcohol or a vitamin drink independently of what they were told. Once again, craving ratings were a function of the instructional manipulation; subjects expecting that they were getting alcohol reported more craving.

Marlatt et al (1973) in search of an experimental 'loss of control in alcoholics' went beyond mere ratings of craving and assessed actual alcohol consumption using the balanced placebo design in conjunction with a 'taste-rating task'. Non-abstinent alcoholic subjects were primed with a beverage 15 minutes prior to the taste-rating task. As they were given to understand it, their job was to drink from marked flasks containing the beverage and rate the taste qualities of that beverage. The actual dependent measure was how much ad libitum drinking they did. The results were clear: alcoholics who believed they had been given an alcoholic beverage consumed more than those subjects who believed they had only been given tonic, regardless of whether or not they actually had been administered alcohol. Stockwell, Rankin,

Hodgson and Taylor (1982) also used the balanced placebo design explicitly to enquire about subjective expectations prior to alcohol/placebo consumption.

These early single expectancy studies paved the way for a new examination of a full range of expectancies in different groups of people using multiple-item strategies. Brown et al (1980) undertook a study to examine directly a full range of alcohol-related expectancies across a broad range of individuals. The intention was to develop a scale that tapped beliefs about the reinforcing properties of drinking. They interviewed 125 adults with drinking histories ranging from teetotalers to chronic alcoholics and created a pool of 90 possible expectancies of behavioural and subjective outcomes from alcohol use. These 90 items (Alcohol Expectancy Questionnaire) were then administered to 440 college students and they found by means of factor analysis six independent expectancy factors: alcohol transforms experiences in a positive way, in that it enhances social and physical pleasure, enhances sexual performance and experience, increases power and aggression, increases social assertiveness, and reduces tension. One important finding was that the less experienced drinker held global expectancies, whereas more experienced drinkers refined and limited their experiences to a few key factors, notably, expectations of sexual enhancement and aggressive arousal. Several questionnaires have been developed to measure alcohol expectancies (Faber, Khavari and Douglass, 1980; Southwick, Steele, Marlatt and Lindell, 1981; Christansen, Goldman and Inn, 1982; Connors, O'Farrel, Cutter and Thompson, 1986; Leigh, 1987). All of these scales were constructed by doing factor analysis on a large number of descriptions of alcohol effects, gleaned from various surveys of drinkers and then forming several subscales from items that loaded together on the individual factors.

The concept of expectancy has been studied in different populations and has been shown to differentiate people in terms of the strength of their expectancies and in its relationship to drinking patterns. Research has shown that the scales possess the power to discriminate between drinkers with varying levels of alcohol intake and severity of alcohol problems. Connors et al (1986) showed that expectancies differentiated alcoholics, problem drinkers and non-problem drinkers. Connors et al (1987) showed that the utility of drinking to reduce discomfort increased with the amount of alcohol

consumed. Zarontello (1986) found that alcoholic inpatients expected more global positive changes, social assertiveness, social and physical pleasure and tension reduction from alcohol use than did non-alcoholic general medical inpatients. There are also data showing a relationship between the duration of the drinking problem or the period of abstinence and the drinking expectancies. Brown (1985) has shown that recovering alcoholics with higher expectancies were less likely to be abstinent at one-year follow-up; poorer outcomes being associated with stronger alcohol expectancy endorsements. Rather et al (1989) showed that the longer a recovering alcoholic had been abstinent from alcohol the less likely he or she would be to have expectations of the reinforcing effects of alcohol.

Marlatt (1978, 1985) has developed a cognitive model in which craving is understood in terms of expectancies. In his early description of the model Marlatt (1978) defined craving as a strong desire for the alleviation of unpleasant withdrawal symptoms: craving for the relieving effects of alcohol. Later in his work Marlatt (1985) referred to craving as a cognitive construct that is comprised primarily of positive outcome expectancies. Although positive outcome expectancies may reflect anticipation of relief from withdrawal symptoms, the model emphasizes the anticipation of euphoria, excitation, or stimulation as the primary expectancies determining craving in addicts.

Outcome expectancy has been studied in relation to relapse. Eastman and Norris (1982) found that alcoholics who held positive expectations regarding alcohol were more likely to relapse than were alcoholics not reporting such expectancies. In an attempt to test this model, Cooney et al (1987) made an empirical distinction between efficacy and outcome expectations. An outcome expectation was defined as the belief that a given behaviour (e.g. drinking) would produce a given outcome (e.g. relaxation). An efficacy expectation was defined as the belief that one is capable of successfully performing a given behaviour. Efficacy expectations were said to determine whether an individual initiates and persists with coping behaviour in difficult circumstances. The primary goal was to examine the effects of alcohol cue exposure on the thinking and affect of abstinent alcoholics and non-alcoholics. Cooney et al (1987) exposed alcoholics and non-alcoholics to a neutral stimulus and to their favourite alcoholic

beverage. They held and sniffed the beverage but were not allowed to consume it. They measured expectations using the Alcohol Effects Questionnaire. Results indicated that both groups of subjects showed an increased desire to drink, increased expectations of pleasant alcohol effects, decreased expectations of arousal, and decreased expectations of behavioural impairment from drinking. Alcoholic subjects however responded to alcohol cues with reports of increased physical symptoms, decreased confidence about coping with future temptation, and increased guilt. These results were consistent with the hypothesis that an alcoholic in a high-risk relapse situation experiences an increase in positive outcome expectations and a decrease in self-efficacy.

Connors et al (1988) were interested in studying the expectations that alcoholic individuals had at the point of relapse. They interviewed 34 subjects in a two year follow-up to gather information on their relapse event. At these interviews they asked what the subject expected drinking would accomplish at the time of relapse. They could classify all the answers into three categories: alcohol as an aid to coping with a social situation; alcohol as a strategy for gaining or attempting to gain control of a situation; alcohol as coping strategy to deal with a non-social situation. The data seem to suggest that in relapse situations the expectations regarding the utility of alcohol revolve predominantly around mediating or getting through difficult situations. Leigh and Stacy (1993) developed a scale specifically to measure alcohol outcome expectations and were interested in discovering whether general positive expectations could be differentiated from negative outcome expectations and whether each one could better predict drinking behaviour. They found through factor analysis two factors of positive and negative expectancy that were only weakly correlated. Positive outcome expectancies were more powerful motivators of drinking. Stacy et al (1990) also found that positive expectancies were a better predictor of drinking than either negative ones or attitudes.

These studies of the nature of the concept of expectancy stress the importance of the past learning experience with alcohol and also stress the importance of the measurement of the concept in order to clarify its relevance. One important topic for

elucidation is what distinguishes between a drinker's general expectations regarding alcohol and his/her specific alcohol expectancies. The former are expectancies that pervade drinking behaviour, while the latter are critical only under specific experiences with drinking. Any measure of expectancies has to tap different evaluative meanings for individuals who drink differently. The specific expectancies measured should reflect the belief system of the population of interest and the situations in which this population is involved. A social learning perspective of drinking behaviour holds that individuals drink in order to achieve certain desirable consequences or to avoid undesirable ones. The expectancies of someone with a history of many years of drinking in order to relieve withdrawal symptoms will certainly be different from those of someone drinking only sporadically.

The alcohol dependence construct proposes that one of the learning processes involved in the syndrome is related to the mechanism of having withdrawal symptoms and drinking to relieve or avoid them. The reinforcing properties of alcohol become related not only to the effect of alcohol itself but also to its relief of withdrawal. Edwards (1986) summarises this idea:

"Whatever the potency of the straight forward euphorogenic effects of alcohol as a reinforcer of alcohol-seeking behaviour, its reinforcing property will (it could be argued) become vastly more potent when it has not only a primary psychotropic property, but now also the secondary property of relieving withdrawal distress..."

Quickly changing from an agitated state of alcohol withdrawal back to stability is a powerful direct experience that will certainly change the expectations in relation to the use of alcohol. It can be argued that the group of expectancies specific to alcohol dependence will involve the experience of drinking in order to relieve or avoid withdrawal symptoms.

In summary:

1- Multiple-item instruments are superior to single-item instruments for the measurement of complex constructs such as subjective altered state.

2- The concept of expectancy as has been used in the alcohol literature provides a valuable alternative due to its sound measurement attributes as demonstrated in numerous studies. Its advantage is that it takes into consideration the learning processes involved in the use of alcohol. One disadvantage is that current expectancy questionnaires tend to measure either very generalized expectancies (e.g., 'Alcohol is like magic', in Brown et al, 1980) or quite specific expectancies, such as those related to social, sexual, or aggressive outcomes of drinking. Others instruments have measured expectancies using only outcome expectancies (Leigh and Stacy, 1993; Fromme, Stroot and Kaplan, 1993; Stacy, Widaman and Marlatt, 1990). No instrument has so far measured expectancies that are specific to people dependent on alcohol.

3- As the subjective element to be measured is part of the ADS construct, it has to be theoretically integrated with the total hypothesis concerning the syndrome. One factor that has been explicitly named as contributing to the learning mechanism involved in the development of the ADS is that of withdrawal symptoms. Therefore, the expectancies that will be discussed in the development of the measurement of this subjective element will be linked to the withdrawal symptoms as a contributor of specific kind of expectancies.

4- In order to advance the understanding of this particular element of the ADS a new questionnaire is proposed and will be discussed in more details in the next section.

2.11 - Pilot Study for the Development of Subjective Severity of Alcohol Dependence Questionnaire - (SSADQ)

A pilot study was designed to assess three different and distinct stages of the questionnaire construction. The first stage was a series of open interviews with alcoholic patients that aimed to define clearly the construct to be measured and generate items for the future questionnaire. The second part was the design of the questionnaire

using the items generated by the open interviews. The third part was a pretesting assessment of the questionnaire.

2.11A - First Stage of the Pilot Study: Exploratory Interviews

Oppenheim (1992) discusses several of the characteristics of exploratory interviews in relation to the general strategy of questionnaire design. He argues that the main purpose of these interviews is two fold: to develop more precise ideas concerning the construct being measured and to generate actual items to be used in the prospective questionnaire. These interviews are concerned with understanding how the population of interest think, feel and behave in relation to the research topics. The main task is idea collection rather than data collection.

For the present project these exploratory interviews were based initially conceived on the theoretical assumption that people with past experience of alcohol dependence have special types of alcohol expectancies. This theoretical focus on the expectancies was a vital step in the development of a scale because conceptually it defined the construct to be measured. Without a well-defined construct, it is difficult to write good items and to derive hypotheses for validation (Oppenheim, 1992).

Interview design was initially without a formal structure or even a schedule, and few guide-lines were necessary to operationalise the interviewing procedure. A 'hidden agenda' was created to guide the interviewer in areas of the construct that it was theoretically important to explore. The essence of the 'hidden agenda' according to Oppenheim (1992) is that while it is not obvious to the patients it can help the researcher to keep focus whilst doing the interview. The proposed 'hidden agenda' had five areas that were worth exploring according to the expectancies model:

- 1) expectancies related to drinking in order to relieve alcohol withdrawal symptoms
- 2) expectancies related to drinking to avoid withdrawal symptoms
- 3) expectancies related to periods when the patient had to stay without drink
- 4) expectancies related to difficulties in stopping drinking once started

5) expectancies related to the feeling of a need for a drink.

The first ten interviews were with patients attending for alcohol detoxification at the Emergency Clinic of the Maudsley Hospital. The practical approach used during the interviews was essentially non-directive. Every effort was made to get respondents to express their ideas spontaneously in their own words. Not all the areas were explored in all the interviews and quality of information was the main objective. The interviews were taped-recorded to facilitate further explorations of the expectancies and also to facilitate the generation of items for the future questionnaire. Analysis of the tapes revealed that in addition to the five areas described above, some patients gave very vivid accounts of how they felt about drinking as something central and important in their lives and also that drinking facilitated doing the normal things in life. These two new areas were added to the hidden agenda and therefore expanded the initial conceptualization of the construct. This new agenda was used in another group of ten interviews with patients attending the same facilities.

2.11B - Second Stage of the Pilot Study - Questionnaire Design

For each of the twenty tapes a selection of statements were gathered that represented the patient's views about subjective experience with alcohol. The number of pooled items arrived at by this procedure was very large (over 400 items). The analysis of all these items revealed the complexity of the construct being measured, and showed that there were several ways to organize this material. The data also showed that the seven areas of subjective severity of dependence previously described were well represented in the group of statements. Table 2.2 gives the seven areas with a selection of items that describe the idea behind each of the areas.

Table 2.2 - Areas of the Subjective Severity of Dependence Questionnaire (SSADQ)

<p>CENTRALITY OF DRINKING</p> <ul style="list-style-type: none"> - The only real need in my life is my need for drink - Drink always comes first - My whole life revolves around getting my next drink - All my activities during the day are involved with drinking <p>DRINK TO PROMOTE NORMAL FUNCTIONING</p> <ul style="list-style-type: none"> - I need a drink to do even the most trivial every-day things - Without drink I would find it difficult to function - In order to do something, I have to drink first - If I have to do something difficult I don't do it until I have had a drink <p>DRINK AS A MUST</p> <ul style="list-style-type: none"> - Sometimes I would do anything to get a drink - In the morning, drinking is a must for me - I frequently feel that nothing else matters except having a drink - When I'm dry, the only thought that I have my head is to get some alcohol inside me <p>DIFFICULTY IN STOPPING DRINKING ONCE STARTED</p> <ul style="list-style-type: none"> - If I have one or two drinks I'll go on - The more I drink, the more I want to drink - Once I start drinking I just carry on - I can't stop drinking if drink is still around <p>FEELING DURING ENFORCED ABSTINENCE</p> <ul style="list-style-type: none"> - When I need a drink and cannot get it I feel as if I'm dying - I get very anxious if anything looks like getting between me and my next drink - In some social situations I feel trapped and anxious because I can't get a drink - Sometimes I feel like I'm on edge while waiting for the opportunity to have a drink <p>DRINKING AS A RELIEF</p> <ul style="list-style-type: none"> - I need a drink in the morning to make me feel better - My life starts when I have my first drink of the day - If I wake up early, I worry if I can't get a drink - Drinking is like being given an injection that revives you <p>AVOIDANCE OF THE WITHDRAWAL SYMPTOMS</p> <ul style="list-style-type: none"> - I make sure that I can have a drink at any time during the day - I have to have a few drinks before going to a place where there may be no drink - I know exactly where I can get a drink first thing in the morning - I have to top myself up all day long

Items organization

As the number of items was too large a reduction of the initial pool was organized. The criteria for exclusion were: repetition of the item or similar meaning; ambiguity; excessive number of words; ideas difficult to understand. A small group of items that did not fit into any of the seven areas were also excluded. With this initial selection the total number of items reduced to 180. The next step was to find a balance between the number of items and the seven areas of subjective dependence. Some of the areas had far too many items and it was necessary to organize the items according to the intensity of the statements. The idea was to arrive at a group of items for each area that would identify the expectancies to be measured with a certain degrees of intensity. As it was not always possible to identify items that fitted on the degree of intensity a few items were created.

Some authors such as Spector (1992) recommend caution in order to reduce sources of bias described as 'response sets', which are tendencies of subjects to respond to items systematically. One of the sources of bias is the acquiescence response, which is the tendency to agree with all items regardless of their content. In order to avoid this source of bias, a group of statements with negatively worded meaning was created. As this group of items was not much present in the interviews they had also to be created. Thus, an individual area would have items positively and negatively worded. For example, in the area 'Centrality of Drinking', at the positive side there was the item 'The only real need in my life is my need for drink', at the negative side there was 'I can be involved in many activities without a drink'. The version arrived at after all these changes had 120 items. Each area had ten to twelve items on the positive side and six to eight items on the negative side.

Response Categories

The response category chosen was one that allowed respondents to indicate the degree of agreement or disagreement with each item. The response choices were bipolar and symmetrical around a neutral point, with five Likert-style answer categories: Strongly

Disagree - Disagree - Uncertain - Agree - Strongly Agree, with numbers 1 to 5 representing each category. A 'no' option (Uncertain) was offered because several experimental researchers have shown that many more respondents will choose the category 'don't know' when the alternative is explicitly offered than when it is not. According to Spector (1992), such filtering for 'don't know' opinions generally affects from between an eighth and one third of those interviewed.

2.11C - Third Stage of the Pilot Study - Pretest Study

The purpose of the pretest was to assess empirically three aspects of the questionnaire: variation of the items; perceived meaning of the items by the respondents and respondent interest and attention in relation to the questionnaire. The variation of the items is very important when measuring a construct that potentially varies along a continuum of severity. There is a need to look out for items showing greater variability and discriminative power; because, if every subject answers the same item in the same way the item is useless in psychometric terms because it will not be able to differentiate people (DeVellis, 1991).

The assessment of the perceived meaning of the items is probably the most important task in the pretest study because it will give the researcher reassurance on the purpose of the questionnaire. Although as a rule every respondent will give a meaning to any question asked in a survey, it is not necessarily the same meaning for all those taking part in the study. In one experimental study about the meaning of items, Belson (1981) found that in no case did all respondents bring to every part of the question the approximate meaning intended by the investigator. He draws two main conclusions from this study. Firstly, the meaning that investigators intend for questions used in surveys is frequently not the meaning that respondents apprehend. Secondly, respondents nevertheless answer most questions because; "When a respondent finds it difficult to answer a question, he is likely to modify it in such a way as to be able to answer it more easily" (Belson, 1981). In summary, respondents probably transform obscure questions into ones that seem sensible from their standpoint as they strain for meaning.

In terms of respondent interest and attention, the concern in the pretest study was to assess how much involvement with the questionnaire the patients had, particularly because the initial design of the SSADQ had more than 100 items. Converse (1992) has warned against the size of questionnaires and the repetition of questions, and particularly of 'fatigue' effects toward the end of the question set, as respondents tend to check the same alternative, no matter what the question.

Intensive Pretesting Design

The intensive pretesting design has the objective of examining a few items of the questionnaire in great detail with each respondent. The main purpose was to assess the perceived meaning and understanding of all questions. The procedure was to choose a number of patients similar to those in the main research sample to answer the questionnaire as a practice run. Ten alcoholic patients attending the Emergency Clinic of the Maudsley Hospital were asked to participate in this study. The technique used was to ask the patients to read each question aloud and comment on the meaning and his impressions and understanding of each question and whether the content of the item was part of his experience with alcohol. The interviews were tape recorded and the researcher took notes about his impressions of the patients' reactions during the interview. After a maximum of ninety minutes the researcher stopped asking questions and invited the patients to finish the questionnaire alone.

Extensive Pretesting Design

The extensive pretesting design had the objective of assessing not only the individual items of the questionnaire but also the questionnaire as a whole. This design uses a larger number of patients in order to facilitate the evaluation of the variation in individual items and also to evaluate more general characteristics of the questionnaire, such as patient's interest and attention. Twenty alcoholic patients attending the Emergency Clinic of the Maudsley Hospital were invited to participate. The general procedure was similar to that in the intensive pretesting stage, except that the patients answered the questionnaire alone. It was only at the end that the researcher made

some enquiries about the patients' general opinion and understanding of the whole questionnaire. In particular questions were asked about the clarity of the instructions and the general flow of the questions. Questions were also asked about the reasons that contributed to patients' choice in some of the items.

Intensive and Extensive Pretest Analysis

The analysis of both stages of pretesting indicated that 20 items could be dropped. The reasons were that many respondents had difficulties in understanding the questions due to the ambiguous nature of the statement, the complexity of ideas within the statement or to language problems. Also a few items were dropped because the analysis of the 30 questionnaires showed low response variation among the patients. Some patients had difficulty in understanding the instructions, and a few changes were made in the text. A final version of the questionnaire with 100 items (Appendix B - SSADQ) was administered to a group of five patients, and no major problems were found with the items or with the instructions.

Chapter 3 - Measurement of Drinking Repertoire

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3.1 - Early Descriptions of Drinking Behaviour

In the past two centuries the history of the nature of excessive drinking has produced a enormous diversity of theories to explain the way people drink. The form in which drinking behaviour is described and classified, in particular which aspects are emphasized and valued, reveal much about the underlying assumptions of the theories and ideas about the nature of excessive drinking. According to Bynum (1968), before the 19th century words used to describe excessive drinking in the English language had a strong moral flavour:

"The word drunkard, then as now, carried with it a moral judgment. Sot, originally a foolish or stupid person, came around 1600 to mean one who is habitually drunk, but it served no better. The Latin root *inebriare*, 'to intoxicate' furnished the English language with *inebriare*, which was used throughout the 19th century, but its meaning described a condition of drunkenness, and not a disease".

The reason that there was no morally neutral word to describe excessive drinking implies that such a concept did not exist. Levine (1978) pointed out that in colonial America 'addicted' meant habituated, and one was habituated to drunkenness, not liquor. Almost everyone 'habitually' drank moderate amounts of alcoholic beverages; only some people habitually drank them to the point of drunkenness. However, the observation that the pattern of drinking in some people was different was observed as early as 1724 by Cheyne when describing a drunkard (Porter, 1985):

"They begin with the weaker wines; these, by use and habit, will not do; they leave the stomach sick and mawkish; they fly to stronger wines, and stronger still, and run the climax from brandy to barbados waters, and double-distill'd spirits, till at last they find nothing hot enough for them."

At the beginning of the 19th century authors began to develop the idea that excessive drinking could be seen as a medical condition and, as a consequence, the description of drinking behaviour became more detailed. Thomas Trotter (1804) was one of the first authors to systematise the ideas about drinking behaviour as a source of problems and to make assumptions about its cause. In his book he uses non-moral terms to describe excessive drinking; for example 'habitual drunkenness', 'the habit of inebriety' or 'the habit of intoxication'. His concerns were not with drunkenness as an isolated phenomenon, but with its constancy, its habit, which he considered to be a disease. Trotter's view was that drinking behaviour had a development; a progression in which the habit would make a major contribution to the process of excessive drinking:

"However seducing the love of inordinate drinking may be, like other bad habits, men seldom get into it at once. There is a gradation in the vice"

Once the 'habit of drunkenness' had been established, Trotter believed that there was a process of association in the patient's mind with the pleasurable effects of alcohol which would be responsible for the succession of drinking:

" As soon as the limited portion of liquor is swallowed, an agreeable glow is experienced; and by it so grateful a feeling is conveyed to the mind, which in an instant connects the chain of habit, that is our duty to break. This glow and feeling are associated in the patient's mind with all those pleasurable temptation he has been accustomed to receive from his former bumper. He therefore reasons with himself that he finds much relief; and as he is aware that the effect of the present dose will only be of short duration, he must take another to prolong his reverie, and ward off some intruding care. With a second glass he finds more pleasing objects presented to his imagination, and then he is urged to try a third. His depressed spirits, fears, and apprehensions have now vanished: he is so happy within himself that he despises fortune, and views the world with contempt; thus he goes on, libation after libation, till he sinks into a drunken slumber."

It is possible to identify in Trotter's ideas two main aspects specifically concerned with drinking behaviour. He observed both the progression and evolution of the drinking that occurred over time and that there was a mental process occurring after alcohol has

been ingested. The idea of gradation and progression was also shared by Rush (1791) in America:

"It belongs to the history of drunkenness to remark, that its paroxysms occur, like the paroxysms of many diseases, at certain periods, and after longer or shorter intervals. They often begin with annual, and gradually increase in their frequency, until they appear in quarterly, monthly, weekly, and quotidian or daily periods. Finally they afford scarcely any marks of remission either during the day or the night."

It was at this time that authors who proposed specific etiologies for excessive drinking began to use drinking behaviour as a criterion for the identification of the disease. For Bruhl-Cramer in 1819 (in Bynum, 1968) the reason that people drank too much was that they had a disease called *Trunksucht* (or dipsomania), which he defined simply as an abnormal, involuntary craving for alcoholic beverages. However, he divided dipsomania into subgroups according to the drinking behaviour, along lines similar to those contemporary authors had subdivided fevers: periodic, decreasing, intermittent, and continuous. Bruhl-Cramer further subdivided acute (non-continuous) dipsomania into subtypes, based on its long-term course. The diminishing form was characterized by a significant difference in the desire for alcohol at different times of the day. The intermittent form expressed itself in paroxysms at regular intervals, for example every weekend. The periodic form showed episodes of exacerbation followed by long symptom-free periods when the patient would either abstain or drink only sparingly.

3.2 - Drinking Behaviour During the Period 1850-1941

During the second half of the 19th century several theories of alcoholism flourished, particularly in England, USA, France and Germany. It was during this period that physicians began to consider alcoholism as a disease and consequently were forced to create the necessary terminology. Magnus Huss (1851) in an influential work preferred to give alcoholism a strictly clinical definition but used excessive drinking as a criterion:

"This group of symptoms I wish to designate by the name *alcoholismus chronicus*, by which I understand those pathological symptoms which develop in such persons who over a long period of time continually use wine or other alcoholic beverages in large quantities."

In a systematic review of the world alcohol literature between 1850 and 1941, Babor and Lauerma (1986) identified 39 classifications of alcoholics. In an analysis of the criteria used in these classifications, it was found that drinking behaviour was used as a criterion in 22 of the 39 classifications. The usual format was to employ the characteristics of drinking behaviour as loose criteria for the identification of different types of drinker. There was a clear tendency to split the classification systems according to two forms of drinking behaviour : continuous and intermittent. In the majority these two forms of drinking would be used to distinguish between different types of drinkers along with the proposed etiologies. This tendency was observed in several countries (Babor and Lauerma, 1986).

In France for example, following the tradition of Pinel, Esquirol and Morel, Magnan and Legrain popularized a theory based on the concepts of inherited mental degeneracy and moral insanity. For Magnan there were two extremes of alcoholism that could be identified in terms of drinking : infrequent (accidental intoxication) and chronic alcoholism (a permanent condition with hereditary antecedents). In America, ideas about drinking were dominated by the American Association for the Study And Cure of Inebriety and they had a more psychological influence. In 1893 Thomas Crothers published a volume that loosely classified drinking behaviour around two concepts: 'Inebriety' and 'Dipsomania'. For him 'Inebriety' was a more general term referring to habitual drunkness, whereas 'Dipsomania' was used to describe a large and special class of inebriates "in which the drink impulse comes on suddenly and after a time dies out, and is succeeded by a free interval". In a later and most systematic typology Crothers divided drinkers in 'Continuous' and 'Periodic'. 'Periodic' drinkers often had long terms of abstinence between binges whereas 'Continuous' drinkers drank almost constantly (Lender, 1979).

In England, William Carpenter (1850) described three types of 'oenomania': acute, periodic (binges alternated with abstinence), and chronic. Wingfield (1919) also described two types of chronic alcoholics (one which regularly drank to excess but was never intoxicated and another which resembled the first except that the patient was never sober) and two types of dipsomania (pseudodipsomania and true dipsomania). Crichton-Miller (1928) described subtypes of steady and intermittent drinkers which he explained on the basis of affective states or other psychological causes (Babor and Lauerma, 1986).

The main characteristic of this period was the abundance of theories about drinking. However, no theory had any hegemony outside its country of origin or initiated a tradition of empirical research into drinking behaviour. Drinking behaviour was very much at the centre of most of these theories and was used as a clinical criterion to identify different etiological processes or types that would explain excessive drinking. However, none of these theories employed reliable methods to make any kind of measurement of such important behaviour (Babor and Lauerma, 1986).

3.3 - Jellinek and the Typology of Drinking Behaviour

Drinking behaviour acquires a special place in the writings of Jellinek. In their classic literature review of the treatment of alcoholism, Bowman and Jellinek (1941) devoted a major section to the description of 24 typological formulations of alcoholism that had been published in previous decades. In their attempt to synthesize the meaning of these typologies they created a hierarchical classification system in order to identify 'ultimate' types of alcoholics. These types could be differentiated according to drinking behaviour into steady versus intermittent drinkers. These groups were further classified on the basis of etiology (endogenous versus exogenous) and finally into four 'ultimate' subgroups. There was a conviction that there was a basic dichotomy between the 'true' alcohol addicts and the habitual symptomatic excessive drinker. Primary or 'true' addicts were those with a steady pattern of drinking and endogenous

etiology, and were characterized by a definite need for alcohol and an inability to abstain.

In his next work 'Phases of Alcohol Addiction' Jellinek (1946) studied the drinking history with the hope of revealing "... relevant factors in the development of inebriety". He described differences in the development of drinking behaviour in these two forms of alcoholism, with changes in the drinking pattern being regarded as significant landmarks in the development of alcoholism. In the 'Crucial Phase' loss of control would distinguish between the two groups. The drinking behaviours said to exemplify this phase were: periods of total abstinence, changing the pattern of drinking, behaviour becoming alcohol-centred, and regular matutinal drinking. Jellinek also described what happened in a day of drinking during this phase:

"It should be noted that the 'physical demand' involved in the 'loss of control' results in continual rather than continuous drinking. Particularly the 'matutinal drink' which occurs toward the end of the crucial phase shows the continual pattern. The first drink at rising, let us say at 7 a.m., is followed by another drink at 10 or 11 a.m., and another drink around 1 p.m., while the more intensive drinking hardly starts before 5 p.m."

Although this study was based on a survey of the drinking behaviour of a group attending Alcoholics Anonymous it is remarkable how vague the criteria for measuring drinking behaviour were. Throughout the paper terms like 'the consumption is heavy', 'well beyond the ordinary usage', 'avid drinking', and 'prolonged intoxications' are used. Despite these rather inaccurate descriptions and measurement, Jellinek (1960) expanded his initial work and developed the idea of species of alcoholism in his later book *The Disease Concept of Alcoholism*. Drinking behaviour is also at the centre of this typology. The descriptions of drinking behaviour used to identify these different species of alcoholism are shown in Table 3.1.

Jellinek's typology of alcoholism had a enormous influence, but was not followed by empirical studies that could have promoted the development of the theory and the validation of the distinct types of drinking behaviour (Babor and Dolinsky, 1988). The

lack of a clear framework for the measurement of such crucial elements as drinking behaviour has certainly contributed to the poor empirical development of the theory. Even concepts central to his theory such as loss of control with its manifestation in terms of drinking behaviour has never been explicitly defined. The idea of ideal types of alcoholism with distinctive drinking behaviours but based on such poor empirical evidence came under severe attack by the next generation of researchers who challenged the lack of any empirical support (Mello, 1974; Babor and Dolinsky, 1988).

Table 3.1 - Characteristics of drinking behaviour in Jellinek's species of alcoholism

Species of alcoholism	Description of Drinking Behaviour
<i>Alpha</i>	"The drinking is 'undisciplined' in the sense that it contravenes such rules as society tacitly agrees upon - such as time, occasion, locale, amount and effect of drinking"
<i>Beta</i>	"Heavy drinking"
<i>Gamma</i>	'Loss of control', "but he still can control whether he will drink on any occasion or not. This is evidenced in the fact that after the onset of 'loss of control' the drinker can go through a period of voluntary abstinence ('going on the water wagon').", periods of total abstinence, behaviour becomes alcohol-centred, regular matutinal drinking
<i>Delta</i>	inability to abstain ("In contrast to gamma alcoholism, there is no ability to 'go on the water wagon' for even a day or two...; the ability to control the amount of intake on any given occasion, however remains intact").
<i>Epsilon</i>	"periodic bouts"

3.4 - Drinking Behaviour in Laboratory Studies

Disappointment in the lack of empirical evidence in studies of drinking behaviour began to manifest itself in the writings of many scientists and was summarised by Mendelson (1971) in the following terms: "Our heritage from years of scientific neglect is profound ignorance concerning even the basic behavioral and biosocial concomitant of alcoholism." Jellinek's typology of drinking and the concept of loss of control were particularly targeted because they typically represented the development of armchair ideas rather than the systematic study of clinical populations (Caddy and Gottheil, 1983; Babor and Dolinsky, 1988). There was also strong criticism of the limited data

available because they mainly came from retrospective reports from sober alcoholics (Mello, 1974).

The alternative suggested by several influential scientists (Mendelson, 1964; Mello and Mendelson, 1965; Mello, 1974; Caddy and Gottheil, 1983) was that drinking behaviour should be investigated under systematic, controlled conditions in the laboratory. They employed a variety of operant procedures whereby subjects were set to work at a variety of tasks and could exert a degree of control over the amount and rate of their drinking, enabling the patterns of working and drinking to be studied. The measure of the actual drinking behaviour in the majority of these studies was based on the total volume of alcohol consumed and the resultant blood alcohol levels over successive 24-hour periods. The idiosyncratic patterns of alcohol use exhibited by the subjects and the several factors that were believed to contribute to the observed fluctuations led the researchers from the study of spontaneous drinking patterns to the identification and assessment of the forces that influence drinking within a drinking episode (Mello, 1974; Caddy and Gottheil, 1983). The studies consistently showed no evidence of loss of control in any of the volunteers.

The impact of these studies in terms of the understanding of drinking behaviour is a matter of dispute, particularly because it became an area of research and assessment used exclusively in the laboratory. However, an important contribution was the emphasis given to the importance of the measurement of drinking behaviour in its own right and to exploring methods of investigation that could reveal more information about this behaviour.

3.5 - Alcohol Dependence Syndrome and Drinking Behaviour

The body of ideas that led to the development of the concept of the Alcohol Dependence Syndrome argued against truly distinct types of drinking behaviour (Edwards, 1974). It was considered that any typology of drinking behaviour was a less useful clinical analysis than one which sought to establish the degree of dependence and

identify the variety of pathoplastic factors. It was also pointed out that the failure to recognize that drinking behaviour always exhibits some degree of plasticity could lead to overvaluing the absoluteness of clinical typologies in alcoholism studies.

The concept of Alcohol Dependence Syndrome (Edwards and Gross, 1976) describes drinking behaviour in more detail as one element of the syndrome, namely narrowing of the drinking repertoire. This new concept of drinking behaviour has several characteristics that distinguish it from previous formulations. The main characteristic is that drinking is considered under the theoretical context of the dependence construct. This theoretical framework has several implications. Drinking behaviour does not have any special place within the ADS construct; it is only one of the elements to be considered in diagnosis and assessment. Drinking can no longer be seen as a behaviour to be classified into categories, it varies along a continuum of severity. As dependence increases in severity, it leads to an increase in non-normative patterns of drinking to almost continuous consumption. According to Edwards (1977):

"As the individual moves progressively toward greater dependence, so his repertoire of drinking patterns (at first perhaps broadened), become increasingly narrowed."

If on the one hand the ADS theory stresses the tendency of the repertoire to become narrow, it also emphasises that drinking behaviour would always maintain some degree of flexibility, with environmental and personality factors playing an important role (Edwards and Gross, 1976):

"Change in personal circumstances such as a new job or a different marriage may for a time constrain the drinking. Pricing and sales regulations may also influence the dependent drinker. The syndrome must be pictured as subtle and plastic rather than as something set hard, but as dependence advances the pattern tends to become increasingly stereotyped."

In terms of the mechanisms involved in drinking behaviour, it is suggested that it is mainly functional and reflects the experience of withdrawal symptoms or their avoid-

ance (Edwards and Gross, 1976). However, the mechanism involved is not seen as an absolute phenomenon, the idea being that as dependence increases the cues for drinking become increasingly related to the relief or avoidance of withdrawal. This more theoretically driven description of the behavioural perspective of drinking offers a more privileged opportunity for measurement, although the studies that have so far tried to measure it have experienced great difficulty in operationalizing such a complex concept as drinking repertoire.

Chick (1980a) was the first author to propose specific criteria to measure drinking repertoire. He defined repertoire according to flexibility of drinking and produced two items in a 21 items scale measuring alcohol dependence, namely 'flexibility of drinking according to day of week' and 'flexibility of drinking according to mood'. He found that narrowing of drinking repertoire as measured by these two items formed a separate dimension from the syndrome. One of the difficulties in the interpretation of this result is that the measurement of narrowing of drinking repertoire was based on only two items. As has been discussed in Chapter 2, a single item measurement has limitations because it cannot fully represent a complex concept, it lacks precision and it is impossible to estimate its reliability. In this particular situation it is also possible that the patients misinterpreted the phenomenon being measured. Chick's results showed a low intercorrelation of .26 between these two closely related items, reinforcing the idea of poorly defined terms (Fowler, 1988). On the other hand, Davidson et al (1989) found that a single item ('Do you take drink or drugs morning, afternoon and evening') was part of a single factor representing the alcohol dependence syndrome. This finding has more recently been replicated (Raistrick et al, in press).

Using a different approach in terms of measurement, Stockwell et al (1983) sought to estimate the variability of drinking repertoire by means of a structured interview and examined the relationship of this with SADQ scores. From the information collected in the interviews the authors selected three drinking patterns: mainly continuous drinkers; mainly binge drinkers; and mainly continuous drinkers who regularly had one or two days virtual abstinence per week ('occasional abstainers'). They also collected information on a typical drinking day in terms of grammes of alcohol consumed and

the variability of alcohol intake per day. Using multiple analysis of variance with the SADQ as the dependent variable, narrowness, both in terms of limited variability between and within heavy drinking days, significantly contributed to the variance ($p < .001$) in each instance. Further analysis showed that at the 2.5% significance level both 'mainly continuous' and 'mainly binge' drinkers tended to have higher SADQ scores than 'occasional abstainers'. The great innovation of this study was that it made specific assumptions about the definition of drinking repertoire and how to measure it. However, although Stockwell et al's (1983) definition of drinking repertoire was based on several criteria, it still relied upon three different types of drinking pattern; patterns that, although clinically conceived, had no empirical support.

In summary, drinking repertoire, as proposed by the Alcohol Dependence Syndrome, offers several advantages in relation to previous typological approaches of drinking behaviour. Firstly drinking behaviour is considered within the theoretical framework of the ADS. Secondly there is a clear proposal of the factors involved in the patterning of drinking, the alcohol withdrawal symptoms being among the most important. Thirdly the importance of its measurement is associated with the validation of the ADS. However, due to the complexity of its measurement, there have been few attempts to assess it, making it one of the least studied and therefore least understood elements of the alcohol dependence syndrome (Babor, 1992). This difficulty in measurement has contributed to the non-inclusion of this element of the ADS in the main psychiatric classification systems.

3.6 - Drinking Behaviour and the Classification Systems (DSM-IV and ICD-10)

In the psychiatric literature, actual drinking behaviour and dependence symptoms have often been considered equivalent manifestations of the entity 'alcoholism' (Grant and Harford, 1990). Consistent with this view definitions of alcohol abuse and dependence, as described in major psychiatric nomenclatures, have traditionally highlighted pathological use of alcohol rather than levels of alcohol consumption per se. It seems that this belief in the equivalence of dependence symptoms and heavy alcohol intake

has had an inhibiting effect on research into the importance of drinking patterns in dependence (Grant and Harford, 1990).

The main classification systems in psychiatry, DSM-IV and ICD-10, have adopted the body of theoretical and empirical work on the Alcohol Dependence Syndrome but have not included the element drinking repertoire. An earlier version of the ICD-10 subtitled 'Diagnostic Criteria for Research' (WHO, 1990) had a specific item 'a narrowing of the repertoire of drinking patterns', where it was portrayed as a tendency to drink alcoholic drinks in the same way on weekdays and weekends, whatever the social constraints regarding appropriate drinking behaviour. However, this ICD-10 item criterion came under strong criticism concerning the "requirement for the difficult-to-define criterion of 'narrowing of the repertoire of patterns of substance use'" (Schuckit et al, 1991). Rounsaville et al (1993) in a preliminary analysis of the ICD-10 also showed that an item measuring narrowing of drug use repertoire was the least internally consistent item for most drug categories. As a consequence this item was dropped from the final version of ICD-10 (Rounsaville et al, 1993).

The consequence is that both systems have adopted notably loose terminology when mentioning drinking behaviour, do not even include assessments of drinking levels or drinking patterns. This approach, seen in both DSM-IV and ICD-10, can be criticised on two levels. On a theoretical level the classification systems have been constructed with an incomplete concept of alcohol dependence by excluding an item equivalent to the narrowing of drinking repertoire. On a practical level all references to drinking behaviour used in both systems became vague expressions such as: 'drinking larger amounts of alcohol', 'frequent intoxication' and 'recurring use' (Grant and Towle, 1991).

3.7 - Influence of the Surveys Studies on the Measurement of Drinking Behaviour

If on the one hand the psychiatric literature has been ambiguous about measurement of drinking, other areas of the literature about alcohol have made an enormous

contribution to the understanding of drinking behaviour. In the early seventies studies of clinical populations of alcoholics became more frequent because of the increased interest in the evaluation of treatment of patients with drinking problems. In an early review Emrick (1974) examined 265 studies of alcoholism treatment and found that drinking behaviour was used in 80% of these papers as an index to evaluate alcohol treatment. Ever since drinking behaviour has been used as one of the most important measures in treatment evaluation. Most of these studies have not made specific assumptions about the drinking behaviour they have been measuring but have relied on a progressively more sophisticated method of data collection to assess one important outcome measure.

It was also in the early seventies that surveys became an important element in the study of drinking practices and problems in the general population (Cahalan et al, 1969; Room, 1990). One of the characteristics of these surveys was that they offered a simple and reliable description of drinking behaviour without making many assumptions about drinking itself. This area and method of investigation has produced several benefits in terms of measurement to the field of alcohol studies. Firstly, it focused awareness of the importance of proper sampling procedures and reliable and valid instruments for data collection. Secondly, the methodology employed by the surveys has provided the tools to study drinking patterns in all kinds of population subgroups. Thirdly, a further advantage of survey data is that they have allowed a detailed examination of different facets of drinking behaviour (Midanik and Room, 1992). When the methodological stringency of general population surveys was extended to clinical populations, it exerted a substantial influence on the way in which clinical studies measuring drinking behaviour were undertaken (Greenfield, 1986; Room, 1990). The use of some sort of Quantity-Frequency criteria to classify drinking became the norm.

One of the consequences was that studies began to show the variability and complexity of drinking behaviour in the clinical population, in particular when looked at over a reasonable period of time (Orford et al, 1976; Polich et al, 1981; Skog and Duckert, 1993). For instance, Polich et al (1981) have shown that there was considerable

movement in and out of the category of severe problem drinking within a four years follow-up period. Only 13% of patients were long term abstainers at both the 18 months and 4 year follow-ups, 9% were stable non-symptomatic drinkers, and 20% were stable symptomatic drinkers. The remaining 58% had different statuses at the two follow-up points. More recently Skog and Duckert (1993) also found that drinking behaviour in alcoholics changed over time but that when change occurred subjects typically moved to neighbouring consumption categories with few very large or dramatic jumps.

Although most of the studies have used some form of Quantity-Frequency methods to measure drinking behaviour, there are many differences amongst the methods used. There have been several reviews of the development of and rationales for various methods that have been used to measure alcohol consumption in surveys (Greenfield, 1986; Room, 1990). The authors appear unanimous in considering that each method has advantages and disadvantages according to the particular aims of the study (Midanik and Room, 1992). For many purposes, particularly where a one-dimensional summary of drinking intensity is needed, a volume of alcohol measure might suffice. On the other hand to study behaviourally or socially mediated associates of heavy drinking, pattern of consumption, rather than overall volume, may be important. However, whatever method of asking about drinking is used, most studies aggregate the data from the different questions into summary measures or scores. The clinical studies in particular, whose main objective was to describe drinking patterns in the population, tended to summarise the drinking pattern in discrete categories, often using typologies.

More recently there has been criticism about whether the methodology employed by these clinical studies actually represents the complexity of drinking behaviour (Midanik and Room, 1992). All the methods have used some form of summary to describe different drinking patterns. However, there are many problems with summaries. Firstly they do not give a sense of the variability of the drinking pattern because they use group averages to summarize drinking over time and they tend to obscure changes in drinking patterns among individuals as well as individual differences in drinking

patterns over time. Secondly many drinkers have quite complex patterns that can not be easily summarised and this phenomenon is exacerbated by the request in most surveys to report typical drinking behaviour rather than actual drinking. Thirdly the categories used in the summaries are usually arbitrarily constructed. Categorical summaries are useful for simplifying presentation of results but are less sensitive than continuous measures. Nevertheless, there seems to be a consensus that no single approach to measurement can do full justice to the complexities of drinking behaviour. The aspect of the drinking pattern that should be emphasized during data collection and analysis depends in part on the purpose of the research.

By making more precise assumptions about the methods of data collection and measurement recent general population surveys have helped to answer some of the questions surrounding the relationship between drinking behaviour and alcohol dependence. Grant and Harford (1990) studied the risk of alcohol dependence at different levels of alcohol intake in a general population survey. They used aggregate measures of alcohol consumption that estimated the average amount of ethanol in ounces consumed per day during the past year. Linear logistic regression analyses were conducted to examine separately the association between average daily ethanol consumption and DSM-III-R alcohol dependence. The majority of respondents positive for DSM-III-R alcohol dependence were heavier drinkers. However, alcohol dependence was more closely related to ethanol consumption among young adults than older ones. More recently, Dawson and Archer (1993) have criticised the use of measures of average, usual, or typical consumption as used by Grant and Harford (1990) in terms of the limitation in representing the actual pattern of drinking. Using data from a national representative sample of adults in the USA they found that the relative frequency of heavy drinking had a strong positive association with the risk of past-year alcohol dependence, even after adjusting for the potentially confounding effect of average daily ethanol intake. Average daily intake was positively correlated with the relative frequency of heavy drinking, and both consumption measures were positively associated with the risk of alcohol dependence. This study also revealed that the association between relatively heavy drinking and dependence varied according to age, gender and education.

Greater understanding of drinking behaviour in several different populations has occurred as a consequence of improvement in the methods of data collection and measurement. In order specifically to improve the quality of information on the drinking behaviour of a clinical population three related approaches have to be developed further. Firstly, there is a need to further improve the techniques of data collection in terms of reliability and validity. Secondly, explicit assumptions have to be made about the specific drinking behaviour being measured. Thirdly, there is a need for a working model of drinking behaviour that looks at the pattern of drinking and not just cumulative summaries.

3.8 - Methodological Issues on the Measurement of Drinking Behaviour

Since self-report methods have become more popular as a means of measuring alcohol consumption, increasing attention has been devoted to questions about their reliability and validity. Reliability here is defined as the consistency of an individual's reporting both within a single assessment session and between two occasions. It is a source of random error and is caused by uncontrollable and unpredictable random influences (Skinner, 1984; Babor and Del Boca, 1992). Therefore, reliability is the reproducibility or consistency of indices related to alcohol use. There have been several studies showing that alcoholic patients give reliable information concerning drinking behaviour when the interviews were conducted on two occasions (test-retest) (Rohan, 1976; Armor et al, 1978; Sobell et al, 1979; Skinner and Sheu, 1982; Babor et al, 1987b).

Validity in this context has a special meaning and is associated with a type of error called systematic or fixed bias that occurs when something distorts a response every time a measurement is made. This kind of bias results in either a systematic overestimation or underestimation of the person's alcohol consumption (Midanik, 1982; Skinner, 1984; Babor and Del Boca, 1992). Early studies of the validity of self-reports made by alcoholics were considered suspect. This scepticism had its origins in the earliest formulations of Alcoholics Anonymous, which identified denial of problem drinking as the hallmark of alcoholism. Studies such as Watson et al (1984), Fuller

et al (1988), have also suggested that the validity of data obtained from a person with an alcohol-use disorder is questionable. However, recent reviews have analyzed a very impressive number of studies and come to a much more favourable conclusion (Babor et al, 1987b; Midanik, 1988).

This debate in the literature on whether or not self-reports by alcoholics were reliable and valid has more recently progressed to more substantive questions. Recent reviews (Sobell et al, 1979; Babor et al, 1987b; Midanik, 1988; Babor et al, 1990) have concluded that data about alcohol consumption are neither inherently valid nor invalid but vary with the methodological approach of the data collection and the personal characteristics of the respondents. There has been an indication that several specific factors can increase the validity of self-reports of drinking as shown in Table 3.3 (Skinner, 1984; Babor and Del Boca, 1992). The important aspect is to match the appropriate conditions that are necessary to produce reliable and valid self-report information for a given purpose (Babor and Del Boca, 1992).

In an effort to provide a theoretical framework for understanding the optimal conditions for obtaining self-report information, Babor et al (1987b, 1992) have proposed a conceptual model that borrows from the principles of learning, memory, cognition, motivation and social influence. The model specifies that the major sources of unreliability and invalidity are in the question-answering process. It also illustrates the complex environmental, social and cognitive demands placed on respondents who answer questions about alcohol consumption. On a practical level, the model has been used to explore new ways in which response error can be reduced, eliminated or controlled.

Table 3.2. Factors enhancing the validity of self-reports

<p>IMPROVING MOTIVATION</p> <ul style="list-style-type: none"> - Patient is assured of confidentiality of information - Patient has no obvious reasons for distorting reports of alcohol use - Emphasis on the research nature of the interview - Patient complies with other aspects of treatment - Good rapport with the interviewer - Patient aware that self-report will be checked with other sources <p>IMPROVING CLARITY OF THE TASK</p> <ul style="list-style-type: none"> - Patient is stable, no major symptoms - Patient is alcohol free at time of assessment - Use of structured interview - Good presentation of the questionnaire - Skills of the interviewer - Clear time interval to be assessed - Clear definition of the drinking behaviour to be assessed <p>IMPROVING COGNITIVE PROCESSING</p> <ul style="list-style-type: none"> - Memory errors can be minimized by use of memory aids - Questions as specific and with language as clear as possible - Facilitation of the retrieval of the information
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More recently a new generation of studies has started to single out some of the factors that contribute to the validity of self-reports. Midanik and Hines (1991) describe a study which assessed the recall strategies used for four different kinds of standard alcohol questions commonly used in surveys. The focus of this type of research was to gain a better understanding of the cognitive strategies used by respondents of surveys to arrive at a response to a question. By having a greater understanding of which cognitive strategies are used for different types of questions, methods can be used to facilitate better responses within the interview context. The authors found that most respondents used multiple strategies to remember their past drinking behaviour. Although the primary strategy was 'anchoring and adjustment', in which an initial recall or response was given, this was followed by a 'reasonableness assessment', with further recall and adjustment. 'Context' was also an important strategy for estimating frequency of drinking and frequency of drunkenness. In this type of recall, particular cues surrounding an event were used to stimulate recall. Based on this research the authors have proposed strategies that can improve the validity of self-reports : provide multiple cues for recall; the respondents are allowed more time to recall events; respondents put more effort into the recall process. Tackling similar issues, Embree and Whitehead (1993) studied various questionnaires that assess the consumption of

alcohol. They found two salient characteristics of questions that affected validity and reliability (isolated and analyzed using linear structural relations LISREL), namely, a question's ability to aid recall and its ability to mitigate the effects of persons providing socially desirable responses.

3.9 - Model of a Drinking Repertoire

One of the keys for improving the validity and reliability of drinking behaviour measurement is the clarity of the theoretical conceptualisation of the behaviour being measured. An improved model of drinking behaviour with precise criteria about the components to be measured can contribute to the greater clarity of the phenomenon. The importance of measurement in the clarification of a given theory is summarised by Blalock (1974):

"Measurement considerations often enable us to clarify our theoretical thinking and to suggest new variables that should be considered. It is often thought, prior to actual attempts at measurement, that we really understand the nature of a phenomenon because we have experienced it directly... Careful attention to measurement may force a clarification of one's basic concepts and theories."

There is a need for a model that goes beyond simply measuring quantity of alcohol consumed. An explicit evaluation of drinking repertoire would help clarify how the actual drinking pattern relates to the concept of alcohol dependence. Drinking repertoire as proposed by Edwards and Gross (1976) is a concept that has a quite specific theoretical framework that will consequently influence the way in which the model is organized. In a review that considered drinking behaviour and alcohol dependence under the Social Learning Theory, Hodgson and Stockwell (1985) proposed that drinking is a learned behaviour, and one that ranges along a continuous dimension of alcohol consumption. From this perspective, there is no clear line of demarcation between the social drinker and the 'alcoholic'. The theory makes explicit assumptions concerning drinking: drinking alcohol is mainly functional (where alcohol is consumed because of the expectation that a pleasant consequence will follow, or an unpleasant consequence will be avoided); drinking is a learned phenomenon (several mechanisms

are involved in the learned process of drinking, but one powerful experience in dependent drinking is the relief of the withdrawal symptoms by further drink); learning to drink heavily will be influenced by compensatory adaptive processes (it has been suggested that an adaptive or homeostatic process gradually develops in order to counteract alcohol's effect) (Edwards et al, 1981). This process results in both tolerance and withdrawal symptoms.

Although the Social Learning Theory proposes that drinking in a dependent individual follows the same principles as other varieties of drinking, the model of drinking behaviour in relation to the dependence concept has to allow for learning mechanisms specific to the dependent drinker. In particular, the relief and avoidance of withdrawal symptoms are mechanisms that may contribute to the pattern of dependent drinking. Therefore the proposed model of drinking repertoire to be measured emphasises the behavioural aspects that are more likely to express these mechanisms of relief and avoidance of withdrawal.

Following these theoretical principles there is a need to make operational decisions about the general model of drinking repertoire. Figure 3.1 shows a diagram with the main components of the model. At the centre is what is to be considered a narrow repertoire, which can be specifically defined as a period of time when there is high consumption of alcohol, daily drinking, morning drinking and spread of drinking throughout the day. The dotted line in the diagram represents a hypothetical wide repertoire, which is the more elusive part of the model. A wide repertoire can be achieved by different forms and variations and by the reduction of any or all of the components of the model. The most likely, however, is that there is a combined reduction in all three components. Therefore, the model proposes that there are several components to be measured: the amount of alcohol consumed; the proportion of days drinking in a given period of time; the proportion of days with drinking spread throughout the day, and the proportion of days with morning drinking.

The model below is a guide for the actual process of measurement to be used in this thesis. In order to facilitate the actual process of measurement, two distinct forms of

assessment (a semi structured interview and a questionnaire) were proposed. The main reasons for using these two forms of measurement were to achieve the most complete set of data possible by exploring the differences between interview and questionnaires as well as to show the consistency of the model being tested through different forms of evaluation. One form of measurement developed was a structured interview (Drinking Repertoire Interview) and the other was a series of self-reported questionnaires (Inventory of Drinking Repertoire). The next two sections describe the development of these two instruments.

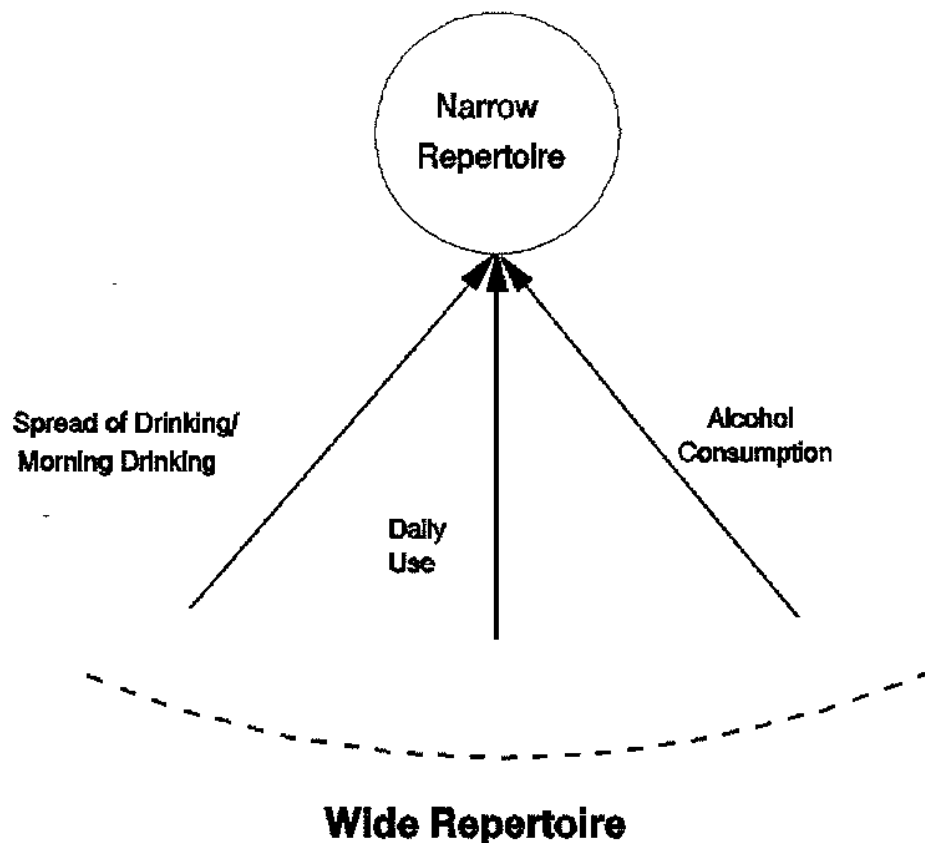


Figure 3.1 - Model of Drinking Repertoire

3.10 - Measurement of Drinking Repertoire by Interview (Drinking Repertoire Interview - DRI)

3.10.A. Pilot Study

A pilot study was carried out with twenty patients attending for alcohol detoxification at the Emergency Clinic of the Maudsley Hospital. The aim of this pilot study was two-fold: to create the structure of the Drinking Repertoire Interview and to develop and organize the most appropriate interview technique for the future data collection.

The initial structure of the interview consisted of Part I which gathered information concerning basic socio-demographic characteristics, previous treatments for alcohol problems, and a general drinking history. Part II of the interview examined exclusively the drinking behaviour in the previous six months. One important decision was to choose the exact window of assessment for this second part of the interview. This term window of assessment refers to the time frame following which drinking behaviour can be measured (Allen et al, 1992). It has been shown that information about drinking can be collected in detail for periods of one year (Sobell and Sobell, 1992). However, the interviews in the pilot study revealed that after a period of six months several respondents were not particularly confident of the information provided and were in need of more cues to remember. Other reasons which contributed to the choice of the period of six months were that the actual data collection would include interviewing patients in treatment, it has been shown that the previous six months represents a period of stable drinking behaviour (Polich et al, 1981), and the questionnaires used in the study focused on a recent period of drinking.

The initial interviews of the pilot study were not particularly structured. However, soon became clear that a more structured interview with a well established technique was needed, because some of the drinking behaviour being assessed was clearly subject to idiosyncratic interpretation by the patients. For example, when collecting information about a typical drinking day, there was huge variation in the initial interpretation of what that meant. Some patients were confused about what 'typical

drinking day' was. It also became clear that a precise scoring system for Part II was needed because of the amount of information generated by this part of the interview. Most of the pilot study was spent developing the interview technique described in the next section.

3.10B - Technique for the Administration of the Drinking Repertoire Interview (DRI)

The technique used during the interview had the main objective of increasing the reliability and validity of the self-reported drinking behaviour. The strategy used was based on several recommendations discussed previously in section 3.8. At the beginning of the interview there was a formal opening where the interviewer told the patient about the characteristics of the study. The beginning of the interview was very structured with the interviewer having a written guide of the main aspects to be covered. The objective was that all respondents should have a common understanding of the purpose of the study and thus give respondents a similar orientation to the project so that the context of the interview was as constant as possible. It has also been shown that a clear and objective introduction increases motivation for the interview (Babor and Del Boca, 1992). Table 3.3 shows the main aspects of this introduction. The interviewer had instructions to reinforce the role behaviour by prompting the respondent to 'take time to think carefully about your own experience'. The emphasis was on the need for accurate responses.

Table 3.3 - Drinking Repertoire Interview introductions

- | |
|--|
| <ol style="list-style-type: none"> 1- Explain the research nature of the project 2- Explain the specific objective of the interview which is the study of drinking behaviour 3- Emphasize the voluntary character of the interview and ask for a commitment agreement 4- Assure the absolute confidentiality of the information and the complete independence of the interviewees from the clinical staff. 5- Guarantee that no information given will ever be able to associate individual respondents with their answers because of the code system used to record the information. 6- Communicate that the whole interview takes on average 60 minutes. |
|--|

In relation to the information concerning the previous six months of drinking, a more detailed and specific technique was needed in order to facilitate the patient's recall.

One important aspect was to make the behaviour to be assessed as clear as possible by explaining it as objectively as possible. Essentially the patients were asked about each week of the previous six months and invited to describe in their own words the quantity and pattern of drinking. The interviewer inquired more specifically about: the number of days drinking any amount on alcohol in each week; on the days when alcohol was ingested what was the amount most frequently ingested, and also what was the lower consumption (if the patient could not provide accurate information about consumption, the interviewer had several photographs of glasses, cans, bottles, etc); number of days in a week with morning drinking and, number of days in a week with spread of drinking occurred.

Table 3.4 shows several memory aid procedures which were used to help people recall their drinking during the previous six months. Some procedures were adapted from the Time Line Follow Back (TLFB) (Sobell and Sobell, 1992) and other procedures were developed during the pilot study. The TLFB is an approach to retrospective measurement of drinking, whose advantages have been mainly in terms of procedures to aid recall. Its approach differs from traditional self-report measures by seeking a high degree of specificity in the recollection rather than asking the patient to average drinking over some time frame:

Table 3.4 - Memory aids used during the Drinking Repertoire Interview

- 1 - Using a visual daily calendar (Appendix A) of the previous 26 weeks. The calendar provides subjects with a temporal framework for recalling dates and patterns related to their drinking. Also, the time period over which drinking is to be recalled is marked on the calendar and reviewed with the subjects.
- 2 - Listing key dates on the calendar to assist recall of drinking. These key dates were holidays, birthdays, newsworthy events, and idiosyncratic happenings in the subject's life.
- 3 - Identifying periods of invariant drinking or extended abstinence.
- 4 - Using key dates and periods of invariant drinking to provide anchors for reporting drinking that occurred around these episodes.
- 5 - The interview started from the most recent week of drinking and traced back consecutively each of the 26 weeks of the period.
- 6 - The interviewer asked the patients to describe the amount of drinking in terms of the actual beverage used and he had a chart of the alcohol content of most of the drinks in the United Kingdom and transformed the amount in grams of alcohol

The scoring system used for each week of drinking was as follows. The actual recording of information took place at the end of the interview (Appendix A):

a) Days of the week drinking : if any alcohol was ingested it was considered as a drinking day. Four categories were used for the classification of the week: 1 - drinking every day; 2 - drinking most days of the week (5-6 days); 3 - drinking some days of the week (3-4 days); and 4 - drinking occasional days of the week (1-2 days).

b) Morning Drinking : In relation to the days on which the patient drank during a week those use five categories of morning drinking (any drinking that occurred within four hours after awakening or if the patient had irregular sleeping pattern, it was considered after the longest period of the day sleeping): 1 - every day morning drinking; 2 - most days morning drinking; 3 - some days morning drinking; 4 - occasional morning drinking and 5 - no morning drinking.

c) Spread of drinking throughout the day: This was said to occur when there was more than four hours of continuous drinking. Five categories were used in relation to the days that the patient had drunk: 1 - every day spread of drinking; 2 - most days spread of drinking; 3 - some days spread of drinking; 4 - occasional spread of drinking and 5 - no period of drinking for longer than four hours.

d) Alcohol Consumption : a detailed account of consumption was made. The aspect to be measured was the frequency of the maximum and the minimum consumption occurring in a week. Three levels of alcohol consumption were chosen (<100g of alcohol, >100<200g and >200g). Since the patients could vary in terms of the quantity and the frequency ingested, a double system of classification for the week was adopted, one for the most frequent occurrence and other for the least frequent. For example, a patient could have drunk more than 200g of alcohol on five days and less than 100g for two days, which would lead him to be classified as most days >200g, occasional <100g. Using this classification ten categories were created.

Table 3.5 - Categories of alcohol consumption used as score in the DRI

0 - No consumption
1 - occasional <100g of alcohol
2 - some days <100g of alcohol
3 - most days <100g of alcohol
4 - occasional >100g <200g
5 - some days >100g <200g
6 - most days >100g <200g
7 - occasional >200g
8 - some days > 200g
9 - most days > 200g

These ten categories made it possible to grade the week into two levels, according to the frequency of occurrence of the levels of consumption. For example a patient that in one particular week drank more than 200g in five days and in two days drank less than 100g, would receive on the first level a score of 9 and on the second level a score of 1. This method allowed the week to be classified into thirteen categories: 99, 94, 91, 85, 82, 67, 66, 61, 52, 37, 34, 33 and abstinent (00).

3.11 - Measurement of the Drinking Repertoire by Questionnaire (Inventory of Drinking Repertoire - IDR)

As an extension of the process of measurement of drinking repertoire by interview a series of self-administered questionnaires were created. The argument to expand the measurement of drinking repertoire using questionnaires was made on several grounds. The advantage of a questionnaire is that it has a different sort of objectivity than the interview; it can be scaled along its dimensionality and also it is less open to researcher bias (Fowler, 1991; DeVellis, 1991; Oppenheim, 1992). Another important aspect of using a questionnaire for measuring drinking repertoire is that it can be more easily compared with existing questionnaires measuring the concept of alcohol dependence.

3.11A - Design of the Structure of the Inventory of Drinking Repertoire (IDR)

The initial difficulty in the design of a questionnaire to measure drinking repertoire was how to organize a series of items that could measure a phenomenon so changeable over time as drinking behaviour? The strategy adopted was the creation of a series of scales (Inventory of Drinking Behaviour) measuring drinking repertoire within a specific time period. The aim was that each scale would assess specific periods of time, providing a comprehensive range of the actual repertoire of drinking. The word inventory as employed here follows Streiner (1993) who considers it as an instrument which consists of a number of different independent scales or questionnaires.

The first part of the inventory selected three distinct periods of time in the previous six months of drinking to create three scales: 1 - a scale of a Typical Drinking Day in the previous two months of drinking; 2 - a scale of a Typical Month of Drinking in the previous six months of drinking; and 3 - a scale of the whole Last Six Months of Drinking. In the second part of the inventory a different aspect of the drinking repertoire was assessed. Implicit in the idea of narrowing of the repertoire is that drinking that follows on from a period of abstinence is as rigid as before. The main interest was in assessing the speed with which the drinking pattern became rigid again after two different periods without a drink. Thus, two scales were created in order to assess drinking immediately after a period of abstinence: 1 - a scale of Drinking After Two Days Completely Dry; and 2 - a scale of Drinking After a Period of Two Weeks Completely Dry.

The five scales have similar group of item assessing the same areas of drinking repertoire. In order to make the scales easy to answer in the form of self-administration an adaptation of the model of repertoire had to be made. Firstly, specific assessment about actual alcohol consumption was left out. Secondly, the emphasis became the measurement of the flexibility or rigidity of drinking behaviour over certain periods of time. Three areas of the drinking behaviour were proposed to be evaluated according to the flexibility/rigidity criteria.

1- Time of the first drink of the day: The time of the first drink of the day can be considered as a strong indicator of relief drinking. If the first drink occurred immediately after awakening up, it can be considered as a behaviour that is more rigid than if drinking occurred only in the evening. Therefore the timing of the first drinking varies from a rigid early morning drink to a more flexible lunch time or even more flexible late evening drink. In order to measure this particular drinking behaviour, several items were created that represented this behaviour along a continuum of severity. At one extreme there were items representing very rigid behaviour: 'First thing in the morning I have a drink'. Middle items reflected a more flexible behaviour: 'I have my first drink of the day at lunch time'. At the other extreme were items representing a even more flexible behaviour: 'I have my first drink of the day in the evening'. The scales had at least two items covering each possibility of behaviour, with different wording (e.g. 'I take my first drink of the day less than five minutes after waking up'). The reason for having at least two items covering each possibility was two fold: 1- to assess which of them would have a better performance in psychometric terms; and 2- to check the consistency of the response (DeVellis, 1991).

2- Spread of drinking throughout the day: The spread of drinking throughout the day was also a way to assess relief drinking. If one is using alcohol as a relief, there will be a tendency to spread drinking throughout most hours of the day. This behaviour can also be assessed along a continuum of severity. At one extreme there is a very rigid behaviour: 'I drink all day long'. At the other extreme a more flexible one as: 'I do all my drinking for the day in just a couple of hours'. There were also at least two items covering each possibility of behaviour with different wording (e.g. 'I do all my drinking for the day in a short period').

3- Night drinking: The drinking that occurs at night time can also represent relief drinking. This behaviour was also assessed with a continuum of severity, at one extreme drinking heavily before going to bed and awakening during the night to have a drink: 'Before I go to bed I have to have a couple of drinks', 'I wake up in the middle of the night to have a drink'). At the other extreme: 'I go to bed without

having had a drink in the last hour or so', 'If I wake up in the middle of the night I go without a drink'. Table 3.6 shows a group of items representing the areas above described for the Typical Month of Drinking scale.

Table 3.6 - Areas of the Typical Month of Drinking scale

Areas
<p>TIME OF THE FIRST DRINK OF THE DAY</p> <p>I had a drink in the morning</p> <p>I drank my first drink at lunch time</p> <p>I drank my first drink in the evening</p>
<p>SPREAD OF DRINKING THROUGHOUT THE DAY</p> <p>After my first drink in the morning, I had a few drinks within a couple of hours</p> <p>I drank throughout the day</p> <p>I went without a drink for hours</p>
<p>NIGHT DRINKING</p> <p>I had a couple of drinks before I went to bed</p> <p>I stopped drinking two or three hours before I went to bed</p> <p>I woken up in the middle of the night to have a drink</p>

As for each of the five scales in the inventory assessed different periods of time, distinct answers categories had to be created. As interest in the scale Typical Drinking Day was on the customary behaviour a five point frequency category was used (Never/Rarely/ Sometimes/Usually/Always). For the scale Typical Month of Drinking a more precise period of time was asked about and the categories were (Never/Rarely/Sometimes/Most Days/Every Day). For the scale Last Six months of Drinking a long time span was covered and what happened over several weeks was the element of concern (Never/Rarely/Some Weeks/Most Weeks /Every Week). Distinct categories had to be used in the scales relating to drinking after a period of abstinence.

The interest here was in knowing how quickly the pattern of drinking occurred. Therefore, for the scale After Two Days Completely Dry, the patients were asked to answer (Never/After a few weeks/After a week/After a couple of days/On the following day). In the scale After Two Weeks Completely Dry the patients were asked to answer (Never/After a couple of Months/After a Month/After a couple of Weeks/In the first Week).

The first version of the questionnaire had five scales with at least 20 statements combining the items in the three areas. They had similar structure, and even similar wording, adapting for the particularities of each period asked about. This version was submitted to a thorough pilot study as described below.

3.11B - Pilot Study of the Inventory of Drinking Repertoire (IDR)

In the pilot study several aspects of the instruments were being tested: the actual wording of the items (grammar, difficulty in understanding, ambiguous items, etc); how the answer categories worked; how clear the instructions were; and most of all how the actual items could represent the patients experience with drinking during each period. The inventory was administered to 20 patients attending for alcohol detoxification at the Emergency Clinic of the Maudsley Hospital.

An 'intensive pretesting' was designed for half of these patients. As discussed in more details in Chapter 2 the intensive pretesting design has the objective of examining a few items of the questionnaire in great detail with each respondent. The main purpose was to assess the perceived meaning and understanding of all questions. The technique used was as discussed before in Chapter 2, consisted to ask the patients to read each question aloud and comment on the meaning and his impressions and understanding of each question and whether the content of the item was part of his experience with alcohol. For the other ten patients in the 'extensive pretesting', when they finished the questionnaire the researcher discussed the answers with them. The 'extensive pretesting' design has the objective of assessing not only the individual items of the questionnaire but also the questionnaire as a whole.

One important aspect that had to be changed in the inventory after the pilot was in the two scales that measured drinking after a period of abstinence. Several patients had not had a dry period of two weeks and some of them had not even had two days completely dry in the previous six months. It was decided that a longer period of time had to be employed that would allow most of the patients to have periods without a drink, otherwise there would be a strong possibility of loss of information for a substantial number of patients during the data collection phase. The change made allowed for the possibility that the period of time in which they had a period abstinence could be extended to the previous two years. There was also a few items in the scales that were ambiguous or had a wording or grammar problems that had to be excluded. A final version of the Inventory of Drinking Repertoire (Appendix B) was administered to another group of five patients from the Maudsley Hospital, and no major problems was identified with only minors printing mistakes in need of correction.

Chapter 4 - Measurement of the Modifiers of Drinking Behaviour

Chapter 4 - Measurement of the Modifiers of Drinking Behaviour

4.1 - Plasticity of Drinking Behaviour

In the psychiatric literature since the beginning of the century there has been a great awareness of the distinction between the factors involved in the etiology of mental disorder and the environmental and personal factors contributing to that disorder. The terms 'pathogenic' and 'pathoplastic' used to describe these modifying factors were first employed by Birnbaum in 1923 (in Edwards, 1974):

"The essential clinical phenomena which occur in any illness are, first, those which refer to the actual cause of the illness, which endow it with a specific character, its quality of being 'thus and no other': secondly, those which may be said to shape the disorder in that they give contour to individual illnesses whose basic form and character have already been etiologically established. The former group of phenomena I would call pathogenic (the word itself provides a sufficiently clear definition), the latter pathoplastic."

In the alcohol literature there has also been an awareness of this theoretical distinction. With the disease concept of alcoholism, represented in the writings of Jellinek (1960), there is an open acknowledgment of the pathogenic and pathoplastic factors involved in the drinking behaviour in alcoholism. When Jellinek developed his typology of alcoholism, he clearly stated that the difference between gamma (loss-of-control) and delta (inability-to-abstain) alcoholism might lay in part with cultural patterning: gamma alcoholism was typical in Anglo-Saxon countries, while delta alcoholism was more common in France and other countries with a large wine consumption. The idea of a fundamental and unitary pathological process being moulded by various secondary factors, so as to present different clinical pictures, is inherent to Jellinek's writing. He was well aware of the great variety of clinical presentations of alcoholism, and pointed out that the five-item typology did not exhaust the range of possibilities:

"There are, of course, many other species of alcoholism...- and all the remaining 19 letters of the Greek and if necessary other alphabets are available for labelling them."

In terms of pathogenic factors, Jellinek considered that the loss of control phenomenon was a disease condition per se. Its presence would mark the stage in the excessive drinker's career when the addictive process began, and would distinguish gamma from delta alcoholism. Loss of control, therefore, was considered as the pathogenic factor contributing to the addictive process. The description of the 'loss of control' emphasises the difference between this state and any other that might be experienced by the alcoholic: "The drinking bout in the presence of loss of control differs greatly from one in which a drinker gets drunk deliberately." (p.146)

4.2 - The Alcohol Dependence Syndrome and the Concept of Plasticity

The Alcohol Dependence Syndrome (Edwards and Gross, 1976) differs from the disease concept of alcoholism in a number of ways, but one important difference concerns the influence of pathogenic factors. The ideas that contributed to the Alcohol Dependence Syndrome do not make any assumptions about a single pathogenic factor. The essential postulate being that: the syndrome is formed by a clustering of certain elements, and it is not necessary for all elements to be present to the same degree; it occurs with graded intensity; and its presentation will be shaped by the pathoplastic influences of environment, personality and culture. Instead of loss of control being the deciding factor in the differentiation of typologies of alcoholism, the ADS construct proposes that the use of alcohol takes precedence over other behaviours. An early discussion of the syndrome in a WHO document (1981) summarised this view:

"Drug dependence is a syndrome manifested by a behavioural pattern in which the use of a given psychoactive drug, or class of drugs, is given a much higher priority than other behaviours that once had higher value."

The idea of plasticity of behaviour is at the centre of the concept of Alcohol Dependence Syndrome (Edwards, 1974). The change in plasticity contributes to the presentation of the syndrome and it varies along a continuum of severity. In the description of the syndrome by Edwards and Gross (1976), the idea of plasticity is made more explicit through the description of several of the elements proposed. In relation to drinking behaviour the narrowing of drinking repertoire element was clearly presented

in terms of a constant interaction between the individual's drinking and the environment. Drinking behaviour is considered a modifiable phenomenon. The emphasis is to consider drinking behaviour in someone dependent as a phenomenon with diminished responsiveness to the ordinary processes of social and psychological control over drinking. The salience of drink-seeking behaviour is one element of the syndrome that fully describes the loss of plasticity. It is portrayed as the drinking behaviour of the individual taking precedence over all the others forms of behaviour. The main aspect is the change in the balance of priorities of daily life. Drink-seeking behaviour acquires a salience and centrality which results in a need to satisfy the desire to drink and a willingness to ignore the appropriateness of circumstances in which drinking behaviour may be indulged. According to Edwards and Gross (1976):

"This stereotyping of the drinking pattern as dependence advances leads to the individual giving priority to maintaining his alcohol intake; indeed the failure of unpleasant consequences to deter may be a clinical indicator of the degree of dependence."

Indeed, the degree to which dependence exists depends on the response of the individual to the environment. The plasticity of the syndrome has to be understood in relation to the variety of pathoplastic influences, from the individual to the broader environmental level. As the syndrome is proposed it will always exhibit some degree of plasticity, and it will show itself in a variety of forms in different cultures and with different personalities. Instead of truly distinct types of alcohol dependence, there may be only one form, but with a variety of faces. Based on this view, the severity of dependence can be assessed through the variety of pathoplastic factors that influence the drinking behaviour in each individual case. Thus, the commonly accepted premise that drinking behaviour has a multifactorial basis should be studied through a series of postulates that can be quantified. Understanding the influence of cultural, social and physiological pathoplastic factors in the maintenance of drinking is at the heart of the validation process of the ADS.

4.3 - Psychiatric Classification Systems and the Concept of Plasticity

The idea of diminished responsivity to environmental and personal pressures to control drinking is emphasized in both classification systems (DSM-IV and ICD-10) albeit to different degrees. The difference between ICD and DSM is in the emphasis given to the plasticity of drinking in relation to a number of criteria representing this aspect of the syndrome. The American system pays more attention to the social and personal consequences of the use of drugs and has done so since earlier versions of the DSM-III-R (Rounsaville et al 1989, Rounsaville et al 1993). As table 2.1 shows DSM-IV has four of the seven items related to decreased plasticity: 'the substance is often taken in larger amounts or over a longer period than was intended'; 'a great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects'; 'important social, occupational, or recreational activities given up or reduced because of substance use'; 'continued substance use despite knowledge of having a persistent or recurrent social, psychological, or physical problem that is likely to have been caused or exacerbated by the substance'. With ICD-10, on the other hand, only two of the six items relate to decreased plasticity: 'progressive neglect of alternative pleasures or interests because of psychoactive substance use, increased amount of time necessary to obtain or take the substance or to recover from its effects'; and 'persisting with substance use despite clear evidence of overtly harmful consequences'.

4.4 - Conceptualization of the Plasticity of Drinking Behaviour

As considered above alcohol dependence implies decreased response to a series of influences which in different circumstances would discourage drinking behaviour. More information is needed about the factors involved in decreasing the plasticity of drinking behaviour, which would be of importance to the understanding of the development and maintenance of alcohol dependence. A large number of factors have been shown to influence drinking behaviour in several conditions and for different populations. The advantage of focusing on a limited number of factors is that this will

allow us to identify a common core of situations that can be tested against the measurement of the alcohol dependence syndrome.

Early studies during the sixties, using behavioural approaches, tried to demonstrate that the drinking behaviour of alcoholics could be modified under certain circumstances. The operant paradigm, used to measure drinking behaviour, was pioneered by Mello and Mendelson (1965) and established the beginning of a tradition of measuring drinking behaviour in the laboratory. They viewed an alcoholic's consumption response as the primary reinforcer of alcohol acquisition behaviour. In an important series of experiments in the laboratory they demonstrated that for alcoholics the amount of alcohol consumed varied with a series of factors. Amongst the factors playing an important role were the amount of work required to obtain alcohol, and the quality of social interaction. They also noted that spontaneous drinking promoted idiosyncratic patterns rather than a very stable and stereotyped pattern. After the initial work of Mello and Mendelson (1965) many others studies used the operant paradigm to study drinking behaviour. A variety of positive (e.g., money, redeemable tokens, social interaction) and negative (e.g., electric shock, social isolation) reinforcers were employed within a number of different paradigms (e.g., punishment, escape, token economics, contingency contracting) in order to investigate the potential change in drinking behaviour.

The effect of social-interpersonal factors on drinking have been investigated in more detail under laboratory conditions. Access to socialization and avoidance of social isolation have been shown to control drinking under different conditions (Griffiths et al 1978; Mello 1972). These studies showed that alcoholics could be induced to stop drinking, to abstain, and to moderate their drinking in order to earn such incentives as money and access to an enriched environment. However, many authors have criticized this theoretical model, particularly in relation to the difficulty of determining the degree of control these variables could have over drinking in the natural environment.

The alternative to direct reinforcement models of drinking, proposed by the operant paradigm, was the social learning approach. The advantage of this model is that it

emphasizes the role of modelling and cognitive-symbolic processes as well as direct reinforcement. It also expands the range of influences that can be explored in the process of control of drinking behaviour in the broader environment. It considers that addictive drinking is mediated by the same decision process that governs all drinking and that this process is no less salient in addictive than in non-addictive drinking. There are three primary characteristics that distinguish the social learning approach: it recognizes the subjectivity of perception; it sees behaviour as the result of interactions between internal (e.g., cognitions and emotions) and external (e.g., situational settings) events; and the relationship between behaviour and internal and external events is seen as reciprocal.

The studies using social learning approaches focus on four main aspects of drinking behaviour: the frequency and duration of drinking; the amount of alcohol consumed; the situational events that precede and follow drinking; and the nature and severity of problems associated with excessive alcohol use. The studies also provide indirect assessment of unobservable cognitions and emotions, thereby permitting an evaluation of how they contribute to drinking behaviour. They also consider drinking behaviour as a complex phenomenon with no single learning process seen capable of explaining the etiology of problem drinking. Chief determinants include past learning history, previous experience with alcohol, situational and environmental antecedents, cognitive expectations, and prevailing reinforcement contingencies (both positive and negative). The combination of these determinants yields compelling explanations for both acquisition and maintenance of drinking behaviour.

4.5 - Factors Involved in Modifying Drinking Behaviour

As there are countless factors that could potentially influence individual drinking behaviour it was decided to choose a limited number of factors that deter drinking behaviour. Based on a literature review five groups of factors were chosen for further examination. The first factor concerns the environmental pressures that restrain drinking. The second concerns the social pressures that are effective in decreasing

alcohol consumption. The third relates to the daily coping mechanisms that contribute to patients deciding to decrease their alcohol ingestion. The fourth examines the influence that symptoms of alcohol intoxication and other physical symptoms can have on deterring drinking. And the fifth is the influence of the general availability of alcohol.

4.5A - Context and Setting of Drinking

There is an extensive literature looking at environmental factors that contribute to the use of alcohol as well as other psychoactive substances (McCarty, 1985; Davis and Tunks, 1990-1991; Cooper et al, 1992; McMahan et al, 1992). The term 'context' has been used ambiguously, referring sometimes to physical environments, at other times to social settings or situations. This makes comparison between studies difficult.

The importance of the context of drinking in the general population has been widely studied and the findings from surveys suggest a relationship between the amount consumed and variables such as physical location, type of companions present, type of alcoholic beverage drunk, and gender. In an influential paper, Cahalan, Cisin and Crossley (1969) showed that the general population of the USA reported drinking less than usual in social meetings with neighbours, people from church, or members of their own family and more alcohol than usual with close friends. Heavier drinkers drank in more locations and more frequently in public than light and moderate drinkers. Heavier drinkers were also more likely to drink alone, although they usually drank with close friends. Many subsequent surveys of the general population have shown similar relationships between location, social interaction and alcohol consumption (Room, 1972; Harford, 1983; Davis and Tunks, 1990-1991). Generally the level of consumption is higher in a bar than in a home setting (Harford, 1983), whereas the frequency of alcohol consumption is higher in the drinker's home (Cahalan et al, 1969).

Harford (1983) surveyed 794 adults in metropolitan Boston and found important differences in alcohol consumption between men and women. Men tended to drink

most heavily in bars and in the company of friends, but the setting appeared to have little impact when friends were present. Bar settings appeared to be conducive to heavier drinking, irrespective of the type of companion present. For women heavy drinking also occurred in bars but, unlike men, only when friends were present. Evidence was found that consumption levels differed for the same person in different settings, suggesting that the physical environment does influence drinking behaviour. An important finding was that the presence of a spouse, relatives, or others was associated with a lower level of drinking. Klein and Pittman (1990), using a national probability sample of 2,401 Americans, looked at differences in the perceived appropriateness of drinking beer, spirits, wine and wine coolers in six different social settings. They found remarkably clear-cut notions of when it was appropriate to drink. No beverage was perceived as being appropriate for all different social occasions.

There has been some indication that particular drinking locations are more likely to be associated with higher consumption than others. Recent studies have used a variety of methodologies to examine the relationship between the experience of adverse consequences of drinking, in particular drink-driving offence, and the location in which drinking took place. Self-reported frequency of drunkenness is found to be more strongly related to drinking location than to socio-demographic characteristics. Stockwell, Somerford and Lang (1991) found that 32% of male and 28% of female drinkers drank at licensed premises on their heaviest day of drinking, and this figure increase to 46% among those under 25 years of age. Bars and taverns have been found to contribute disproportionately to impaired drinking. Another place which has been shown to increase the risk is drinking at a friend's home (Snow and Landrum, 1986; Casswell et al, 1993). Stockwell et al (1992) were able to measure the characteristics of drinking settings and their relationship to consumption and the probability of harm occurring. Their study showed that there are certain types of setting which are more 'risky' than others with regard to the likelihood of alcohol intoxication occurring, even when age, sex and marital status of the drinker are controlled for.

Surveys of adolescent drinkers show that drinking tends to begin in the home, and this is the site where drinking occurs most frequently. Older teenager, however, are more likely to drink in locations not supervised by adults - at parties with peers, in secluded spots, and in cars. Young adults (18 to 30) are least likely to drink in home settings but drink with friends in bars and restaurants (Cahalan et al, 1969). Harford, Grant and Grigson (1987) studied psychosocial factors and adolescent drinking in American students. A network of heavy drinking peers increased the probability of exposure to settings where alcohol was available and consumed. Knibbe, Oostveen and Goor (1991) also found that 85% of the total weekly consumption among young Dutch men was related to the frequency of visiting public drinking places, the size of the drinking group and group pressure.

In order to further explore drinking context and social influences on the drinking among young New Zealanders, Connolly et al (1992) explored a series of situational variables that had an effect on the amount of alcohol consumed on the most recent drinking occasion. Consumption was lower at home compared with other people's homes and other places. Consumption was also low when an adult was present and lower still when alone. When the source of the drink was an adult, consumption was lower compared to when a peer or the adolescent himself was responsible for obtaining the drink. Smaller quantities of alcohol tended to be consumed during day-time drinking sessions than night-time ones. Another factor that contributed to lower consumption were times when the adolescent had less money available to spend.

Beyond the constraints that the environment can have on drinking, authors such as Brown, Goldman, Inn and Anderson (1980) have argued that the drinking context also influences the reinforcement associated with drinking. Alcohol may be perceived as more reinforcing in some social contexts. Brown (1985) assessed how alcohol reinforcement varies with the social and physical environment in which drinking most frequently took place. Alcoholics who drank with family members expected less reinforcement from alcohol than alcoholics drinking in other social contexts (e.g., alone, with friends, or acquaintances). Frommen and Dunn (1992) studied how beverage content, environmental cues, and alcohol outcome expectancies influenced a

subject's administration of an alcoholic drink and his or her response to a social drinking situation. Both drinking setting and beliefs about the effect of alcohol influenced the subject's perceived reinforcement from drinking.

There are few studies looking at the influence of drinking context within clinical populations. Alterman, Gottheil, Skoloda and Grasberger (1974) showed that drinking behaviour can be influenced by subtle social reinforcement with a specific psychological set towards drinking or not drinking. During a treatment programme in which alcoholics could choose to drink, those whose group discussions had reinforced abstinence and who stated that they would remain abstinent subsequently drank less than those whose discussions had been more permissive.

Choquette, Hesselbrock and Babor (1985) published an important paper in which the influence of drinking situations was studied with a population of patients undergoing treatment for alcoholism. The authors assumed that even the dependent drinker, on the basis of personal experience, learns that excessive drinking is acceptable in some situations and unacceptable in others. They assessed how much the situational cues could serve as discriminant stimuli or set a context for drinking in a group of people dependent on alcohol. Significantly more drinking occurred when the alcoholic was alone. The majority of patients reported drinking less than usual with family members. Friends also seemed to provide a source of control over the alcoholic's drinking, though different groups of friends influenced drinking in different ways; for example, close friends tended to facilitate drinking. Having said this, more alcohol was consumed in situations with friends if they provided a source of support and more was consumed alone if they were a source of control. Neighbours and co-workers had little reported effect on consumption. The striking feature of this study is that although discriminative cues appeared to influence drinking, most of the situations studied tended to produce social control compared to the baseline condition of drinking alone.

Family and work are the main sources of daily social control over drinking. Social norms and activities with the family, in the workplace and in the community provide cues that support or deter drinking behaviour. Orford et al (1976b) were among the

first to study, in a clinical setting, the influence of family and significant others on outcome in treated alcoholics. Relatively cohesive couples were more than twice as likely to find themselves in the 'good' rather than the 'bad' outcome group at follow-up. Non-cohesive couples were more than three times as likely to be in the 'bad' outcome group. Orford (1992) recently reviewed the subject of excessive drinking and the family and stressed the similarity between coping with excessive drinking in the family and in the work place. The forms of coping identified in family research and in work policies correspond to basic dimensions of interpersonal behaviour: dominance-submissiveness and friendliness-hostility.

In relation to work the perception of a positive working environment has been associated with less post-treatment drinking for working patients who lack marital support (Moos and Finney, 1983; McCrady et al, 1986). Trice and Sonnenstuhl (1990) discussed the sociocultural approach and the centrality of norms and social controls as coping strategies for drinking in the work place through an employee assistance programme. These programme construed drinking norms in two ways. Firstly they established a clear statement of what constituted alcohol abuse and dependence through a formal policy. Secondly they developed an intervention approach known as 'constructive confrontation', which provided a pragmatic technique for correcting deviant behaviour. Recent research has shown that this approach is a very effective strategy for assisting alcoholics in the work place. Beattie et al (1992) developed a questionnaire to measure the impact on alcohol abusers of factors specific to the workplace. They found three factors that accounted for 51.9% of the variance. The first factor related to adverse effects of drinking on work performance, and the other two factors reflected the interaction and support of co-workers.

The treatment potential of these environmental factors has been widely appreciated in the literature. Galanter (1993), recently proposed an integrated approach called 'network therapy' that relies on the supportive role of a group of family and peers introduced into the therapy sessions of the alcoholic. He proposed a combination of social cohesiveness and behavioural techniques as an alternative to the traditional forms of treatment for the addictions.

4.5B - Modelling and Social Interaction

The social interaction that occurs during alcohol consumption has been investigated in laboratory and clinical settings. In the laboratory, in semi-naturalistic and natural bar settings a series of studies has investigated social influences on drinking through the concept of modelling. The importance of modelling is that it may have the potential to counteract as well as amplify abusive patterns of drinking.

Much of the research concerning modelling has focused on manipulating the characteristics of the model, including the nature of the social interaction between the model and the subject. The general paradigm has been to investigate the influence of heavy-drinking versus light-drinking role-models, and the nature of these model's social interaction (unsociable versus sociable) on an individual's drinking behaviour. Initial research on the effect of the model's consumption rate on other social drinkers (Caudill and Marlatt, 1975) suggested that heavy-drinking men tended to match the consumption of their drinking partner whether his consumption was heavy or light. Heavy drinking male college students participated in a 15-minute wine-tasting study either alone or with an experimental confederate who drank heavily (700 ml of wine) or lightly (100 ml of wine). Models were also warm and friendly or aloof and cold to the subject. Students who participated with the heavy drinking confederate drank significantly more wine than either students who did not have a model or students who drank with lighter-drinking models. The lighter-drinking model and no model conditions did not differ significantly. The attempt to influence the strength of the modelling effect with a warm or cold model had no effect in this particular study. Subsequent examinations of this phenomenon replicated these findings in laboratory analogue drinking tasks such as the taste-rating task (Lied and Marlatt, 1979), in natural bar settings (Reid, 1978), and semi-naturalistic bar settings (Caudill and Lipscomb, 1980).

Even more subtle aspects of the social interaction seem to influence drinking. The personal characteristics of the model interact with the sex and drinking habits of the drinker. Lied and Marlatt (1979) found a strong interaction between the drinker's sex and the drinker's drinking habits. Men and women categorized as heavy drinkers were

more responsive to differential modelling than lighter drinkers. Light and heavy drinkers drank similar amounts if exposed to a high consumption model. When drinking with a high consumption model, however, male and female heavy drinkers drank significantly more than light drinkers. Moreover, male heavy drinkers exposed to a heavy consumption model drank significantly more than female heavy drinkers. A light consumption model promotes restrained drinking, whilst a heavy consumption model has a disinhibitory effect on alcohol consumption among heavy drinkers. In a 1985 study, Collins et al found that a subject's alcohol consumption rate was dependent on both the rate of consumption of the role model and on the model's level of sociability. However, in this study heavier drinking in the subject was produced by exposure to either a sociable heavy-drinking model, an unsociable heavy-drinking model, or an unsociable light drinking model. The authors deduced that an unsociable model may be aversive to subjects and they tend to respond by drinking more heavily.

The nature of the interaction between the drinker and the people in the immediate environment has a substantial impact on whether or not modelling alters drinking behaviour. Consequently, modelling seems to be one mechanism that contributes to increased or decreased alcohol consumption when drinking occurs in a social context. The strength of the influence is a function of the usual drinking level. Heavy drinkers both exert more modelling influence and are more easily influenced. Overall, the results of the experimental studies suggest that the modelling phenomenon is robust. Importantly, the process of social bonding, and the perception of the model as a peer, increases the significance of the modelling effect. This phenomenon is influenced by drinking history and gender such that heavy-drinking males are most likely to escalate alcohol consumption in the presence of other heavy-drinking males.

In recent years attention has been given to social support as a measure of control in drinking behaviour. It has become clear that the construct 'social support' is a complex one when applied to drinking behaviour and is probably multidimensional. Most studies have focused on the effects of the patient's perception of general social support on the outcome of alcohol treatment. The Significant-Other Behaviour Questionnaire (SBQ) was developed to measure the effect that a significant other had

on the drinking behaviour of an alcoholic (Orford et al, 1975). Love et al (1993) found that factor analysis of both the patients' and significant others' SBQ forms resulted in a factor solution consistent with four possible responses to the patient's drinking: supporting drinking; supporting sobriety; punishing drinking; and withdrawal from the patient when he is drinking.

4.5C - Reasons for not drinking - Coping Mechanism

According to Social Learning Theory, cognitive factors modulate all person-environmental interactions. The decision to drink or exercise restraint is ultimately mediated by cognitive factors formulated around the current situational context. Reasons for drinking have been extensively studied over the last decade and the results show, unsurprisingly, that people differ widely in their reasons for drinking (Smith et al, 1993). These differences seem to be important because different drinking motives have been shown to predict distinct patterns of alcohol consumption and alcohol-related problems. For example, numerous studies indicate that individuals who drink to cope with negative emotions or feelings of personal deficiency are more likely to drink heavily, to drink alone, and to experience problems indicative of alcohol abuse than those who drink primarily for social or affiliative motives (Cutter and O'Farrell, 1984). Annis et al (1987) using the Inventory of Drinking Situations, found by factor analysis two factors that revealed the situations in which drinking was more likely to occur: negative affect situations and urges to drink; and positive affect situations and testing control. Cannon et al (1990), using the same inventory with alcoholics, found through Principal Component Analysis a three factor solution, with alcoholics being more likely to drink in: negative affect states; positive affect states combined with social cues to drink; and attempts to test one's ability to control one's drinking.

Reasons for not drinking have not been so extensively studied. Amodeo and Kurtz (1990) were able to identify a host of motivators or reasons for not drinking in alcoholics, including: to regain physical health, clear up mental confusion, preserve family relations, increase professional mobility, enjoy life more, regain self-respect, and avoid further legal, financial or emotional problems. Hodgson (1989) argued that

people make the decision to change their drinking behaviour when they are expecting short or long term benefits. Drinkers cut down in order to achieve better health, better family relationships, a better job or simply to improve self-respect.

Coping is a concept that has been used in many studies looking at reasons for not drinking. Most data suggest that coping mechanisms are very important in the maintenance of drinking behaviour after alcoholism treatment (Litman et al, 1983; Shiffman, 1989). When faced with the temptation to drink, the coping response is expected to be a strong determinant of success in controlling temptation. In this context, the term coping response refers to the cognitive and/or behavioural action a person engages in to reduce temptation. According to this model, the act of coping prevents relapse from occurring.

Several studies involving alcoholic populations have yielded results which are consistent with a coping model of relapse. Cheney et al (1978) found that alcoholics who had shorter response latencies on the Situational Competency Test drank less, were more likely to be employed, and had more regular attendance for aftercare following treatment. Litman et al (1979) found that the use of cognitive coping was a strong discriminator between relapsing alcoholics and survivors; in particular, a broad coping repertoire was associated with a greater likelihood of the patient being a survivor. Cronkite and Moos (1980) found that post-treatment coping styles were positively related to better functioning on three out of four outcome measures.

The importance of coping has also been studied in situations other than relapse in clinical populations. Hesselbrock et al (1987) analyzed reasons for drinking and reasons for not drinking in young adults. They found that the greater the amount of alcohol consumed, the more important social enhancement and relief of unpleasant affect became as reasons for drinking whereas lower consumption was associated with not wanting to become intoxicated, not liking the effect of alcohol and not liking the taste. Neidigh et al (1988) examined the efficacy of coping responses among college students attempting to control their temptation to drink. Subjects were asked to consider the last time they tried to control their drinking and how they dealt with the

situation by choosing from a questionnaire called Coping With Temptations Questionnaire. In order to evaluate the hypothesis that coping was a significant determinant of the ability to control the temptation to drink, three sets of hierarchical regression analyses were studied which showed failure to resist temptation on 10 behavioural, 13 cognitive, and 23 combined coping responses. Several coping responses showed a significant relation to a decrease in drinking. Both cognitive and behavioural coping mechanisms were associated with control of the temptation to drink. Within the cognitive domain, three coping responses showed a significant relation to outcome: 'willpower', 'self encouragement', and 'think of the effects of just one drink'. Using the individual coping items as independent variables indicated that coping was a significant factor in determining students' ability to control the temptation to drink.

Greenfield et al (1989) studied the dimensions of cognitions associated with self-regulation of alcohol consumption. They made a survey of 2,482 students and used a 22 items scale Reasons for Limiting Drinking (RLD). Through factor analysis four factors were identified which accounted for 39 % of the variance. The factors were called: 'self-control' (I like to feel in control of myself); 'upbringing' (I was brought up not to drink); 'self-reform' (I was embarrassed by something I said or did when drinking); and 'performance' (drinking interferes with my studies). Using the same questionnaire, Guidish and Greenfield (1990) investigated the ability of these factors to predict the outcome of a prevention programme for heavy drinking men at university. Multiple regression analyses were used to assess the ability of pre-treatment motivation to predict change on selected outcomes measures. Two of the factors were found to be significantly but independently related to program outcome. Litman et al (1983) found that coping had a four factor structure (positive and negative thinking, avoidance/distraction and seeking social support) in a group of alcoholics. In particular 'Positive Thinking' and 'Avoidance/Distraction' were found to be predictive of subsequent outcome 6 to 12 months later.

A variety of specific cognitive-behavioural mechanisms has been assumed to be of crucial importance in the self-regulation of gratification of drinking behaviour. Wills and Shiffman (1985) proposed that temptation-coping is a specific mechanism that aims

to resist alcohol use. With temptation-coping many strategies may be resorted to including: 'be aware of enough number of reasons for not drinking'; 'be able to judge in which settings drinking is appropriate'; 'have a rich enough and flexible repertoire of general and alcohol-specific coping skills to achieve desired goals without drinking at all or without drinking to excess'; and 'have a full awareness of the long-term negative consequences of alcohol abuse to offset the short-term powerful reinforcing effects of alcohol use'. Brown et al (1989) also studied the coping mechanisms used by adolescent alcohol abusers and non-abusers in high-risk situations. Cognitive strategies were reported in 77% of the responses to high-risk drinking situations. The cognitive responses most frequently cited included concern with social or personal repercussions; for example, 'I was afraid my parents would be mad', 'I thought I might get brain damage'. Comparison of cognitive strategies for different groups indicated that alcohol abusing adolescents expressed more concern regarding the social repercussions of alcohol consumption than did their non-abusing peers. An important finding in this study was that no single strategy was employed in a majority of situations; pointing to the importance of having a broad coping repertoire with multiple strategies for making decisions about alcohol consumption.

In summary, cognitive factors have been identified as mechanisms used to restrain drinking and as important factors in maintaining post-treatment abstinence. However, the structure of the coping mechanism is still to be defined, although it is probably a multidimensional phenomena. Despite this complexity one mechanism that seems to be important is 'Positive Thinking' as a general disposition to face the challenge to remain sober or constrain drinking.

4.5D - Intoxication and Physical Symptoms

There are some data showing that severe intoxication is something to be avoided even for heavy drinkers (McCarty, 1985). In one of the few studies concerning this issue, Bruun (1959) analyzed drinking norms in small groups and noted that although drinking heavily was seen as desirable, there was an acceptance that intoxication was

inappropriate. He suggested that the normative proscription on intoxicated behaviour was congruent with the concept of a competent drinker. Therefore, a competent drinker should avoid showing signs of intoxication. As a result, maintaining the image of being a competent drinker may inhibit further drinking. Gusfield et al (1982) in an ethnographic study of drink-driving among bar-room drinkers, showed that individuals wished to be perceived as being competent drinkers. In this study patrons drank heavily but tried to limit consumption so that they did not appear or act intoxicated. Hesselbrock et al (1987), when studying reasons for not drinking in young adults, found that one of the reasons for lower consumption was not wanting to become intoxicated. Southwick et al (1981) looked in more detail at the expectancy of the use of alcohol in low and high dosages. They found that even among heavy drinkers a high dosage of alcohol promoted greater than expected degrees of behavioural impairment and much lower pleasure scores.

4.5E - Availability

There have been studies that created experimental conditions to assess the influence of price on drinking behaviour. Strickler et al (1979), when comparing drinking in a laboratory setting with drinking in a bar, noticed that as beverage price decreased there was an increase in the amount of alcohol consumed in both settings. The effect of the 'happy hour' on drinking patterns has been examined in two studies. Babor (1978) tested the effect of price and price reduction on the drinking habits of men classified as heavy and casual drinkers who were living in an experimental setting. Consumption of alcoholic beverages increased substantially during an afternoon 'happy hour'. The increase was more pronounced among heavy drinkers. Moreover, 'happy hour' drinking increased total consumption; the increase was in addition to, rather than a substitute for, drinking at other times. However, a return to the regular price resulted in the abrupt termination of most drinking. In other words, drinkers prompted to start during the 'happy hour' were not stimulated to continue drinking when the 'happy hour' ended. Price exerted an influence even among intoxicated heavy drinkers.

In a second study Babor (1980) assessed the effects of the 'happy hour' among 16 regular patrons in a bar. The abrupt termination of drinking observed in the laboratory study was not noted. However, a switch from mixed drinks to less expensive beer at the end of happy hour demonstrated sensitivity to price. Light drinkers, heavy drinkers, and alcoholics appear to be responsive to price reduction in bars and taverns. These studies showed that the cost of alcoholic drinks is an important element in the microsetting and that even dependent drinkers are sensitive to price.

Econometric analysis shows that alcoholic beverages are like other commodities in the market: they are sensitive to changes in price and income (Rush et al, 1986). Increases in price lead to decreased consumption, or in econometric terms, 'demand for a commodity declines as its price increases'. Despite the addictive nature of alcohol, numerous econometric studies have confirmed this relationship for alcohol and also for other legal drugs. The availability of alcohol and access to drinking also have an impact on consumption. The literature on alcohol availability indicates that for the general population under some conditions physical availability is positively associated with per capita alcohol consumption (Abbey et al, 1993). Several researchers have demonstrated a positive relationship between physical availability and alcohol consumption (Smart, 1980; Rush et al, 1986).

Smart (1980) constructed a typology of availability which consisted of four categories: economic, physical, subjective, and social. Economic availability is the price-specific cost of alcohol. Physical availability refers to "all physical (legal) arrangements made by governments to allow the purchase and consumption of alcoholic beverages". Subjective availability is defined as "individual differences in how accessible people feel that alcohol is to them". Social availability was defined as "availability within small social or family groups". The more frequently alcohol is consumed by members of one social network, the more likely it is that alcohol will be available when one is with them and consequently it will be perceived as convenient to obtain. Smart (1980) suggests that at the individual level, subjective and social factors may mediate and outweigh the relationship between physical availability and consumption.

There is, however, a scarcity of data in relation to the impact of price and availability in clinical populations of alcohol misusers. Kendell et al (1983) reinterviewed 463 'regular drinkers' after an increase in excise duty on alcoholic beverages. They showed that heavy drinkers and suspected dependent drinkers both reduced their consumption at least as much as light or moderate drinkers.

The review presented in this section has showed that there is evidence of a great variety of factors that contribute to the regulation of drinking behaviour. Most of the studies discussed were based on non-clinical populations. However, it is expected that the same factors can contribute to the regulation of drinking in people dependent on alcohol. The context in which drinking occurs, the environmental and social demands associated with this behaviour, cognitive mechanisms, the presence of physical symptoms of intoxication and the availability of alcohol itself are all important in making the decision to drink or not. The next section describes the design of a questionnaire to assess the influence of these five factors on actual drinking behaviour of people dependent on alcohol.

4.6 - Pilot Study of the Modifiers of Drinking Behaviour Questionnaire (MDBQ)

Following the guidelines described in chapter 2, a pilot study was designed to assess three different and distinct stages of questionnaire construction. The first stage was a series of open interviews with alcohol dependent patients that aimed to collect information concerning situations that decreased alcohol consumption based on the areas discussed above. The second stage was the design of the questionnaire using the material generated by these open interviews. The third stage was an extensive and intensive pre-testing of the questionnaire which aimed to test how appropriate the items were for a group of alcohol dependent patients.

4.6A - First Stage of Pilot Study: Exploratory Interviews

These interviews were initially organized in order to explore the experiences of a group of patients in situations that might be expected to make them decrease or stop drinking for a few hours. These open interviews had as a 'hidden agenda' the main areas to be explored (Oppenheim 1992). The five factors that were chosen as modifiers of drinking behaviour were:

- 1 - Decrease in alcohol consumption because of environmental demand
- 2 - Decrease in alcohol consumption because of social pressure
- 3 - Decrease in alcohol consumption because of personal coping
- 4 - Decrease in alcohol consumption because of intoxication or physical symptoms.
- 5 - Decrease in alcohol consumption because of lack of availability

The general technique used in these interviews was discussed in detail in Chapter 2. The first ten interviews were undertaken with patients attending the Alcohol Detoxification facilities of the Maudsley Hospital. The interviewer asked the patients to recall the previous two months drinking, and invited them to recall situations that led them to decrease the amount of alcohol consumed, or stop drinking altogether for a few hours. After this general approach the interviewer focused on the previous two weeks' drinking, looking in more detail at days when the patient drank less than usual and the reasons for doing so. After these initial ten interviews the 'hidden agenda' was examined in relation to possible changes. No modification was made because the information gathered at the interviews seemed to fit the initial 'hidden agenda'. There followed another group of ten interviews. Analysis of all twenty interviews generated more than 200 items representing situations or reasons for stopping or decreasing drinking.

4.6B - Second Stage of Pilot Study: Questionnaire Design

The organization of these 200 items presented a difficult task, because of the remarkable diversity of situations that led to patients decreasing their alcohol consumption. A large number of items seemed unique to one individual and thus

difficult to fit into the areas under consideration, or to create a new area with. In spite of this difficulty the majority of items could be allocated into one of the five areas. However, many items were discarded because they were repetitions or had a very close meaning to another item. The first version of the questionnaire had 90 items, with each of the five areas having between 15 and 20 items. Table 4.1 gives the items representing each area.

The choice of answer categories created a serious difficulty. There were two sources of information to be assembled. The first was the frequency with which the potential situations that decreased drinking happened and the second was the degree to which these situations decreased alcohol consumption. The solution to this double source of variation was to create double response categories. In the first column of the questionnaire the answer categories displayed the frequency with which the situations happened, with the following options: Never - A few days - Many days - Most days - Every day. In the second column the degree to which the situation had affected alcohol consumption was recorded, with the following options : Did not affect my drinking - Reduced my drinking a little - Reduced my drinking quite a lot - Stopped me drinking for a few hours - Made me drink more. It was decided to include an answer category 'made me drink more' as a checking procedure to evaluate the cleanliness of the item. All information referred to a typical heavy drinking month within the previous six months drinking.

Table 4.1 - Modifiers of Drinking Behaviour Questionnaire - MDBQ (items representing the five areas)

<p>AREAS</p> <p>ENVIRONMENTAL DEMAND</p> <ul style="list-style-type: none"> - When I have to be fit to work - If I have to do something in a proper frame of mind - When I have to deal with money - If I have to sort things out - If I have to do something constructive - When I have to do things that I have to remember exactly <p>SOCIAL PRESSURE</p> <ul style="list-style-type: none"> - When I am with people who are not drinking - When people come around to visit me - When I am in the company of my family - When I am expecting to see someone important - When I go to see my doctor <p>PERSONAL COPING</p> <ul style="list-style-type: none"> - When I have to force myself to stay dry - When I intend to make an effort to stay dry - When I said to myself "I won't drink today" - When I fear that I cause my body too much harm - When I fight not to drink <p>INTOXICATION - PHYSICAL SYMPTOMS</p> <ul style="list-style-type: none"> - When I get too drunk - When my stomach is unsettled - When I'm topped up - When I try drinking but I vomit - When I'm so drunk that I can't put things together - When I have a headache <p>AVAILABILITY</p> <ul style="list-style-type: none"> - When I have no money at all - When I need the money for something more important - When I am not in the places where I usually drink - When my money is getting low - When drinking isn't available

4.6C - Third Stage of the Pilot Study: Pretest Study

The purpose of the pretest study was discussed in details in chapter 2. In the intensive pretesting a group of ten patients was interviewed at the Emergency Clinic of the Maudsley Hospital. They were asked to answer the questionnaire in the presence of the interviewer. After they had answered each question they were invited to explain what they understood to be the meaning of each statement, and also to comment on the questions based on their own experience. In the extensive pretesting the aim was not to assess each individual item but the questionnaire as a whole. Another group of ten patients from the Emergency Clinic of the Maudsley Hospital was approached and asked to answer the whole questionnaire. At the end the interviewer asked some general questions about the questionnaire, in particular about the comprehensibility of the instructions and the general flow of the questions. Patients were also asked how they represented their experiences in the answer categories.

Intensive and Extensive Pretest Analysis

The analysis of both stages of pretesting indicated that 18 items had to be dropped. The reasons for dropping these items were diverse: some items were ambiguous or difficult for the patients to understand; some items did not happen to most patients; and some items made most of the patients drink more rather than less. However, the main aspect to be considered in the analysis of the pretest study was the difficulty that the patients had in answering each item using a double system of response categories. Most of the patients found it very confusing having to choose how often a particular item happened and at the same time how much it influenced their drinking.

This loss of information concerning the frequency with which situations occurred was very much regretted. It was clear that the frequency of exposure to each situation should ideally be taken into account. Only with this more comprehensive level of information could the modifiers of drinking behaviour be fully understood. For although people may stop drinking following the situations represented in the questionnaire, it remained unknown how often these situations actually occurred.

However, the level of difficulty that the patients reported created a barrier that could not be surpassed, at least with the methodology and design employed in this study.

Similar criticism of the deficiency of information concerning the frequency of exposure to situations has been made in the area of relapse by Sutton (1993). He argued that the base rate frequency of exposure to relapse situations needed to be taken into account when attempting to classify situations as high risk or low risk. He argued vigorously against the idea that most of the relapses occur under negative affective states, pointing to the limitations of the information.

A compromise was found and a final version of the questionnaire was created which had 72 items and with the following answer categories that partially took into consideration the frequency of exposure of the situations (Appendix B): Did not happen to me - Did not affect my drinking - Reduced my drinking a little - Reduced my drinking quite a lot - Stopped me drinking for a few hours - Made me drink more. This version was administered to a group of five patients, and no major problems were found with the items or with the instructions.

Chapter 5 - Measurement of the Alcohol Withdrawal Symptoms and Severity of Alcohol Dependence

Chapter 5 - Measurement of the Alcohol Withdrawal Symptoms and Severity of Dependence

5.1 - Early History of the Alcohol Withdrawal Syndrome

Delirium tremens and related clinical states have been part of the human condition since antiquity (Zilboorg and Henry, 1941). However, little was known and even less written about them until the end of the eighteenth century, when the diagnosis and treatment of this group of illnesses were first delineated (Gross et al, 1974). The first accurate description of delirium tremens specifically describing a clinical picture with its primary triad of tremor, marked clouding of the sensorium, and visual hallucinations is usually attributed to Thomas Sutton (1813). Whilst it is true that he first employed the name which this condition still bears, a review of the English and American literature revealed earlier and more detailed descriptions of alcohol withdrawal (Romano, 1941). Lettsom in 1787 (in Romano, 1941) identified a delirious state in alcoholism and was well aware of the motor restlessness, fearful mood and hallucinatory experiences of the delirious patient:

"The appetite now fails, but an insatiable thirst continues, and if it be not supplied with an exhilarating cordial, the vital spirits instantly flag, and such horrors take place as are dreadful even to a bystander; the poor victim is so depressed, as to fancy a thousand imaginary evils; he expects momentarily to expire, and starts up suddenly from his seat; walks wildly about the room, breathes short, and seems to struggle for breath; if these horrors seize him in bed, when waking from slumber, he springs up like an elastic body, with a sense of suffocation, and the horrors of frightful objects around him; at the same time the pain of the precordia continues and augments; the sight of wholesome plain food gives disgust instead of appetite; drink is his cry..."

Samuel Pearson wrote in 1801 (published in 1813) an account entitled *Observations on Brain Fever*, in which he designated the acute alcoholic psychosis as 'brain fever' and clearly differentiated this condition from infectious disease, and attributed the cause to frequent and excessive intoxication (Romano, 1941). His description of the clinical state is remarkably clear:

"It is preceded by tremors of the hands; restlessness; irregularity of the hands; restlessness; irregularity of thought, deficiency of memory, anxiety to be in company, dreadful nocturnal dreams, when the quantity of liquor through the day has been insufficient; much diminution of appetite, especially an aversion to animal food; violent vomiting in the morning, and excessive perspiration from trivial causes."

"...confusion of thoughts arises to such a height, that objects are seen of the most hideous forms, and in positions that it is physically impossible they can be situated; the patient generally sees flies or other insects, or pieces of money, which he anxiously desires to possess;..."

Authors describing the general condition of excessive drinking had also observed several of the withdrawal symptoms. Trotter (1804) for example had not only identified and described symptoms related to alcohol withdrawal but also noticed the importance of withdrawal symptoms as a motivation for relief drinking:

"The head and hands of some inebriates, particularly in the morning, shake and tremble; but regain their strength, and become steady, as the dose of stimulant is repeated."

Historically the nature of the etiological relationship between alcohol and the withdrawal syndrome began with controversy (Romano, 1941). Lettson viewed it as an alcohol withdrawal syndrome. Pearson on the other hand viewed it as a direct effect of excessive drinking. Sutton believed that it was an idiopathic disease of the brain. In the century that followed, the controversy about the etiology of withdrawal states continued and there appeared a number of hypotheses concerning the cause and the treatment of delirium tremens. During the latter part of the nineteenth century the 'toxins' were widely accepted as the cause of the delirium (Romano, 1941). It was believed that a secondary or intermediate product of protein decomposition arose in the gastro-intestinal tract, the central nervous system, or the kidneys, and that the delirium was caused by flooding of the cerebral cortex with this toxin.

The next major influential work, and one that stimulated the move toward a more accurate definition of the condition, was published at the turn of this century by Bonhoeffer (Gross, 1974). He described in 1901 a variant of the syndrome which he named 'acute alcoholic hallucinosis', which was characterized by auditory hallucina-

tions but minimal evidence of toxicity (in terms of tremor and/or clouding of the sensorium). A syndrome similar to what we now call alcoholic hallucinosis was described as a separate entity as early as 1847 by Marcel, who called it *folie d'ivrogne* (in Glass, 1989a). For Bonhoeffer delirium tremens and hallucinosis were different manifestations of the same process, an opinion shared by Kraepelin and Wernicke (Gross et al, 1974). The status of alcoholic hallucinosis as a separate entity from alcohol withdrawal has remained controversial to this day: the debate being whether it is part of an alcohol withdrawal state; a heterogeneous condition with a varied outcome; or even a distinct entity in its own right with a particular etiology, course and outcome (Glass, 1989a,b).

5.2 - Alcohol Withdrawal Syndrome on the First Half of the Twentieth Century

In a review of the literature from 1930 to 1940 on the nature of delirium tremens, Bowman and Jellinek (1942) observed that most authors attributed the etiology to causes other than withdrawal from alcohol. The most common etiological factors mentioned were: impairment of hepatic function, encephalitis, metabolic, neuropathic, physical trauma, vitamin B deficiency, water metabolism, and anoxia. Of the 31 authors whose work was reviewed, only four believed that alcohol was the cause of symptoms. Bowman and Jellinek (1942) themselves defended the belief that delirium tremens was not caused by alcohol. They thought it was a psychosis of episodic nature which did not reach down to the personality structure; a form of encephalopathy which befell only a fraction of chronic alcoholics. It was believed to be a metabolic disturbance caused by a complex interaction between loss of the detoxifying function of the liver, faulty carbohydrate metabolism, disturbed protein metabolism, acidosis, relative hypoxia of the brain, general nutritional deficiencies, and disturbances of water balance. They made their views very clear:

"The delirium tremens argument may be regarded as disproved. In American state hospitals, where thousands of alcoholics are admitted annually, not a drop of alcohol is given and the development of delirium tremens in these institutions is a rarity."

5.3 - Withdrawal From Alcohol as an Etiological Factor

Although the identification of alcohol withdrawal symptoms was widely accepted and observed as a clinical entity, conflicting etiological theories, in particular the excessive concern with causes other than withdrawal from alcohol, undoubtedly prevented the development of a better understanding of the condition. A fair synopsis of the views of the first part of the twenty century might be to say that withdrawal from alcohol was peripheral to the evolving ideas about the concept of alcoholism (Edwards, 1990).

The role of withdrawal from alcohol in delirium tremens and related states was only firmly established during the 1950s and 1960s. The turning point came with the publication of crucial studies by Victor and Adams (1953), Isbell et al (1955) and Mendelson (1964). They clearly demonstrated that clinical withdrawal states depended not only on the effects of prolonged exposure to alcohol, but were temporally related to abstinence from the drug. Victor and Adams (1953) in a clinical observational study designated a series of sequential states that appeared from the time of withdrawal. These states evolved along a time continuum from the point of cessation of drinking and along a parallel continuum from lesser to greater degrees of severity. They showed that there was a relationship between the onset of the tremulous hallucinatory-epileptic-delirious states and the relative or absolute withdrawal from alcohol. They believed that, aside from morning tremulousness, these states could be separated into three clinical syndromes. Firstly a state of combined tremulousness and transient hallucinations; secondly withdrawal seizures; and finally a state comprising tremulousness, hallucinations, confusion, and increased psychomotor and autonomic overactivity appearing on the third or fourth day. Victor and Adams (1953) showed that there was a definite time relationship between the syndromes: the mildest degree showing itself after a relatively short period of abstinence; the most severe form manifesting itself after several days.

Isbell et al (1955) were the first to demonstrate the importance of alcohol withdrawal, although their study was conducted with detoxified morphine addicts. Further confirmation was provided by numerous other researchers (Mendelson, 1964; Mello, 1974; Gross et al, 1974). Gross et al (1974) showed that an early stage of alcohol

withdrawal was usually observed soon after the cessation of drinking and that the distinction between this and the full withdrawal syndrome was not sharply demarcated.

The influence of these works on the understanding of the etiology of alcohol withdrawal states was remarkable. However, one aspect that remained controversial was the phenomenological dimensionality of the syndrome. Victor and Adams (1953), for example, implicitly accepted the idea that, as the symptoms occurred in a temporal sequence, the syndrome was a unitary phenomenon. However, as each of three withdrawal states could occur quite distinctly from one another, for purposes of clinical description they were treated as if they manifested themselves in pure form. Later, Wolfe and Victor (1972) proposed a dichotomous classification of withdrawal states, with two major phases being recognized: a minor or early withdrawal syndrome and a major withdrawal syndrome (delirium tremens). This categorization is still used today (Naranjo et al, 1983).

5.4 - Factor Structure of the Alcohol Withdrawal Symptoms

The controversy over the dimensionality of alcohol withdrawal symptoms was tackled by Milton Gross and collaborators, who started a series of studies attempting comprehensively to measure withdrawal symptoms with reliable instruments. The papers produced by this research group (Gross et al 1968, 1972, 1974) were critical of the discrete diagnostic system of withdrawal syndromes and pointed out the limitations of the then accepted clinical classification. In an early paper Gross et al (1968) discussed the limitations of the classification of acute alcoholic psychosis in terms of the unreliability of criteria for diagnosis and the lack of clinical validity for the concept. They observed that half of a sample of 100 patients presented with mixed or atypical pictures, which did not conform to neat diagnostic definitions. Later Gross et al (1972) showed up the phenomenological limitations of the three diagnostic categories of alcohol withdrawal - early withdrawal, alcoholic hallucinosis and delirium tremens. They concluded that the variable clinical pictures seen between patients and the lack of precise diagnostic criteria could only be solved by characterizing each

patient's signs and symptoms in reliable, empirically derived, precise, and quantitative terms.

Following on from these papers Gross et al (1971, 1973) made the first attempt comprehensively to measure withdrawal symptoms with reliable rating scales. They started characterizing each patient's signs and symptoms by means of a scale, the Total Severity Assessment (TSA), which consisted of 33 items of signs and symptoms that were quantified on the first day after stopping drinking. This scale and a shorter version known as the SSA (Selected Severity Assessment) were shown to have a high inter-rater reliability (Gross et al, 1973), allowing better measurement of the dimensions of withdrawal symptoms. In a subsequent study of 100 patients, using Factors Analysis to identify the internal structure of the data, they found that three factors could be identified and accounted for 66% of the variance (Rosenblatt et al, 1972; Gross et al, 1974). The first factor was called hallucinogenic, the second psychophysiological and the third involved a disturbance of consciousness (Table 5.1). In a further investigation of these data cluster analysis failed to demonstrate discrete subgroups and Gross et al (1974) interpreted this as confirmation of there being a single syndrome within which there was a continuum from lesser to greater severity.

Table 5.1 - Factor structure of the Alcohol Withdrawal Symptoms according to Rosenblatt et al, (1972) and Gross et al, (1974)

Factor I	nausea, tinnitus, visual disturbances, pruritus, paraesthesia, muscle pain, agitation, sleep disturbances, tactile hallucinations, auditory and/or visual hallucination
Factor II	anxiety, depression, tremor, sweats
Factor III	clouding of sensorium, impairment of consciousness, impairment of contact, disturbances of gait, nystagmus

Following this work, Hershon (1977) found 36 symptoms that seemed to be most frequently part of the clinical picture of alcohol withdrawal. He presented these symptoms to a group of alcoholic patients using a card-sorting technique with an emphasis on the selection of symptoms that were relieved by further drinking. Principal Components Analysis revealed two factors that accounted for 54% of the variance.

The first factor was called 'Physical Disturbances' and the second 'Affect Disturbance' (Table 5.2).

Table 5.2 - Factor structure of the Alcohol Withdrawal Symptoms according to Hershon (1977)

Factor I	nausea, tinnitus, hyperacusis, hands and fingers shake, face shakes, eyes blink, chest pains, headaches, indigestion, vomiting, auditory hallucinations, visual hallucinations, sweating, muscle cramps, choking lump in throat, whole body shakes, weakness, nightmares, difficulty in breathing, belching, dizziness
Factor II	depression, guilty, think people are against me, cannot face day, anxiety, tiredness, restlessness, panicky

In another study Hesselbrock et al (1983) used the same group of symptoms as Hershon (1977), but concentrated on withdrawal symptoms that had occurred during the month prior to hospitalization. Each item was rated on a four-point Likert-type scale representing the frequency of occurrence during the last month of drinking. Principal Components Analysis revealed three factors that accounted for 39.2% of the variance (Table 5.3). Factor I was called 'Physical Disturbances' and contained 11 of the 22 items identified by Hershon (1977). The second factor, 'Affect Disturbance' also replicated many of the items identified in Hershon's analysis. The third factor, 'Withdrawal Symptoms', consisted of items originally included in the physical disturbance factor that had separated into a distinct factor suggesting classic withdrawal symptoms.

Table 5.3 - Factor structure of the Alcohol Withdrawal Symptoms according to Hesselbrock et al, (1983)

Factor I	rapid heart beat, lump in throat, dizziness, chest pains, nightmares, muscle cramps, tinnitus, auditory hallucination, belching, visual hallucination, eye blinking
Factor II	depression, anxiety, confusion, panicky, restlessness, cannot face day, irritability, paranoia, guilty, headaches, insomnia, anger
Factor III	vomiting, hand tremor, body tremor, nausea, poor appetite, tiredness, craving for alcohol, weakness, sweating

More recent studies also have shown a multifactorial structure to withdrawal symptoms, although they have used different groups of symptoms during the assessment. Banger et al (1992) developed a new rating scale for mild and moderate

alcohol withdrawal states based on items originating from DSM-III-R. They found two factors, the first comprised of four psychosensory items (disorientation, hallucination, inattentiveness, disturbance of contact) and the second included four autonomic and anxiety-related items (agitation, tremor, hyperidrosis, anxiety).

Several other scales have been developed to measure alcohol withdrawal symptoms. However, these scales have been used mainly to assess pharmacological treatment aimed at reducing disagreeable withdrawal experiences and therefore focus primarily on certain aspects of the symptoms. Moreover, they have not been examined in terms of their factor structure. The best known is the CIWA-A (Shaw et al, 1981; Sullivan et al, 1989; Sellers et al, 1991), developed from the TSA (Gross et al, 1973). The CIWA-A is like the TSA, but modified so that it can be applied hourly, or more frequently, to follow the clinical course of the withdrawal reaction. The items included are: tremor, nausea, vomiting, paroxysmal sweats, tactile disturbances, auditory disturbances, visual disturbances, hallucinations, clouding of sensorium, quality of contact, anxiety, agitation, thought disturbances, seizures, headache, and facial flushing. This scale has been used to assess therapeutic response in clinical trials and in the management of ambulatory and hospitalized patients in withdrawal (Sellers and Naranjo, 1985; Romach and Sellers, 1991). Recently Bokstrom et al (1992) developed a new scale for the assessment of psychopathology in withdrawal states, based on the Comprehensive Psychopathological Rating Scale (CPRS). They selected a group of 17 items that were frequent in at least 50% of patients seen during episodes of withdrawal. The items had a satisfactory internal consistency (Cronbach's $\alpha = 0.89$). Many of these items reflect symptoms of mood disturbance: sadness, inner tension, inability to feel, pessimistic thoughts, suicidal thoughts, lassitude, fatigability, concentration difficulties, failing memory, reduced appetite, reduced sleep, reduced sexual interest, autonomic disturbances, muscular tension, apparent sadness, autonomic disturbances, and sleepiness. Items measuring hallucinations were not included because they were very rare in the sample studied.

In summary, studies exploring the dimensional structure of the alcohol withdrawal symptoms have consistently shown that withdrawal is a multidimensional phenomenon.

However, there are disagreements over the number of factors that best represent what is actually seen in clinical practice. One possible reason for this may be the methodological differences between studies, in particular the selection of symptoms to be assessed and the time at which they are assessed. For example, Rosenblatt et al (1972) assessed withdrawal symptoms in a group of patients on their first day in hospital during the acute phase of alcohol withdrawal. Hershon (1977), on the other hand, assessed symptoms of withdrawal that had been relieved by further drinking in recent months, whilst Hesselbrock et al (1983) assessed symptoms during the previous month of drinking. Despite these differences the case for the multidimensionality of alcohol withdrawal symptoms is very strong.

5.5 - Alcohol Withdrawal, DSM-IV and ICD-10

Both DSM-IV and ICD-10 have similar categories for the description of alcohol withdrawal states but they are grouped in different ways. ICD-10 has one category for 'Withdrawal State', but no specific diagnostic criteria for alcohol withdrawal. There are two others states associated with alcohol withdrawal: 'Withdrawal state with delirium', equivalent to classic descriptions of delirium tremens, and 'Psychotic disorder', which is considered to be a cluster of psychotic phenomena occurring during or immediately after psychoactive substance use and includes alcoholic hallucinosis, alcoholic jealousy, and alcoholic paranoia.

DSM-IV also has a category for 'Alcohol Withdrawal' but outlines explicit criteria for its diagnosis (autonomic hyperactivity; increased hand tremor; insomnia; nausea or vomiting; transient visual, tactile, or auditory hallucinations or illusions; psychomotor agitation; anxiety; grand mal seizures). There has been a change within the DSM system in terms of criteria. In the earlier DSM-III-R, tremor of the hands, tongue, or eyelids were symptoms essential to diagnosis. However, Sellers et al (1991) showed that although the presence of tremor had a high discriminant value for diagnosis of withdrawal, so did anxiety and perceptual disturbance. Therefore, in DSM-IV no single symptom acts as a gateway criterion.

Compared to ICD-10, DSM-IV has a greater number of categories related to alcohol withdrawal: 'Alcohol Delirium', 'Alcohol Psychotic Disorder with delusions', 'Alcohol Psychotic Disorder with hallucinations', 'Alcohol Mood Disorder', 'Alcohol Anxiety Disorder' and 'Alcohol Sleep Disorder'. These categories represent disorders related to alcohol withdrawal that appear after the acute withdrawal phase. In general these symptoms are most intense during the first week after cessation of alcohol, yet both subjective and physiological disturbances can continue for weeks or months. In a recent review Satel et al (1993) found that there were strong indications that anxiety, depressive symptoms, CNS hyperexcitability and insomnia can persist for weeks after acute withdrawal from alcohol. However, it remains unclear whether these symptoms represent withdrawal symptoms or are consequences of chronic alcohol consumption.

5.6 - Alcohol Withdrawal and the Dependence Syndrome

Repeated alcohol withdrawal symptoms is one of the elements of the Alcohol Dependence Syndrome. In the original description, Edwards and Gross (1976) pointed out that patients may experience mild withdrawal symptoms at any time during the day when blood alcohol levels begin to fall. Relative withdrawal may produce these symptoms but they are typically worse on waking in the morning after a more extended period of abstinence. The authors proposed four key symptoms: tremor, nausea, sweating and mood disturbance. They stressed that the mood disturbance was important in its own right and was not just a reaction to physical distress.

Despite the theoretical importance attributed to these symptoms, Edwards and Gross (1976) did not consider them as absolutely essential to the alcohol dependence concept. They emphasized that not all the elements of the syndrome need always be present, nor always have the same intensity. However, withdrawal symptoms have assumed an important role in the dependence concept for many reasons. Withdrawal symptoms are fundamental to the development of at least two other elements of the syndrome: narrowing of drinking repertoire and relief or avoidance of withdrawal symptoms by further drinking. With the element narrowing of drinking repertoire, as dependence

advances the cues for drinking become increasingly related to relief or avoidance of withdrawal symptoms. In terms of relief or avoidance of withdrawal symptoms by further drinking, the central idea is that drinking is used to abort incipient withdrawal; drinking being cued not only by frank withdrawal but also by minimal symptoms of subacute withdrawal, which signal worse distress if drink is not taken. The other reason for the importance of these symptoms concerns their significance as a reinforcer in the learning process of dependence. It seems that once withdrawal symptoms have been established, their relief or avoidance provide additional cues to reinforce alcohol-seeking behaviour.

Edwards (1990) reviewed the evidence concerning the relationship between withdrawal symptoms and the alcohol dependence syndrome in historic and scientific papers. Whilst there are still many unanswered questions concerning the role of withdrawal in the development of dependence, there is overwhelming clinical evidence that withdrawal symptoms have a salient role as reinforcers and are thus fundamental to the concept. Despite the theoretical debate about whether or not withdrawal symptoms contribute to the development of dependence, these symptoms have been regarded as part of the alcohol dependence syndrome in all questionnaires measuring it. All include at least one item relating to them (Stockwell et al, 1979; Chick, 1980a; Polich et al, 1980; Skinner, 1981; Hesselbrock et al, 1983; Davidson et al, 1989; Kosten et al, 1987). In factor analytical studies of these questionnaires (Table 1.2), it was shown that the element repeated withdrawal symptoms was part of the unidimensional syndrome. However, as most questionnaires used only one item to measure these symptoms, the wider question concerning their importance in the development of dependence and, in particular, their relationship to other elements remains unanswered. The only questionnaire that strongly emphasizes withdrawal symptoms is the SADQ which has questions concerning withdrawal experiences in eight of its twenty items. The authors (Stockwell et al, 1979) justified this emphasis not because these symptoms represented the essence of the dependence construct but simply because they were considered to be important components which could be relatively easily assessed.

5.7 - Choice and Adaptation of the Alcohol Withdrawal Scale items

It became clear that for the purposes of this study a specific and comprehensive measurement of withdrawal was necessary in order to assess the symptoms in greater detail. There was no great difference between the check-list of symptoms produced by Gross (1973) and that of Hershon (1977). However Hershon's check-list was chosen because it had the advantage of being relatively extensive and had been created to look at symptoms commonly present during periods of alcohol consumption. A self-administrated questionnaire was adapted using these items. It was necessary to make some adjustment in several of the items and the instructions because the original items were developed for use as a card-sorting technique and not as a self-report questionnaire. For example, items such as visual and auditory hallucinations were adapted to 'Seeing strange objects' and 'Hearing funny noises'.

It was also necessary to adjust the answer categories. Because the information required was not only the frequency of the withdrawal symptoms but also their intensity in a given period of time, a double system of answer categories was created. For each symptom the patients had to indicate the frequency with which it occurred, from 'never' to 'every day'; and the severity, from 'not at all' to 'very severe'. The symptoms referred to those experienced in a typical month's drinking in recent months.

This version of the questionnaire was piloted in a group of ten patients according to the technique discussed previously in Chapter 2. Small changes to the instructions had to be made in order to make clear the distinction between intensity and frequency of symptoms. Unlike the Modifiers of Drinking Behaviour Questionnaire (Chapter 4) in which most of the patients had great difficulty in answering a double system of categories, here the pilot study revealed that most patients could discriminate between frequency and intensity of symptoms and this double answering system was kept in the final version of the questionnaire (Appendix B).

5.8 - Choice of Questionnaire to Measure Severity of Dependence

There have been a great number of questionnaires and interviews created in order to measure the alcohol dependence syndrome construct. The SADQ was the first self-report questionnaire explicitly designed to measure the severity of alcohol dependence. It was developed by Stockwell et al (1979) and was originally designed to cover central features of the alcohol dependence syndrome that were most amenable to measurement. The aim was to provide a brief, reliable, self-report instrument that could assess the severity of dependence. It consists of 20 items covering five areas: physical symptoms of withdrawal (PHYS), affective symptoms of withdrawal (AFF), craving and relief drinking (NEED), typical daily consumption (ALC) and reinstatement of symptoms following a period of abstinence (POSABS). Subjects are asked to recall a recent period of heavy drinking and to nominate a particular month to remind them of this. Each question invites a response in terms of frequency of occurrence: 'never or almost never', 'sometimes', 'often', or 'nearly always'. These responses carry scores of 0, 1, 2, or 3, respectively. The maximum possible score on the SADQ is 60.

The factor structure of the SADQ has been evaluated in several studies with great consistency. Using Factor Analysis, Stockwell (1979) found one main factor accounting for 53% of the variance. Meehan et al (1985) used Principal Components Analysis followed by a varimax rotation and yielded a major factor accounting for 45% of the total variance. Drummond (1990) also found similar results on the PCA.

The SADQ has been widely used and has generated a considerable amount of data in the last fourteen years. It has been criticized though (Raistrick et al, 1983; Thorley, 1985), on the grounds that it does not attempt to assess all the elements of the syndrome. It is essentially limited to withdrawal symptomatology, relief drinking and reinstatement of drinking pattern following a period of abstinence; the emphasis is therefore on the physiological aspects of the syndrome rather than on psychosocial or behavioural features. Despite these criticisms, the SADQ has been used in a wide range of studies involving the assessment of alcohol dependence (Table 5.4). The variety of studies in which it has been used is impressive and includes outcome studies

of clinical populations, assessment of patients with liver disease, experimental laboratory studies and cross-cultural studies. It has also been used in populations other than clinical ones. All these studies confirm the early assumptions that the SADQ is easy to administer and is psychometrically sound. On balance the SADQ was considered the questionnaire of choice to measure the severity of dependence (Appendix B).

Table 5.4 - Studies that have used the SADQ to assess alcohol dependence

Authors	Study
Stockwell, T., et al (1979)	Development of the SADQ
Stockwell, T., et al (1983)	Reliability and validity study
Heather, N., et al (1983)	Comparison with subjective measures
Topham, A. (1983)	Comparison with speed of reinstatement
Wodak, A.D., et al (1983)	Assessment of patients with liver disease
Edwards, G., et al (1983)	Outcome study
Smail, P., et al (1984)	Comparison with phobic anxiety
Stockwell, T., et al (1984a)	Comparison with phobic anxiety
Stockwell, T., et al (1984b)	Assessment of dependence in drug trial
Saunders, J.B., et al (1985)	Assessment of patients with liver disease
Meehan, J.P., et al (1985)	Assessment of problems drinkers
Duckitt, A., et al (1985)	Outcome study
Mullan, M., et al (1986)	Comparison with neurosis in twins
Smail, P., et al (1986)	Comparison with phobic anxiety
Cooney, N.L., et al (1986)	Comparison with others questionnaires measuring dependence
Davidson, R., et al (1986)	Comparison with other questionnaires measuring dependence
Taylor, C., et al (1986)	Outcome study
Orford, I., et al (1986)	Outcome study
Corrigan, C., et al (1986)	Assessment of dependence among general medical inpatients
Mensah, I.E., et al (1986)	Assessment of dependence in patients with alcoholic liver disease
Drummond, L.M., et al (1986)	Assessment of dependence in an emergency clinic
Edwards, G., et al (1987)	Outcome study
Heok, K.E. (1987)	Cross-cultural study
Schaefer, M.R., et al (1987)	Relationship between dependence and psychiatric symptoms
Duckert, F., (1988)	Assessment of dependence in an treatment evaluation study
Sarin, S.K., et al (1988)	Assessment of patients with liver disease
Webb, M., et al (1988)	Outcome withdrawal programme
Edwards, G., et al (1988)	Outcome study
Hayashida, M., et al (1989)	Assessment of dependence and cost of alcohol withdrawal programme
Long, C.G., et al (1989)	Assessment of dependence and craving
Doherty, B., et al (1989)	Comparison with SADD

continue...

Table 5.4 - continuation

Authors	Study
Drummond, D.C., (1990)	Comparison with alcohol problems
Sitharthan, T., et al (1990)	Outcome study
Heok, K.E., et al (1990)	Outcome study
Shaw, G.K., et al (1990)	Outcome study
Heok, K.E., et al (1990)	Study of elderly Chinese
Stockwell, T., et al (1990)	Assessment of home detoxification
Farragher, A., et al (1991)	Outcome study
Stockwell, T., et al (1991)	Assessment of dependence and home detoxification from alcohol
Fletcher, K.D., et al (1991)	Assessment of dependence in clinical population and control
Allan, C.A., (1991)	Assessment of dependence in clinical and community population
Drummond, D.C., et al (1991)	Assessment of dependence in clinical population
Doyle, H., et al (1992)	Assessment of dependence in clinical population
Thom, B., et al (1992a)	Assessment of dependence in clinical population
Thom, B., et al (1992b)	Assessment of dependence in clinical population
Duckert, A., et al (1992)	Assessment of dependence in problem drinkers in the community
Greeley, J.D., et al (1993)	Assessment of dependence in heavy and light drinkers
Skog, O., et al (1993)	Assessment of dependence in clinical and community population
Heather, N., et al (1993)	Assessment of dependence in clinical population
Glautier, S. et al (in press)	Cue exposure study
Drummond, D.C., et al (in press)	Outcome study
Raistrick, D., et al (in press)	Comparison with other questionnaires
Stockwell, T., et al (1994)	Comparison with impaired control measures

Chapter 6 - Sampling and Data Collection

Chapter 6 - Sampling and Data Collection

In the previous four chapters the development and adaptation of the five questionnaires and the interview used in the study have been considered. This chapter describes the sampling process, the data collection procedures used and a reliability study.

6.1 - Sampling Process

6.1A - Aim of the sampling

The aim of the sampling process was to provide a balanced group of alcohol dependent patients based on criteria of socio-demographic status, drinking history and severity of alcohol dependence. The method used to achieve a sample of patients with these characteristics was through a convenience sample (Henry, 1990) of patients attending several clinics for treatment of alcohol problems.

6.1B - Sample Frame and Sample Selection

The two vital aspects of any sampling procedure, see for example Fowler (1988) are: (i) the comprehensiveness of the sampling frame, and (ii) the process of selection of each patient in the sample. The approach used to achieve a comprehensive sample was to select a group of clinics in the London area with the following characteristics: treatment facilities only for alcohol dependent patients; high turnover of patients, or at least a balance between new and chronic patients; a balance between in and outpatients. Initially there was a selection of ten clinics. However, four clinics were discarded because they did not offer enough new patients each week or because the staff cooperation could not be obtained for the project to start. A brief description below of the six clinics shows their diversity in terms of organization, scope and setting. It also shows how they differ in terms of the number and turnover of patients and, therefore, the different contributions made to the total number of patients that

participated in the survey. As far as the process of selection of patients was concerned, the aim was to include all the patients attending the clinics during the period of data collection.

1 - Emergency Clinic of the Maudsley Hospital. This is a 24 hours emergency clinic for psychiatric patients that offers an outpatient alcohol detoxification program. After a full psychiatric assessment patients are entered into a programme in which they have to attend the clinic daily for a week to receive medication after being breath-analyzed and have brief counselling sessions with the staff nurses. The main sources of referrals are local GPs, other alcohol clinics that do not provide out patient detoxification facilities and self-referral. The research interviews with the patients were conducted after the second day in the programme in one of the rooms of the clinic.

2 - Booth House - Alcohol Detoxification Unit - Salvation Army. This is a one week inpatient programme for alcohol detoxification for males only. During this week the patients attend group discussions and receive medication for alcohol withdrawal symptoms. The main sources of referral are local GPs, others alcohol clinics that cannot provide inpatient alcohol detoxification, self-referrals and also members of religious orders and AA sponsors. The research interviews were conducted twice a week in one of the clinic's offices. The reasons for having two sessions a week were that the clinic had a high turnover of patients and the severity of withdrawal symptoms suffered by many patients meant that their interview had to be postponed for one or two days.

3 - Drink Crisis Centre (DCC). This is a clinic that provides a one week inpatient programme for alcohol detoxification and a four week residential rehabilitation programme. It is for both sexes but the clinic has a policy to facilitate the admission of women. It has several sources of referral: the locals GPs, probation officers, others agencies and self-referrals. The interviews were conducted twice a week in the clinic facilities. The reasons for the double session were the same as for Booth House.

4 - Rugby House Project. This is a clinic that provides a four to six weeks residential rehabilitation programme for people with drinking problems. Like the DCC it also has

a policy to facilitate the admission of women. As it was a new clinic when the project started the referral sources were not very well established, but local GPs, other agencies and self-referrals were the main sources. The research interviews were conducted during the week-ends in the offices of the clinic.

5 - Warlingham Park Hospital - Alcohol Detoxification Unit. This is an alcohol inpatient unit in a psychiatric hospital and has 35 beds; 10 of these are exclusively for a one week programme for alcohol detoxification and the remainder are for residential programme that last from several weeks to several months. Unlike the other clinics, Warlingham Park has a clear disease oriented treatment programme, with several AA meetings during the week and the whole programme focused on the goals of AA. Its main source of referral are local GPs, but it also receive patients from others clinics and self-referrals. The research interviews were conducted once a week in the offices of the clinic.

6 - Alcohol Recovery Project (ARP) - Kennington Park. This is an outpatient clinic that has a drop-in programme where patients can attend without any previous appointment and participate in group meetings that are held for one hour every morning. Attenders are advised to arrive one hour before this meeting for an informal gathering which creates a friendly atmosphere. The agency receives referrals from local GPs, from dry hostels in the area, from ARP hostels and also from other alcohol agencies in the region. The research interviews were conducted twice a week, immediately before the patients attended the group meetings in the clinic facilities.

6.1C - Sample Size

According to Henry (1990), an efficient sample size is based on an estimate of the sample size required to limit sampling variability to the desired level. An important characteristic of sampling variability is that it decreases as the sample size increases. As this study was developing several questionnaires, a comprehensive group of criteria needed to be taken into consideration for the determination of the sample size and to control the sampling variability. The main criterion considered was the plan of

statistical analysis to be used for each of the new questionnaires (Fowler, 1988). It was planned that all three new questionnaires (SSADQ, IDR and MDBQ) would be analyzed after preliminary analysis by means of Factor Analysis or Principal Component Analysis.

Many rules have been discussed for the number of subjects needed in relation to the variables in the use of Factor Analysis. Some researchers play safe and recommend sample sizes which are at least ten times larger than the number of variables in the research (Child, 1990). At the other extreme some researchers suggest a ratio of subjects to variables of one (Child, 1990). Baggaley (1982), on the other hand, suggested calculating the sample size based on the number of variables and on the estimate of the average correlation between all the variables. He proposed the use of a table that can generate the number of subjects by a formula relating the number of variables and the average correlation between all the variables. Following Baggaley's method the questionnaires that were used in the Pilot Studies were analyzed according to the correlation between variables. Based on Baggaley's (1982) formula the Subjective Severity of Alcohol Dependence Questionnaire (SSADQ) with the largest number of items (100), needed around 400 subjects. With a smaller number of variables the Inventory of Drinking Repertoire (IDR) and the Modifiers of Drinking Behaviour Questionnaire (MDBQ), needed around 200 subjects. When Baggaley's (1982) criteria were compared to criteria proposed by others authors such as Comrey (1988), approximately the same number of subjects was recommended. Therefore, target sample sizes were set of at least 400 respondents for the SSADQ and 200 for the remainder IDR and MDBQ.

6.2 - Data Collection

6.2A - General Strategy

As there were different requirements in terms of number of respondents for the questionnaires and only the SSADQ needed a larger number of subjects, a two tier

system for data collection was adopted. This dual system had a practical justification. With an average of two and a half hours per patient, it would be too expensive in terms of interviewer hours to administer full-length interviews and questionnaires to all subjects. Therefore, 'Short-Form' interview and questionnaires were created with the interview being restricted to Part I of the Drinking Repertoire Interview (socio-demographic data and the general drinking history) and two of the questionnaires: the SSADQ and SADQ. This procedure reduced to about thirty minutes the time spent on interview and questionnaire answering, facilitating its use in outpatients clinics. The 'Long-Form' interview and questionnaires on the other hand had the complete Drinking Repertoire Interview and all five questionnaires: SSADQ, IDR, MDBQ, AWS and SADQ (Appendix B).

As the project involved a substantial amount of interviewing time, a second interviewer was needed for data collection. One interviewer was a psychiatrist (RRL) and one a nurse therapist (CT). Both were experienced clinicians with training in structured interviews, and were exclusively responsible for the data collection. Before the data collection began the second interviewer (CT) underwent a project training period. This started with an exhaustive discussion of the project, and in particular with the structure of the interview and questionnaires. Next CT conducted a series of ten interviews with patients attending the Alcohol Detoxification facilities of the Emergency Clinic of the Maudsley Hospital, which were tape-recorded and thoroughly discussed afterwards by both interviewers. The data collection proper began only when both interviewers were convinced that they were using similar techniques to elicit information from patients. An inter-rater reliability study was designed and this will be discussed in detail later in this chapter.

6.2B - Data Collection Procedure

To facilitate contact and interaction with clinical staff, each of the interviewers was exclusively responsible for interviewing at a particular group of clinics. They visited each of the clinics at least once a week, according to demand. When the interviewer arrived at the clinics, he contacted the staff in charge and asked for the names of the

new patients. He then approached each of the patients, introduced himself and followed the guidelines of the Drinking Repertoire Interview as discussed in Chapter 3. At the end of the interview he invited the patient to answer the questionnaires. He explained in general terms about the nature of each questionnaire, and stressed that there were no right or wrong answers and that only the patient's experience and ideas were of interest. He also pointed out again that the confidentiality and anonymity promised for the interview were extended to the questionnaires.

There were certain procedures to be followed during the actual data collection. The 'Short-Form' interview and questionnaires were designed to be used in all the outpatients clinics and in any situation where the patients would not have time to answer the entire set of questionnaires. For all the remaining patients a 'Long-Form' would be offered. It was also agreed that if any patients had difficulty participating in the project, for example because of severe withdrawal symptoms, or physical or mental discomfort, then the interview would be postponed until the following visit to the clinic. As a rule the patients answered the questionnaires in another room whilst the interviewer was at the clinic. However, for practical reasons this rule could not be enforced throughout the whole of the data collection and in some circumstances patients kept the questionnaires to be finished and returned at the following visit. There were also some exclusion criteria: major psychiatric symptoms detected during the interview, illiteracy, or patients with less than four weeks drinking in the previous six months.

6.2C - Basic Results

The data collection took place between August 1990 and June 1991. Five hundred and sixty seven patients were approached. Figure 6.1 is a diagram of the whole sample of patients initially contacted, with 420 included and 147 excluded. Of the interviews that were included, RRL conducted 336 and CT 86. 82% of the patients were interviewed within two weeks after the last drink, and 91% within one month. The reasons for exclusion were as follows:

Refusals - Thirty-one patients refused to be interviewed, although they did not know the purpose and content of the interview. When asked for their reasons for refusal some of them answered that they had some sort of upset with the clinic or with the staff and were therefore unwilling to cooperate with the researcher. Others answered plainly that they did not feel like talking to anyone about their drinking and yet others said that they felt too unwell to talk.

Illiteracy or inability to read - Twelve patients claimed that they were illiterate and four claimed that they were not able to read at the time of the interview because they did not have their reading spectacles with them.

Major Psychiatric Symptoms - Forty-seven patients had a history of major psychiatric disorder or persistent major psychiatric symptoms during admission and interview.

Nonresponse - Fifty-three patients agreed to be interviewed but failed fully to complete the questionnaires or interview. An questionnaire was considered incomplete when the patient did not fill in at least 70% of the items. Fifteen of these 53 patients did not have at least 4 weeks drinking in the previous six months and would thus be excluded from the study in any case.

As figure 6.1 shows, the final sample was 420 patients, with 202 answering the 'Long-form' and 218 the 'Short-form'. There was no statistically significant difference between these two groups regarding the basic socio-demographic and drinking behaviour information. In total 147 patients contacted were not included, but apart from the 31 who refused it was possible to collect basic socio-demographic and drinking behaviour information for the remaining 116 patients. They were compared with the 420 patients included in the project and no difference was found in the following variables: age, sex, socio-demographic and drinking characteristics. Those that were eligible (131) but did not enter the study produced a nonresponse rate of 23% (131/552).

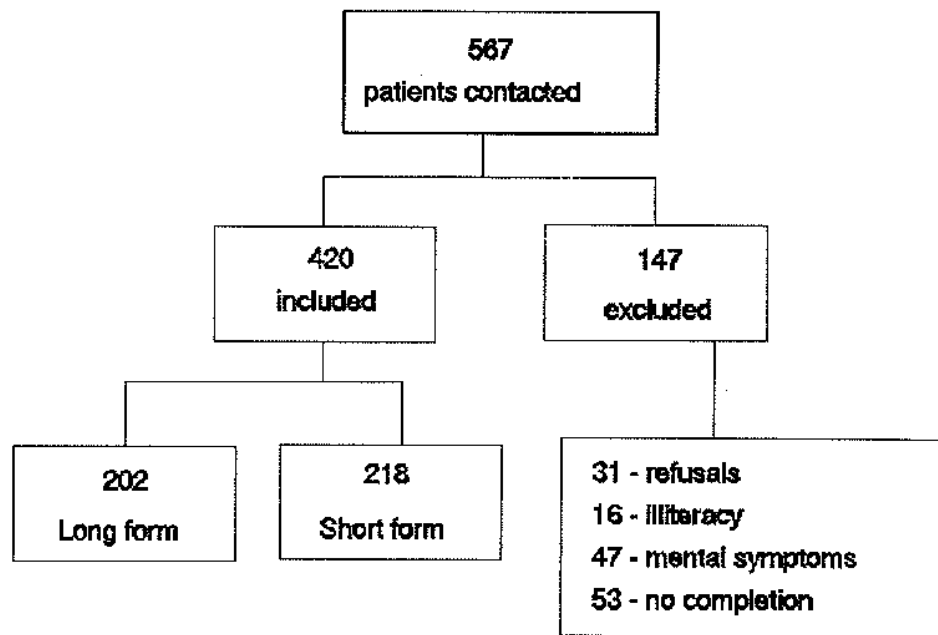


Figure 6.1 - Data Collection Chart

6.3 - Reliability Study

This project has relied heavily on information based on semi-structured interviews. As the data were collected by two independent researchers one might legitimately raise questions relating to the reliability of this method. The interview used is semi-structured, meaning that the interviewer is expected to add probes in areas where he is confused or dissatisfied with the patient's response. It may well be that the consistency of both interviewers in eliciting and assessing information is not the same or is the same only on some occasions. Reliability in the context of semi-structured interviews refers to the extent to which the independent judgments of one observer agree with the independent judgments of another (inter-rater reliability) (Sanson-Fisher and Martin, 1981). It can be said that the interviews have been reliably performed when there are small errors of measurement and there is stability and consistency between the scores on the behaviour being assessed (Mitchell, 1979). The aim of the reliability study is to assess the sources of potential error in the interviewing procedure and to describe the methods used to assess these sources of error.

6.3A - Sources of Measurement Error in Alcohol Studies

As discussed in Chapter 3 the aim in using a semi-structured interview in the data collection is to improve the quality of information and reduce variability due to error. However, the interview procedure itself is a source of unreliability. Assessment of the unreliability of interviews usually concerns either subject variation or interviewers variation (including consistency within each interviewer and lack of agreement between them).

Subject variation has been widely studied in the alcohol field for different kinds of populations. Most of the studies seem to show that drinking behaviour can be elicited with relatively high agreement. Rohan (1976) designed an interview format in which a patient's lifetime drinking history was analyzed in annual segments from the onset of regular drinking. The interviews were conducted on two occasions two weeks apart by different interviewers with two independent samples of 40 male alcoholics. The results of the assessment of lifetime duration of regular drinking were quite reliable with agreements above .97 for the two samples. Sobell et al (1979) assessed daily ingestion of alcohol over the previous 12 months, and found that with a test-retest interval of six weeks, the self-reports of daily drinking behaviour during the 12 months prior to treatment were highly reliable. Skinner and Sheu (1982) interviewed patients with the retest on an average of 4.8 months later, and also found very high reliability. In a more recent study, Cottler et al (1989) report on the reliability of the Composite International Diagnostic Interview Substance Abuse Module (CIDI-SAM). In the reliability assessment, two interviews were conducted one week apart. In the item-by-item reliability of the alcohol section its questions were generally very reliable, with fourteen out of the 25 items having kappa values of .75 or higher.

Interviewers variation has been studied by Caetano et al (1978) using the Clinical Alcoholism Interview Schedule (CAIS) in a study of the inter-rater reliability of five raters independently rating taped interviews. He found a fairly satisfactory level of agreement for most of the items. Chick (1980b) assessed the inter-rater reliability of the items of the EADS that yielded high degree of agreement. Bernardt et al (1984)

compared interviews made by a nurse and by a psychiatrist and also found very high agreement for several measures of alcohol consumption.

6.3B - Methodological Aspects of Reliability Studies Design

The aspect of the reliability of the present study that deserves most consideration is the extent to which the data collected by one interviewer agreed with the independent judgments of the other (inter-rater reliability). R.W.Sanson-Fisher et al (1981) proposed that potential reliability variation in an inter-rater situation can be of two sorts: the interview administration and interview scoring. The main causes of unreliability in the conduct of the interviews are different styles of eliciting information from patients and non-compliance with the rules of the interview. The main causes of error in the interview scoring are different ways of interpreting the scoring and inaccurate assessment of patient's information.

Even when the above sources of error are overcome, this does not guarantee stable reliability because initial levels of agreement between raters may not be maintained over time. There is evidence showing that agreement does not remain stable and Sanson and Martin (1981) showed evidence that the inter-rater agreement can fall by 25 percent when observers believed that their ratings were no longer being checked for reliability. It also seems that interviewers have a tendency to develop an idiosyncratic style of scoring over the period of a study. The advice given is to make spot checks during the whole period of data collection. Therefore, rather than considering the reliability between raters as a fixed quality, reliability should be viewed as a condition to be assessed over time. Continuous monitoring of reliability over the period of study not only provides evidence of the quality of the data being collected but also offers the possibility of assessing sources of error in eliciting information or in scoring.

6.3C - Design of the Reliability Study

As one potential source of unreliability in this project was due to the inter-rater process, the reliability study design concentrated on this aspect using two forms of assessment. The aim in using two forms of assessment was to gain information that could complement the limitation of only one form of measurement. Grove et al (1981) proposed that in the assessment of reliability in semi-structured interviews, it is desirable to use more than one design whenever possible because different designs have different strengths and weaknesses and complement each other. The study was organized in one of the clinics (Warlingham Park) due to practical facilities offered for the second interview. Two groups of 20 patients were selected for the study. The number of patients for each group followed the recommendation by Cicchetti (1976) and more recently by Dunn (1992) that twenty patients is an adequate number for the use of the agreement statistics.

For one group of twenty patients the interview was taperecorded and later on scored by both interviewers (Scoring Group). It was decided to tape one interview a week, chosen as much as possible at random from the patients taking part in the study in Warlingham Park. The attraction of this procedure was in making the interviewers aware of the importance of keeping a stable style of interviewing throughout the process of data collection. The other group of twenty patients was interviewed by one researcher and reinterviewed one week later by the other researcher (Test-Retest Group). Ten of these patients were first interviewed by one researcher (RRL) and the other ten patients by the other researcher (CT), in an effort to avoid bias towards the first interview. This 'Test-Retest' group of patients was also interviewed at regular intervals over the period of data collection.

6.3D - Data Analysis of the reliability study

Reliability study data from semi-standardized interviews can be analyzed at more than one level. They can be analyzed at the level of the individual item, or items can be grouped together to yield scores, or an overall category such as case vs. non-case can

be calculated. Ideally, agreement should be calculated on the unit of data which is to be used in subsequent analyses (Grove et al 1981). Three types of data can be identified in the Drinking Repertoire Interview (DRI), discussed in detail in Chapter 3. The first part is socio-demographic data and previous involvement with treatment which can be analyzed at a categorical level of agreement. The second part has general data about drinking history that are predominantly continuous. The third part is the score of the drinking behaviour in the previous 26 weeks that is a mixture of several scoring categories and continuous data.

Kappa and weighted kappa were used as the main measures of agreement (Bartko, 1991) for the categorical data. Coefficient Kappa is the most commonly used measure for analyzing dichotomous data. It is an appropriate statistic when the data are polytomous and the categories are nominal (unordered). It has the following properties : 1) it is the proportion of agreement corrected for chance agreement; 2) it varies from negative values for less than chance agreement, to +1.0 for perfect agreement; and 3) its sampling characteristics can be subject to statistical significance testing. For the unweighed kappa statistic chance agreement refers to the fact that even if the row and column classification in an agreement table were independent a number of pairs would be located on the leading diagonal. The unweighed kappa statistic gives zero weight to all disagreement cells. For more than two categories, as in a scored rating scale, weighted kappa is the best suited (Bartko, 1991). Weighted kappa generalizes unweighed kappa by employing differential cell weights which reflect differences in the magnitude of disagreement. The more serious the disagreement, the larger the weight. In summary, weighted kappa shares similar properties with unweighed kappa, but whereas kappa does not distinguish between degrees of disagreement, weighted kappa does. Thus, weighted kappa provides for partial credit when disagreement is not complete.

To assess inter-rater reliability of continuous data, the Intraclass Correlation Coefficient (ICC) is the appropriate measure (Bartko and Carpenter, 1976; Bartko, 1991). It can be interpreted as the proportion of the variance accounted for by differences between subjects, with a high value indicating not only that the raters are highly correlated but

that the means derived by them are comparable as well. The ICC is derived from an ANOVA table. This implies that the estimation of the reliability of two or more ratings is based on the assumption that the data are normally distributed and that the variances are homogeneous between ratings.

6.3E - Results of the Reliability Study

The data are presented in the following two tables comparing the 'Scoring Group' with the 'Test-Retest Group'. Table 6.1 presents the reliability results of the first two parts of the interview. The information about the socio-demographic characteristics and the previous involvement with treatment were analyzed as categories using kappa. It shows that they had very high level of agreement, with all the values higher than .83. The remaining items in the table show the individual components of the drinking history; as continuous variables they were analyzed by I.C.C.. They also have high levels of agreement, with values higher than 0.74. Table 6.2 presents the summary of the reliability of the interview scores on ratings of the previous six months of drinking. It also shows a high level of agreement.

Table 6.1 - Inter-rater agreement of the first two parts of the interview (Scoring and Test-Retest Group).

Interview Items	Scoring Group (n=20)	Test-Retest Group (n=20)
Family Status	Kappa=0.94	Kappa=0.84
Residence Status	Kappa=0.96	Kappa=0.87
Employment Status	Kappa=0.92	Kappa=0.84
Previous treatment	Kappa=0.91	Kappa=0.88
"Drinking Most Days of Week"	I.C.C.=0.92	I.C.C.=0.82
"First Morning Drinking"	I.C.C.=0.90	I.C.C.=0.79
"Regular Morning Drinking"	I.C.C.=0.90	I.C.C.=0.81
Number of weeks drinking in the previous two years	I.C.C.=0.88	I.C.C.=0.75
Alcohol Ingestion in a Typical Drinking Day	I.C.C.=0.90	I.C.C.=0.88
Time of the first drink	I.C.C.=0.90	I.C.C.=0.85

Table 6.2 - Inter-rater agreement of scoring categories for the previous six months of drinking (Scoring and Test-Retest Group)

Scoring Categories	Scoring Group (n=20)	Test-Retest Group (n=20)
Number of weeks drinking	I.C.C. =0.96	I.C.C. =0.88
Alcohol Consumption	Weight K= 0.97	Weight K=0.89
Morning Drinking	Weight K= 0.89	Weight K=0.81
Spread of Drinking	Weight K= 0.88	Weight K=0.85

These results support the view that there were no major differences in terms of eliciting and assessing the behaviours measured by the two interviewers. Both designs showed very high levels of agreement confirming that the interviewers did not differ fundamentally as interviewers. The 'Scoring Group' reliability when compared with 'Test-Retest Group' clearly showed better levels of agreement. This finding is in accordance with most studies that compare these two designs (Dunn, 1992). It is very likely that the 'Scoring Group' reliability overestimates agreement because subject dependent variation and variation in interviewing technique are not investigated. Also, when the interviewer listen to the interview tapes he is often aware of the ratings made by the interviewer because of the questions asked or other verbal and non-verbal cues. However, as the 'Test-Retest' design also showed acceptable levels of agreement there is a stronger case for similarities between the interviewers in terms of eliciting and assessing behaviours. The fact that two designs of measurement of reliability were used and the fact that the interviews occurred over the whole of the data collection period strengthens the argument in favour of the consistency of the agreement between the two interviewers.

Chapter 7 - Results

Chapter 7 - Results

Chapter 6 discussed the sampling and the data collection of the study. In this chapter a detailed statistical analysis and results of the survey will be presented. The structure of the chapter is as follows: In the first section there is the description of the total sample of 420 respondents who participated in the study. The second section presents the statistical analysis and results of the Subjective Severity of Alcohol Dependence Questionnaire (SSADQ). The next two sections present the analysis of the measurement of drinking repertoire based on the interview (DRI) and on questionnaires (IDR). The fifth section presents the analysis and results of the Modifiers of Drinking Behaviour Questionnaire (MDBQ). The sixth section examines the Alcohol Withdrawal Scale (AWS) and its relation with the other questionnaires used in the study.

7.1 - Descriptive Analysis of the Sample

As discussed in Chapter 6 the sampling process generated a sample drawn from a comprehensive range of patients attending treatment for alcohol dependence. The description of the sample will be presented according to five main areas: socio-demographic characteristics, previous involvement with treatment for drinking problems, chronicity of heavy drinking, recent drinking history and severity of alcohol dependence. The description is based on the four hundred and twenty patients attending the six clinics who were interviewed and completed the questionnaires.

7.1A - Socio Demographic Characteristics

The male female ratio for the sample was 4:1. The distribution in terms of sex between the clinics varied considerably as shown in Table 7.1. One of the reasons that contributed for this variation was that each clinic had its own policy towards facilitating or not women's admissions. Booth House for example had only facilities for men,

whereas Rugby House and D.C.C. had facilities for both sexes and a clear policy favouring women admissions.

Table 7.1 - Number of male and female patients interviewed in each clinic (n=420).

Clinic	Male	Female
Booth House	130	-
Warlingham Park	79	39
D.C.C.	50	24
Maudsley Hospital	28	4
A.R.P.	34	4
Rugby House	17	11
TOTAL	338	82

Table 7.1 also shows that the number of patients interviewed varied between clinics. These differences reflected two factors: 1- the length of time that the two researchers spent in each one of these clinics, with Booth House and Warlingham Park being the clinics where they spent the longest period of time; 2- it also reflected the time that the patients spent on average in each of these clinics. For example, Booth House was the clinic with the highest turnover of patients, because it is a detoxification clinic where the patients are allowed to stay for a maximum of only one week. Rugby House, on the other hand, had a policy of admitting patients for at least six weeks and when the interviews started there in January 1991, it had just opened and therefore during the five months of data collection the turnover of patients was low.

The mean age of the combined sample was 41.3 years (s.d. \pm 10.1), with no significant difference between males and females (male=41.9; female=38.8). Table 7.2 shows the summary of the main socio demographic characteristics of the sample. In terms of family status more than one third of the sample were living with their family and almost half were living alone. One third were living in non-permanent accommodation or were homeless. Forty percent were unemployed, although more than one third of them admitted to be doing some sort of casual work when they had

opportunities. The great majority had spent their childhood in England, with only 7.6% came from outside the three countries in the table.

Table 7.2 - Socio-demographic characteristics (n=420).

<u>FAMILY STATUS</u>	(%)
Living with spouse and/or children	33.1
Living with relative or friends	22.4
Living alone	44.5
<u>HOUSING STATUS</u>	
Living in permanent accommodation	64.3
Living in non-permanent accommodation	27.6
Homeless or Squatting	8.1
<u>EMPLOYMENT STATUS</u>	
Employed	42.6
Unemployed	40.1
Disabled	11.4
Housewife	3.8
Retired	2.1
<u>COUNTRY WHERE SPENT CHILDHOOD</u>	
England	64.0
Scotland	15.2
Ireland	13.1
Other	7.6

7.1B - Previous Involvement with Treatment

There was considerable range in the sample in terms of previous involvement with treatment for drinking problems. In relation to actual admissions to any inpatients clinic due to drinking problems (General or Psychiatric Hospitals, Alcohol Detoxification Clinics, etc), 52.9% of the patients had no previous admissions, 32.1% had one or two, and only 15% had three or more admissions.

Seventy eight percent of the patients had contacted some form of help for drinking problems during the previous two years. There was a great variety in terms of the type

of help sought, the general pattern being a combination of multiple sources of help over the years as summarised in Table 7.3. The technique used to collect this information was to ask for any kind of help they had sought since alcohol problems began. Help was considered as any attempt to talk to someone concerning their drinking problems. For example, it was considered help talking to the G.P. specifically about their drinking problems.

The General Practitioner was by far the most frequently sought source of help in the past two years, with only 20% of the patients having never talked to their GPs specifically about drinking problems. Alcoholics Anonymous was as the second most used, followed by Counselling and an Alcohol Detoxification Unit. General and Psychiatric hospitals were very rarely used by these patients. However, as can be inferred from Table 7.3 most patients used a combination of sources of help. Even though the G.P. was the predominant source of help used, only 8.3% of the patients sought it exclusively. The most frequent combination of help used in the previous two years was the association of G.P. and A.A.; which happened for 34.8% of the patients (not shown in Table 7.3).

Table 7.3 - Previous help with drinking problems (n =420).

	Never (%)	In previous two years (%)	More than two years ago (%)
General Practitioner	20	63	17
General Hospital	74	15	11
Psychiatric Hospital	63	17	20
Alcoholics Anonymous	43	43	14
Alcohol Detoxification Unit	54	34	12
Dry Hostel	71	20	9
Counselling	55	35	10

7.1C - Chronicity of Drinking History

The interviews covered all major aspects of the patient's drinking history asking patients to estimate several important changes in their drinking behaviour over the years (Appendix A). When asked to estimate for how long they had been drinking most days of the week, there was a large variation in the sample, with a mean of 195 months (s.d. \pm 119). Length of time since when they had the first ever drink in the morning also produced a large variation with a mean of 125 months (s.d. \pm 105). Only seven percent of the sample had never been a regular morning drinkers in their lives. Figure 7.1 shows the estimated the duration of regular morning drinking over the years. Most of the patients estimated that they had only been regular morning drinkers in the previous four years or less. Only 28.3% of the sample estimated that they had been drinking regularly in the morning for more than 10 years.

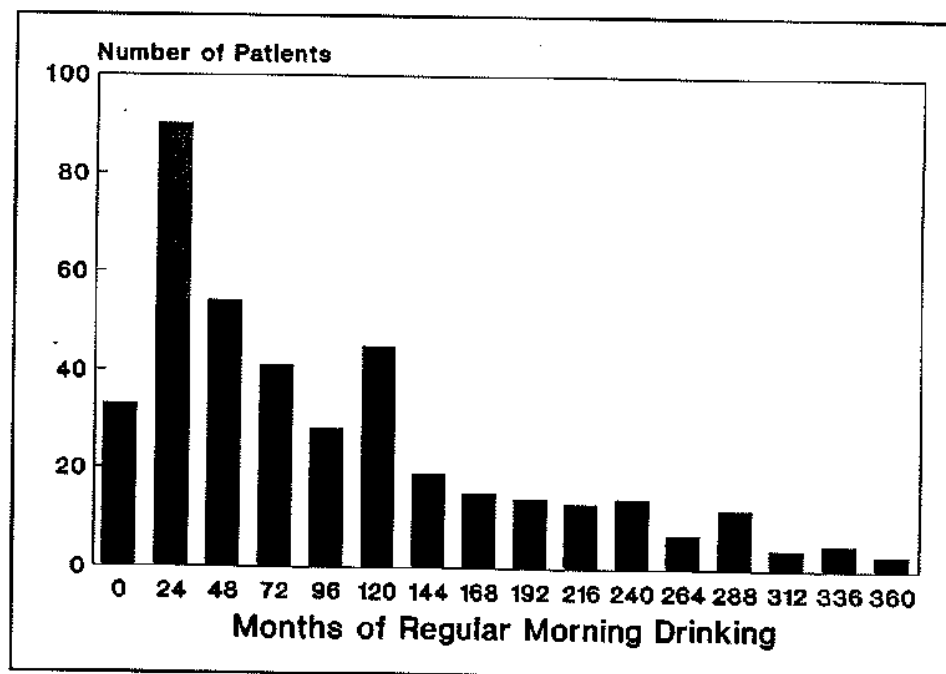


Figure 7.1 - Estimated number of months drinking regularly in the morning (n=420).

7.1D - Drinking behaviour in the previous two years

In order to assess the recent drinking history over the previous two years (104 weeks), the number of weeks in which more than 100g of alcohol was consumed in any day was recorded (Appendix A). Table 7.4 shows that there was a reasonable variation among the patients. There was a group of 22.9% of the patients that drank more than 100g of alcohol every single week of the period. If associated with another group of 33.9% of patients that drank between 79 weeks and 103 weeks a group of drinkers is formed that had been drinking most of the weeks in the past two years.

Table 7.4 - Weeks drinking more than 100g of alcohol on at least one day (n=420).

Number of weeks	Percentage of Patients
4 - 26 weeks	13.5
27 - 52 weeks	13.3
53 - 78 weeks	16.4
79 -103 weeks	33.9
104 weeks	22.9

7.1E - Characteristics of a Typical Drinking Day

Patients were also asked to estimate their behaviour on a typical day of drinking in the previous two months of drinking. The definition used was that the day should represent an average day from the days when drink was consumed during the period. Basically two estimates were reported: the average total amount of alcohol consumed and the estimated average time of the first drink of the day. Figure 7.2 shows a histogram of the estimated grams of alcohol ingested in a period of 24 hours. It shows that there was a great difference in the quantity ingested. It varied from consuming amount as low as 100g to a large consumption of 1200g of alcohol a day. However, most of the patients consumed between 200g and 600g. The mean was 421g (s.d. \pm 210g).

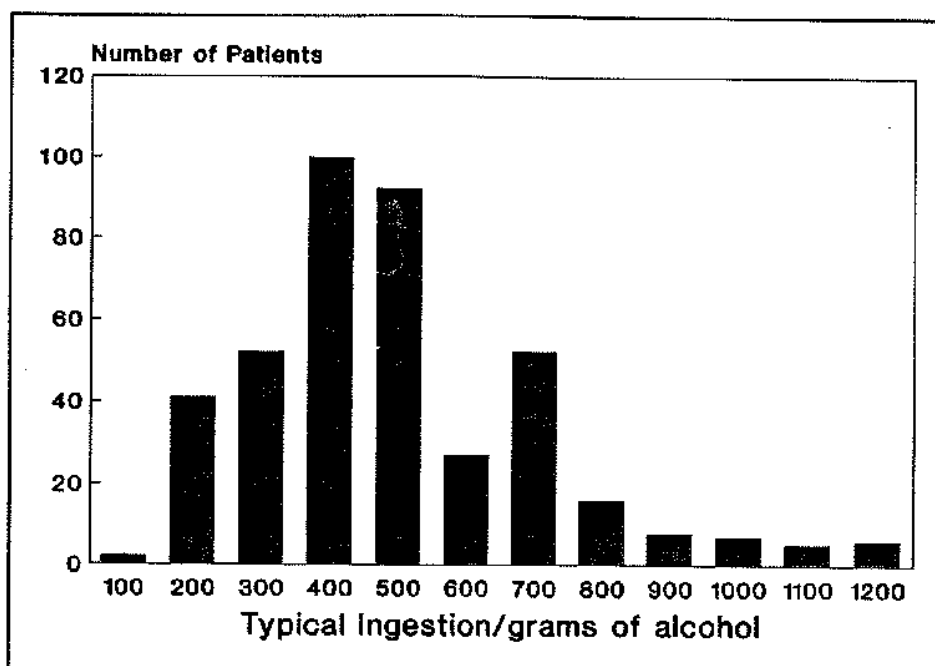


Figure 7.2 - Estimated ingestion of grams of alcohol in a recent typical drinking day (n=420).

The time of the first drink of the day was elicited from the patients by asking them to estimate how soon they had the first drink of the day on a typical drinking day after awakening. Table 7.5 shows the percentage of patients starting to drink at different times. Two thirds of the sample started the day's drinking within the first hour after waking up, and only 18% after four hours.

Table 7.5 - Average time of the first drink of the day (n=420).

Time after waking	Patients (%)
Within five minutes	34
Between five and sixty minutes	36
Between one hour and four hours	12
More than four hours	18

7.1F - Severity of Alcohol Dependence

As discussed in Chapter 5 the general assessment of the degree of alcohol dependence was made by the SADQ. Before showing the results of the total scores of the SADQ a statistical analysis will be presented. The importance in repeating this analysis was to check on the stability of the structure of the SADQ in this large and heterogeneous sample. The structure of the SADQ for the total sample of 420 patients was very similar to previous studies (Stockwell et al, 1979; Meehan et al, 1985; Drummond, 1990). A Principal Component Analysis revealed a main factor that accounted for 41.6 percent of the total variance. All SADQ items loaded strongly on this factor as shown in Table 7.6.

Table 7.6 - Factor loadings of SADQ items on the first factor of the Principal Component Analysis (n=420).

Items	Loadings
1 - I woke up feeling sweaty	.64
2 - My hands shook first thing in the morning	.75
3 - My whole body shook violently first thing in the morning	.75
4 - I woke up absolutely drenched in sweat	.65
5 - I dreaded waking up in the morning	.64
6 - I was frightened of meeting people first thing in the morning	.69
7 - I felt at the edge of despair when I awoke	.67
8 - I felt very frightened when I awoke	.66
9 - I liked to have a morning drink	.71
10- I always gulped my first few morning drinks quickly	.67
11- I drank in the morning to get rid of the shakes	.77
12- I had a very strong craving	.78
13- I drank more than 1/4 bottle spirits a day	.35
14- I drank more than 1/2 bottle spirits a day	.48
15- I drank more than 1 bottle spirits a day	.58
16- I drank more than 2 boules spirits a day	.41
17- I would start to sweat	.54
18- My hands would shake	.61
19- My body would shake	.68
20- I would be craving for a drink	.56

In Table 7.7 the correlations for the total scores of all five sections of the SADQ (Physical, Affective, Need, Alcohol and Post-Abstinence) with each other and with a total SADQ score are presented. This last total score is in each case calculated by summing the scores of the four sections other than the one with which it is being

correlated. Correlations between the SADQ subscales, and those between individual subscales and the SADQ total score were all significant at the level of $p < 0.0001$, and consistent with previous analyses (Stockwell et al, 1979; Drummond, 1990).

Table 7.7 - Correlations between SADQ subscales* and the total SADQ score¹ (n=420).

Sections	PHYS	AFF	NEED	ALC.	POSTAB
PHYS	1.00				
AFF	.54	1.00			
NEED	.67	.55	1.00		
ALC.	.46	.34	.44	1.00	
POSTAB	.61	.39	.59	.37	1.00
SADQ	.75	.58	.74	.50	.62

*Subscales abbreviations

PHYS (Physical withdrawal); AFF (Affective withdrawal); NEED (Craving and salience); ALC (Alcohol Consumption); POSTAB (Reinstatement).

¹ Excluding in each case the relevant SADQ subscale.

The SADQ items were also analyzed individually, revealing that all items had a reasonable high correlation with each other varying from .12 to .76 with a mean of 3.6. The items correlated particularly highly with the total of the questionnaire, varying from .38 to .74. The internal consistency measured by the Cronbach's alpha for the whole questionnaire was .92. The total score of SADQ for the entire sample reveals a mean score of 35.58 (s.d. \pm 13.47) with a range of 1 to 60 (maximum possible score=60). The values of the total SADQ scores were distributed along a continuum of severity as shown in Fig. 7.3. There seems to have a tendency for the distribution to be skewed towards the highest values.

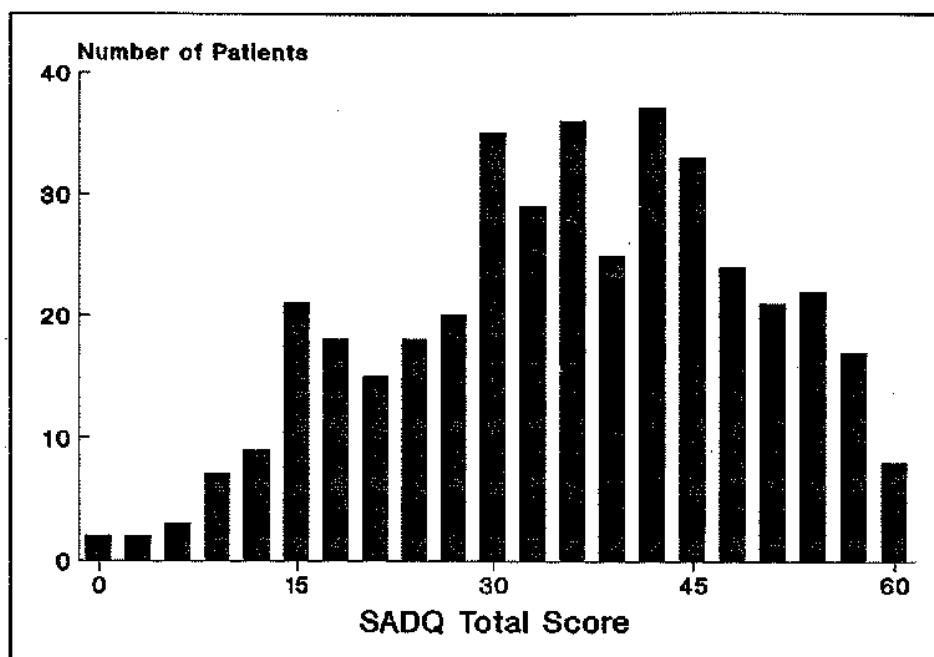


Figure 7.3 - Distribution of the SADQ Total Score (n=420).

7.2 - Statistical Analysis and Results of the Subjective Severity of Alcohol Dependence Questionnaire - (SSADQ)

This section discusses the statistical strategy used to analyze the SSADQ. Several authors have proposed criteria of how to approach the analysis of a multiple-item scales (DeVellis, 1990; Spector, 1992; Oppenheim, 1992). The aim of the analysis is to reach the construct or the latent variable that represents the construct in the scale. Techniques are aimed at selecting a set of items that can be empirically demonstrated to form a single social-psychological dimension (McIver and Carmines, 1981). However, in order to show the manifestation of the construct it is necessary to analyze in detail the individual items as well as the scale as a whole. Thus, there are two levels of analysis which in combination will be able to indicate the construct. The first is to evaluate the performance of the individual items so that appropriate ones can be identified to constitute the scale. The second level is to identify the factor structure of the scale.

7.2A - Item Analysis and Selection

The importance attributed to item analysis reflects the theoretical framework on which scale measurement is based. According to psychometric theory one individual item can be considered to be a separate indicator of the construct to be measured (Spector, 1992). The aim of item analysis is to provide information about how well each individual item relates to the other item pool. The general goal is to produce a version of the scale that is ready to be tested for validation, and this is achieved by evaluating the psychometric performance of the individual items so that appropriate ones can be identified to constitute the scale. The ultimate criterion of the performance of an item is how well it contributes to the internal consistency of the scale (Spector, 1992).

Basically three steps will be followed to assess how the items contribute to internal consistency: the correlation of the item with others items and with the total of the scale; item variance and means; and the internal consistency reliability. The analysis of the items of the SSADQ that follows was based on the 420 questionnaires. The items were analyzed following the guidelines proposed by DeVellis (1991) and Spector (1992) which will be used in all the scales analyses in this project. The SPSS-PC Reliability routine was used for this first part of the item analysis.

Item-scale correlations

Since the objective is to arrive at a set of highly intercorrelated items, then each individual item should correlate substantially with the collection of remaining items. The correlation matrix of all the 100 items of the SSADQ showed a variation of the correlation coefficients from $-.41$ to $.74$. The majority of the items with negative correlations were items with negative wording. These items had the scores reversed for subsequent analysis.

The SPSS-PC Reliability statistic provide the corrected item-scale correlation that correlates the item being evaluated with all the remaining scale items excluding itself. Most items had a high correlation with the total, but there was a large variation from the lowest $.002$ to the highest $.820$. Ten items of the original version of the SSADQ

had a correlation with the total score which was lower than .3. Another way to look at the relationship between an individual item and the rest of the scale is to try to predict the scores on the item based on the scores obtained on all the other items. This can be done by calculating a multiple regression equation with the individual item as dependent variable and all of the other items as independent variables, yielding the statistic 'Squared Multiple Correlation' (SMC). Most of the items of the SSADQ had a SMC higher than .3. In total twenty items were excluded because they had a score lower than .3 on the corrected item-total correlation or on the SMC.

Items variances and means

For an item to be effective it has to vary. If every patient answers the same item in the same way it becomes useless in psychometric terms, because it will not discriminate between respondents, "an item that does not vary cannot covary" (DeVellis, 1990). Therefore, two valuable attributes for a scale item is a relatively high variance and an item mean close to the centre of the range of possible scores. All the 20 items excluded based on the criteria item-scale correlations had also a poor performance in terms of their variances and means, confirming that it was appropriate to exclude them. Additionally, ten more items were excluded based exclusively on the criteria of poor item variance and item means.

Internal Consistency Reliability - Coefficient Alpha (α)

Internal consistency is a measurable property of a set of items that implies that they measure the same construct. It reflects the extent to which items intercorrelate with one another. Failure to intercorrelate is an indication that the items do not represent a common underlying construct. Internal consistency is usually measure by Cronbach's alpha (α). Cronbach's alpha has many definitions; it is the proportion of a scale's total variance that is attributable to a common source, presumably the true score on a latent variable underlying the items (DeVellis, 1991). The formula of Cronbach's alpha is based on the average inter-item correlation and the actual number of items (Pedhazur and Schmelkin, 1992).

The Cronbach's alpha of the original 100 items of the SSADQ was .97. This extremely high Alpha was expected since there was a large number of items and they had a relatively high average correlation between them. The SPSS-PC Reliability routine analyzes the impact that each item has on the scale in terms of the alpha coefficient if that particular item is excluded. When the 30 items that were excluded were assessed in relation to alpha they had in common that all of them further increased slightly the levels of alpha if they were excluded from the scale, showing that the exclusion of these items did not reduce the internal consistency of the scale. The high level of alpha was an indication that the item pool was homogeneous, and that it allowed a reduction of the number of items without loss of internal consistency. Authors such as George et al (1989) and DeVellis (1991) have argued that values of alpha higher than .95 indicate that the scale has an excessive number of items or that they are redundant rather than representing different parameters of the same underlying dimension. Moreover, redundancy may introduce multicollinearity into the statistical model (George et al, 1989). Thus, it was decided to reduce even further the number of items using as criteria their performance in terms of item-total correlation, variance and means. This selection produced a shortened version of the scale of 52 items.

A subsequent analysis of these 52 items revealed an Cronbach's alpha of .96, confirming that the decrease of the number of items did not change their internal consistency. A further decrease of the number of items was justified by this still very high level of alpha. As one of the objectives was to reach a shorter version of the scale that could be used more easily for further analysis and for future use in different studies, a final decision was made in which the best four items of each area of the scale was selected, creating a scale of 28 items (Table 7.8). This decision was justified because kept the balance between the areas of the construct (Oppenheim, 1992). One consequence of this selection of items was that no negative wording items was chosen for the final analysis. In this final version, the corrected item-total correlation and the SMC for all items were higher than .40; and the Cronbach's alpha coefficient remained still .95.

Correlation Between Areas

An additional analysis was carried out in order to assess how each of the seven areas of the scale correlated with each other. As can be seen in Table 7.8 all the areas correlated highly with each other. Moreover, the total score for the scale excluding each area in turn also showed high correlations. All correlations were statistically significant at .001 level. Although it would be expected a high degree of correlation between the areas because of the high internal consistency of the scale, it is important to point out that there was noticeable difference between the areas.

7.2B - Factor Structure of the SSADQ

A Principal Component Analysis was carried out using SPSS-PC on the twenty eight items of the final version of the scale. It extracted four factors, with the percentage of variance and Eigenvalues shown in Table 7.9. All the items loaded highly on the first factor (between .45 to .80) as shown in Table 7.10. In determining how many factors to extract from a Factor Analysis, two methods have been widely used: these are the Kaiser-Guttman rule and Cattell's scree test (Kim and Mueller, 1978). The former of these criteria is simply that all components with Eigenvalues greater than one should be retained and rotated, but has been criticised for too often yielding unreasonably many factors. Cattell's scree test consist of plotting the Eigenvalues in component order, drawing a straight line through the components with the lowest Eigenvalues, and retaining those whose eigenvalues fall above this line. The interpretation of the Eigenvalues based on these two criteria differs slightly in the present analysis. According to Kaiser-Guttman rule there would be a three factor solution, whereas Cattell's scree test revealed only one. It was decided to perform a Factor Analysis using several methods of extraction and rotation. However, no easily interpretable additional factors were uncovered and a one-factor solution was adopted. All 28 items had high loadings on the main component (Table 7.10).

Table 7.8 - Correlation between the seven areas score and the SSADQ* total score

Areas of the SSADQ	Centrality	Function	Must	Difficulty	Enforced	Relief	Avoidance
Centrality of drinking	.75						
Drink to promote normal functioning	.75	.73					
Drink as a must	.48	.37	.54				
Difficulty in stopping drinking	.66	.70	.70	.47			
Feeling during enforced abstinence	.70	.76	.75	.46	.74		
Drinking as a relief	.65	.65	.68	.48	.63	.79	
Avoidance of the withdrawal symptoms	.80	.81	.84	.53	.78	.86	.78
SSADQ* - total score							

* Excluding in each case the relevant SSADQ areas

Table 7.9 - Variance and Eigenvalues on the Principal Component Analysis of the SSADQ (n=420).

Variance (%)	Eigenvalue
1 - 45.5	12.73
2 - 7.1	1.98
3 - 5.2	1.44
4 - 3.8	1.06

7.2C - Comparison of the SSADQ and SADQ

As all the items has a high loading on the first principal component (Table 7.9) it was appropriate to create a total score of the SSADQ by adding up all the scores of the 28 items. It varied from a minimum of 28 when all the items are scored in total disagreement to 140 when they reflect total agreement. As figure 7.4 shows, the total score of the SSADQ has a distribution along a continuum of severity that, similarly to the SADQ (Fig. 7.3), has a tendency to be skewed towards the highest levels. The total SSADQ score correlated strongly (.73, $p < .001$) with the total score of the SADQ. When the individual areas of the SSADQ were compared with the areas of the SADQ these also revealed high levels of correlation, all significant at $p < .001$ (Table 7.11) . It is suggestive that the area of the SADQ that correlated highest with the SSADQ was the area 'Need' which contains items related to the subjective need for a drink. The level of correlation among the SSADQ areas (Table 7.9) tends to be higher than the correlation between SSADQ and SADQ (Table 7.11).

Table 7.10 - Items of the SSADQ and loadings on the first Principal Component (n=420).

Items	Loadin
CENTRALITY OF DRINKING	
01- The only real need in my life is my need for drink	.69
02- Drink always comes first	.75
03- My whole life revolves around getting my next drink	.72
04- All my activities during the day are involved with drinking	.73
DRINK TO PROMOTE NORMAL FUNCTIONING	
05- I need a drink to do even the most trivial every-day things	.77
06- Without drink I would find it difficult to function	.68
07- In order to do something, I have to drink first	.80
08- If I have to do something difficult I don't do it until I have had a drink	.62
DRINK AS A MUST	
09- Sometimes I would do anything to get a drink	.48
10- In the morning, drinking is a must for me	.79
11- I frequently feel that nothing else matters except having a drink	.67
12- When I'm dry, the only thought that I have in my head is to get some alcohol inside me	.59
DIFFICULTY IN STOPPING DRINKING ONCE STARTED	
13- If I have one or two drinks I'll go on	.45
14- The more I drink, the more I want to drink	.45
15- Once I start drinking I just carry on	.49
16- I can't stop drinking if drink is still around	.54
FEELING DURING ENFORCED ABSTINENCE	
17- When I need a drink and cannot get it I feel as if I'm dying	.71
18- I get very anxious if anything looks like getting between me and my next drink	.75
19- In some social situations I feel trapped and anxious because I can't get a drink	.61
20- Sometimes I feel like I'm on edge while waiting for the opportunity to have a drink	.71
DRINKING AS A RELIEF	
21- I need a drink in the morning to make me feel better	.74
22- My life starts when I have my first drink of the day	.82
23- If I wake up early, I worry if I can't get a drink	.71
24- Drinking is like being given an injection that revives you	.65
AVOIDANCE OF WITHDRAWAL SYMPTOMS	
25- I make sure that I can have a drink at any time during the day	.72
26- I have to have a few drinks before going to a place where there may be no drink	.68
27- I know exactly where I can get a drink first thing in the morning	.52
28- I have to top myself up all day long	.69

Table 7.11 - Correlations between areas and total SSADQ with the SADQ (n=420).

	PHYS	AFEC	NEED	ALC	POSTAB	SADQ total
Centrality	.57	.55	.72	.43	.57	.74
Function	.56	.54	.72	.44	.57	.74
Must	.55	.54	.70	.42	.56	.73
Difficulty	.55	.54	.71	.41	.56	.72
Enforced	.55	.53	.71	.42	.55	.72
Relief	.54	.55	.68	.42	.55	.72
Avoidance	.53	.56	.70	.41	.55	.72
SSADQ total	.55	.55	.71	.42	.56	.73

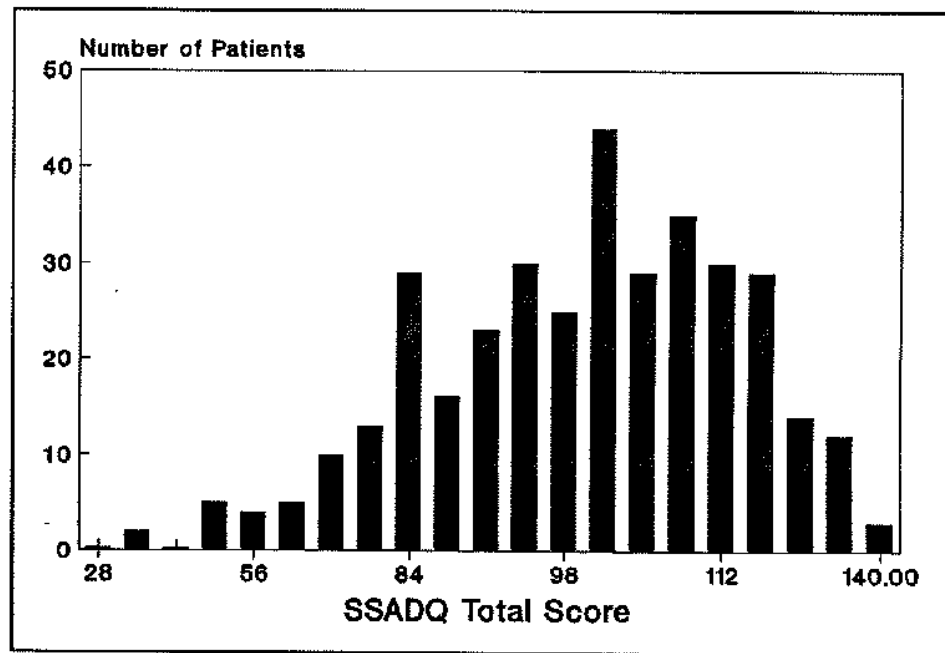


Figure 7.4 - Distribution of the Total Score of the SSADQ (n=420).

7.3 - Statistical Analysis of the Drinking Repertoire Interview - (DRI)

This section describes the statistical strategy developed to examine the data from the Drinking Repertoire Interview which used a new system for scoring drinking behaviour over a period of 26 weeks. As discussed in Chapter 3, most methods found in the literature to analyze drinking behaviour have relied on levels of alcohol consumption that were transformed into categories of drinking behaviour (Orford et al, 1977; Polich et al 1981, Sobell & Sobell et al, 1992). The aim of the statistical analysis to be presented here was to find new methods to evaluate drinking behaviour, taking into consideration the four variables of the drinking repertoire model. Each week will be analyzed based on four scores: number of days drinking, frequency of morning drinking, frequency of spread of drinking throughout the day and levels of alcohol consumption. The analysis described in the following sections starts with a simple combination of the scores given for each week; progresses to a new scoring system based on canonical correlation; identifies through cluster analysis six groups of drinking patterns; and finally examines the drinking repertoire in relation to the severity of alcohol dependence. The data used in this section is based on the 202 patients that were interviewed according to the 'Long-form' schedule as described in Chapter 6.

7.3A - Variability of the 'week pattern'

One of the advantages of this new scoring system of the drinking repertoire is that in using these four variables it allowed a large number of combinations of scores for each week to be examined. The number of patterns allowed by this system can be determined by the combination of the different categories of the four variables. As each variable had a number of categories of scores (number of days drinking=4, morning drinking=5, spread of drinking=5, and alcohol consumption=12) the conceivable number of patterns were the product of the combination of these categories $4 \times 5 \times 5 \times 12$ that is 1200.

The first step in the analysis was the creation of the 'week pattern', that is the combination of these four variables, for each of the 26 weeks of the 202 patients. The

first test of this new scoring system was to assess the variability of the 'week pattern' for the whole sample of patients. The main aspect considered was whether this scoring system was able to identify a reasonably large variety of drinking patterns amongst the patients in the sample. The actual data from the 202 patients showed that there were 146 different patterns identified by the scoring in all weeks examined, showing the power of this system to identify a large diversity of drinking behaviour.

The next step was to assess how many different 'week patterns' were present within the individual patients. Any patient could in principle have a different 'week pattern' for each of the 26 weeks. However, the data showed that a group of 104 patients (52%) had only one pattern; 61 patients (30.5%) two patterns; 32 patients (16%) three patterns and only 3 patients (1.5%) four different patterns. Four patients had to be excluded because of errors in the interview scores. Abstinence was assessed separately; for 91 cases (46%) there was no abstinent week during the 26 weeks period, while for the remainder the number of weeks abstinent had a mean of 3.81 (s.d. \pm 5.39).

In order to progress in the analysis the interaction between these four variables of a drinking week had to be explored in more details. The next section describes a canonical scoring procedure. This new scoring system basically has two characteristics: (i) it transforms the ordinal categories of each of the four variables into continuous values; and (ii) uses the data itself to achieve this transformation. The data used in this form of analysis was not based on each individual patient but on the total pool of all the 'week patterns' shown by all the patients. As shown above there were 104 patients that had one pattern, 61 had two patterns, 32 had three and 3 had four patterns, which altogether represent a total of 334 'week patterns'. Because of missing values there was a reduction to 325 'week patterns'

7.3B - Canonical Scoring of the 'week pattern'

As discussed in Chapter 3, the narrowness of drinking repertoire throughout any given week can be conceived as comprising of two elements. Firstly, the number of days

during the week in which drinking occurred as opposed to the number of days abstinent. Secondly, on days when drinking did occur, there is the question of characterising the drinking behaviour in terms of morning drinking, spread of drinking and quantity of alcohol consumption. The aim of the canonical analysis that follows was to find an overall measurement scheme that can take into account both of these aspects of the drinking repertoire, in some combined fashion.

Figure 7.5 shows diagrammatically the relationship between the variables of a narrow repertoire for the days in which drinking occurs. A strict starting point of a narrow repertoire is represented at the top of the diagram. The repertoire may be widened by a decrease of any of the three constituent parts, so that a wide daily repertoire will exist in a variety of forms. If the decrease of the three constituents is measured, it will give an indication of the extent to which the drinking repertoire has widened. This model also helps to visualise the importance of making the variables continuous and on commensurable scales. As the numbers of the scores of the categories stand at the moment, the different scoring categories of the four variables are arbitrary. There is no meaningful mathematical difference between, for example, to the variable morning drinking, category number 1 (every day morning drinking) and category number 2 (most days morning drinking).

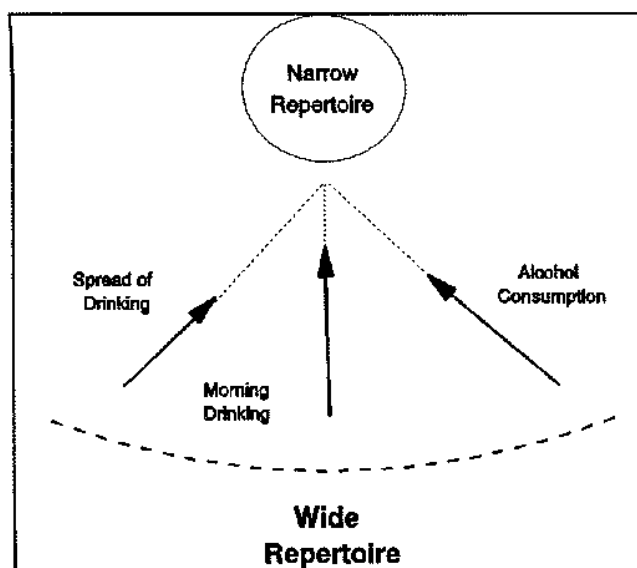


Figure 7.5 - Model of drinking repertoire during drinking days.

The strategy was to record the actual data of the pool of 'week patterns' to produce a continuous scoring variables, combining the three scores for the drinking days (morning drinking, spread of drinking, and alcohol consumption) by means of a canonical scoring technique. The canonical scoring was carried out in SPSS-PC with a Principal Component Analysis procedure, applying it to scaled dummy variables which were constructed to represent the score categories. This is equivalent to maximising the canonical correlations on a Burt matrix, as in Analysis of Correspondence. The following three tables (Table 7.12 to 7.14) show the value of the canonical scores for each of the variables. As the variable alcohol consumption did not have enough cases to produce a meaningful canonical scores for all categories it was necessary to collapse some of them (Table 7.14).

Table 7.12 - Canonical scores for the variable morning drinking (325 'week patterns').

Score Categories	Canonical Scores
1-Every Day Morning Drinking	0
2-Most of Days Morning Drinking	190
3-Some Days Morning Drinking	322
4-Occasional Days Drinking in the Morning	368
5-No Morning Drinking	465

Table 7.13 - Canonical scores for the variable spread of drinking (325 'week patterns').

Scores Categories	Canonical Scores
1-Every Day Spread Drinking	0
2-Most Days Spread Drinking	214
3-Some Days Spread Drinking	292
4-Occasional Days Spread	418
5-No Spread Drinking	459

Table 7.14 - Canonical scores for the variable alcohol consumption (325 'week patters').

Scores Categories	Canonical Scores
99 - Every day > 200g	0
94 - Most days > 200g, occasional > 100g < 200g.	213
91 - Most days > 200g, occasional < 100g.	244
85 - Some days > 200g, some days > 100g < 200g.	318
82 - Some days > 200g, some days < 100g.	
67 - Most days > 100g, occasional > 200g.	353
66 - Most days > 100g < 200g	
52 - Some days > 100g < 200g, some days < 100g	359
61 - Most days > 100g < 200g, occasional < 100g.	
37 - Most days < 100g, occasional > 200g	
34 - Most days < 100g, occasional > 100g < 200g	407
33 - Most days < 100g.	

Thus the scoring categories within each variable have been optimally scored by this procedure: that is, it makes the relative scales compatible between variables by effectively allocating scale weights to each of three constituent measurements in such a way as to maximise the variance of the resultant combined score. In other words the canonical scores retain as much information as possible from the recorded data in order to separate individual's behaviour within the defined structures. The results of a canonical scoring analysis are invariant to mean translation, and were adjusted for convenience to give the final scores having a first scale point of zero.

In order to complete the scoring exercise, the categories of numbers of drinking days throughout the week (drinking every day, most days, some days and occasional days) were also scored by the canonical technique. The results from the preceding canonical scoring exercise were used to determine scores for the categories of drinking day which would maximise the correlations between the two. This was most easily achieved by using an SPSS-PC regression procedure in which the canonical daily score was regressed on dummy variables constructed to represent the categories of frequency of occurrence. The desired category scores are then the respective regression coeffi-

cients, subject as before to a mean translation of convenience to make the lowest category take on a zero score. Table 7.15 shows the canonical scores.

Table 7.15 - Canonical scores for the variable days drinking (325 'week patterns').

Categories	Canonical Scores
1-Every day (7 days)	0
2-Most Days (5-6 days)	133
3-Some Days (3-4 days)	144
4-Occasional (1-2 days)	215

The scoring system as so far described creates compatible optimal scales for all variables describing a 'week pattern'. It is important that the scales are able to discriminate across the range of the 'week patterns'. Consequently, an analysis was carried out where the sum of the all the four canonical scores was used to create a general 'width of drinking repertoire' score. The 'width of drinking repertoire' score varied from zero to 1331. Figure 7.6 shows that this total score has a continuous range and although there is some convergence of the data in the score zero that represents the narrowest repertoire possible, there is also on the score 1331 that represents the widest repertoire assessed. The important fact is the ability of this scoring system to discriminate across a wide range drinking patterns.

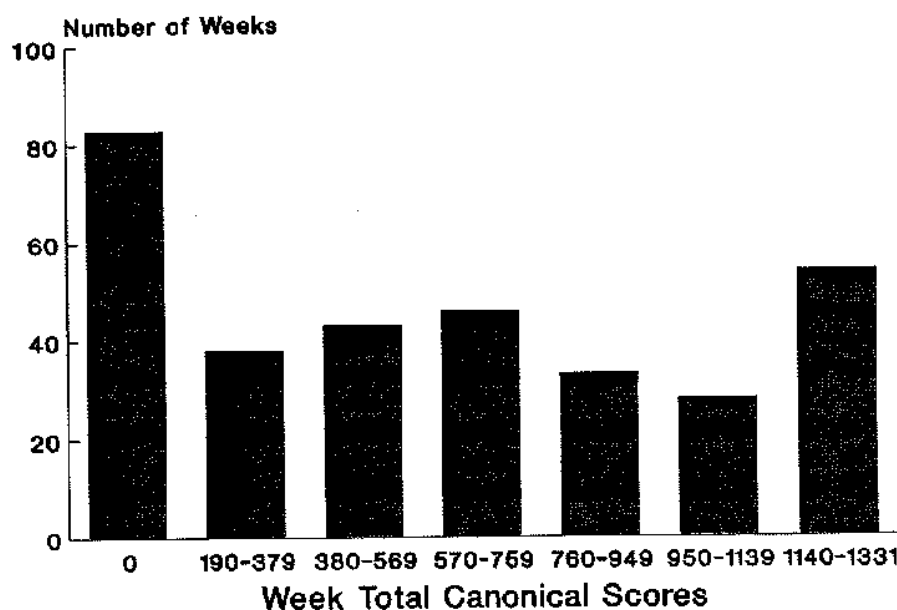


Figure 7.6 - Total Scores of the 'width of drinking repertoire' (325 'week patterns').

7.3C - Cluster Analysis of the 'week patterns'

Although it was possible to achieve a canonical scoring value for each of the 'week patterns', there is no information on how these four variables occur together. It is not enough to have a total score for the week and not knowing for example, whether a high score of alcohol consumption occurs more often with morning drinking or not. To explore this question a Cluster Analysis was performed using the pool of 325 'week patterns' with the individual canonical scores for each of the four variables. Initially several methods of cluster analysis were tried with and without a preceding Principal Component Analysis. All these methods showed similar results, but a six cluster solution using Complete Linkage method with a prior Principal Component Analysis was adopted as a final solution.

The six clusters extracted are shown in the Figure 7.7. The roman numbers at the bottom are the numbers given to the clusters in sequence from the narrowest repertoire in cluster I to the widest repertoire in cluster VI. The sequence of clusters was organized following the cluster average for the total width of repertoire scores described in section 7.3B. For example, cluster I, has the lowest canonical score in the four variables, therefore is the cluster with the narrowest repertoire; weeks classified into this cluster were weeks with zero or near zero for all variables. Cluster VI on the other hand has the highest scores for most variables, meaning the widest repertoire within the weeks measured.

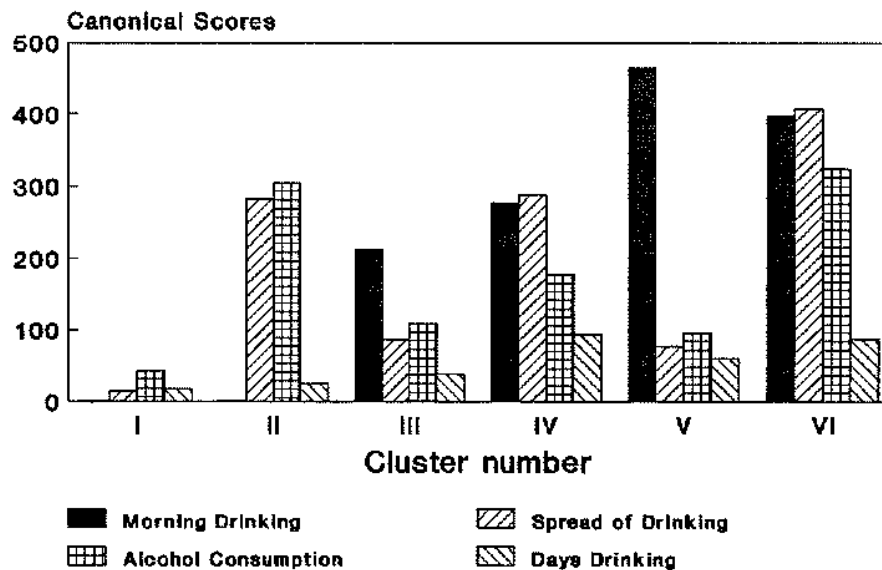


Figure 7.7 - Clusters of drinking behaviour based on the canonical scoring system (325 'week patterns').

The clinical meaning given to the pattern of drinking represented by the other four intermediate clusters is less apparent, but it shows that there are several ways in which the drinking repertoire could present itself within the pool of drinking weeks. Cluster II is a pattern in which there is morning drinking all the time, (canonical score zero) but there is less alcohol consumption and less spread of drinking than in cluster I,

although in terms of days drinking both clusters have similar scores (drinking almost every day). Cluster III has less morning drinking, but keeps a high consumption and high frequency of spread, with less days drinking in the week. Cluster IV has even less morning drinking, with lower ingestion and spread and less number of days drinking. Cluster V has no morning drinking but with high ingestion and spread but with relatively lower number of days drinking. The main aspect of this sequence of clusters is that the sequence clearly represents a progression in terms of widening of the repertoire as was proposed at the beginning of the analysis. The progression of the scores in each of the clusters is more easily seen if the clusters II and V are left aside. It shows that the scores increase steadily from cluster I to VI.

Each cluster represented a different proportion of the number of 325 'week patterns' as shown in Table 7.16. Cluster I and VI represent the majority of the number of weeks, but a substantial number of weeks is shared by the other four clusters. This distribution shows that the clusters were able to identify several classes of drinking behaviour amongst the pool of 'week patterns'. However, cluster II and V that have the less harmonious scores in relation to the other four were the rarest in terms of number of weeks.

Table 7.16 - Number of weeks represented by each cluster (325 'week patterns').

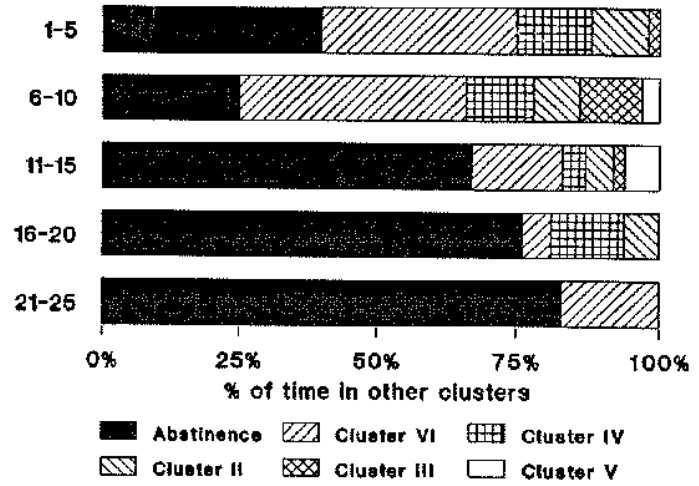
Cluster Number	Number of weeks
I	112
II	16
III	44
IV	50
V	11
VI	92

7.3D - The relationship between clusters of drinking patterns and abstinence

The next stage in the analysis was to assess the role of the different clusters of drinking patterns in representing the actual drinking behaviour of the patients in the sample. The particular aim was to assess how weeks when patients were abstinent would relate with the patterns represented by each cluster. A comparison was made between two groups of patients that had spent weeks in the two extreme clusters (I and VI). It was not possible to make comparisons with all six clusters due to the small number of cases.

As the main interest was in abstinence all patients that had at least one week out of the 26 abstinent, and 1 to 25 weeks in cluster I or VI were selected. They were analyzed in relation to the number of weeks abstinent and also number of weeks in the other 5 remaining clusters. Figure 7.8 shows the differences between these two groups of patients. The most noticeable feature is that amongst the group of patients with weeks in cluster I (narrowest repertoire) the proportion of abstinent weeks was considerably greater than in the group with weeks with cluster VI (widest repertoire). Patients who had more than 21 weeks with cluster I were abstinent 85% of the remainder of the time, as against 50% of those with cluster VI. This difference was less dramatic for patients who had fewer weeks in these clusters but there is a clear tendency of the presence of cluster I pattern to occur with more abstinence.

Weeks in cluster I



Weeks in cluster VI

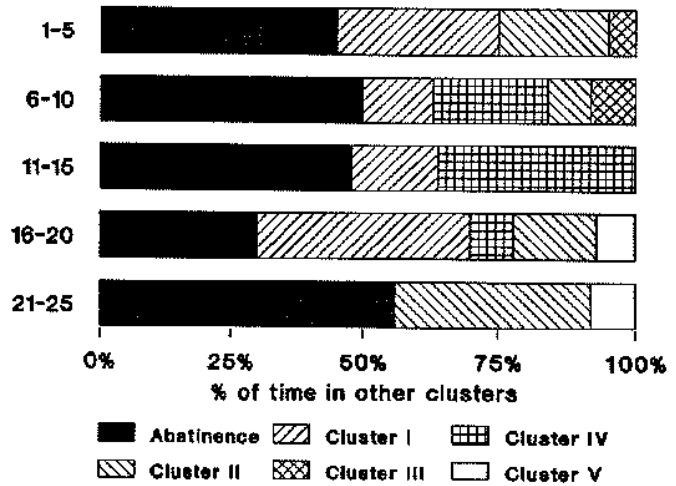


Figure 7.8 - Relationship of time abstinent and Clusters I and VI.

7.3E - Clusters of drinking repertoire and the severity of alcohol dependence

As the number of different drinking patterns that a patient could have was relatively small, it was possible to group the patients according to the main cluster that represented their behaviour during the 26 weeks. The criterion used was that when a patient had more than one cluster, he would be classified according to the cluster in which he spent most time during the period. Six groups of patients was created and the SADQ mean total score for each group was averaged. As shown in figure 7.9 the SADQ mean score for each group of patients representing each cluster tends to decrease for those groups that had a wider repertoire of drinking.

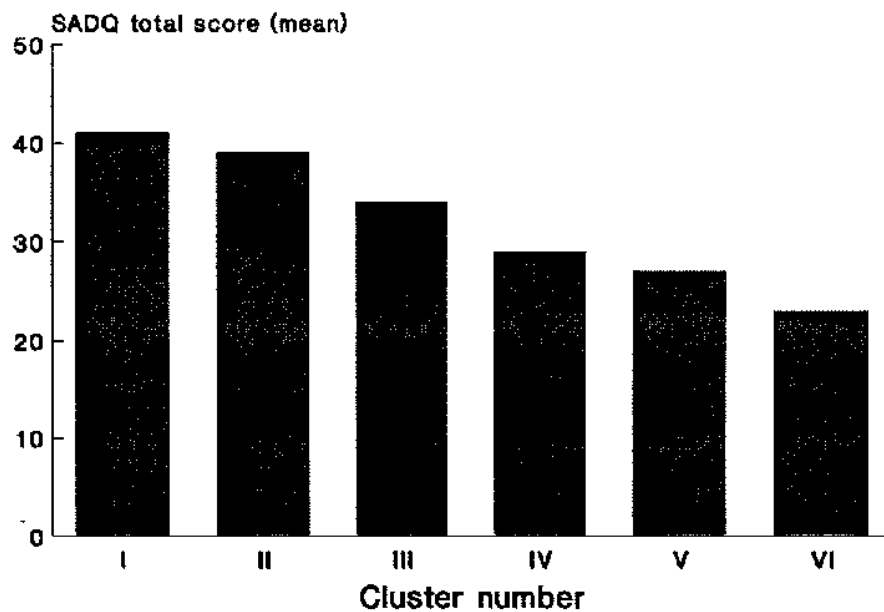


Figure 7.9 - Clusters of drinking repertoire and SADQ (n=202).

7.4 - Statistical Analysis and Results of the Inventory of Drinking Repertoire - (IDR)

In the previous section the drinking repertoire was analyzed in detail based on data from the interviews (DRI). This section analyses drinking repertoire based on a group of questionnaires (IDR) that have been discussed in detail in Chapter 3. The structure of the analysis of the IDR is presented following the same structure as that of section 7.2.

7.4A - Checking the responses patterns

The IDR, due to its characteristics in which there is a repeated pattern of questions within the five different scales, was potentially exposed to response sets (Spector, 1992). These are tendencies for subjects, irrespective of contents to respond to items systematically, in particular, acquiescence response set, that is the tendency to agree with items regardless of the content. This pattern of response could easily be identified if it happened because each scale had items with opposite content such as, for example 'First thing in the morning I have a drink' and 'I drink my first drink of the day in the evening'. A series of checks were initially run for each scale, in which the number of respondents agreeing with items with contradictory contents was assessed. No patients had a pattern of consistently answering contradictory items. Although in some of the scales there were some patients who answered more contradictory items than expected, when analyzed together no patients had a consistently contradictory answering pattern on all the scales.

7.4B - Item Analysis and Selection

The first part of the analysis of the scales was to assess the performance of the individual items. Each of the five scales was analyzed separately using SPSS-PC reliability routine and following the guidelines proposed by DeVellis (1991) and discussed in detail in section 7.2.

Item-scale correlations

The correlation matrix of the items of the five scales showed a variation of correlation coefficients from -.47 to .79. The majority of the items with negative correlations had negative wording and their scores were reversed for further analysis. The corrected item-total correlations had a wide variation from .003 to .740, the SMC also varied from .20 to .76. Three to four items were excluded from each scale because or they had coefficients lower than .3 for either the corrected item-total correlation or the SMC.

Item variances and means

All the above items that were excluded had also a poor performance in terms of variance and means. A couple of items of each scale were also excluded based on the criteria of low item variance or extreme means. The final version of the scales had 7 to 10 items, as can be seen in Table 7.19

Internal Consistency Reliability - Cronbach's alpha (α)

The values of Cronbach's alpha for the five scales with all the original items were reasonably high, varying from .82 to .89, indicating good levels of internal consistency. After the exclusion of the above items the alpha for each scale was still considered high, as shown in Table 7.17.

Table 7.17 - Internal Consistency Reliability - individual scales of the IDR (n=202).

Scales	Alpha
Typical Drinking Day	.82
Typical Drinking Month	.86
Last Six Months of Drinking	.85
After Two days without a drink	.78
After Two weeks without a drink	.82

7.4C - Factor Structure of the individual scales of the IDR

A Principal Component Analysis was carried out on each final version of the scales using SPSS-PC . A single factor accounted for most of the variance and was very similar for the five scales. Table 7.18 shows the percentage of variance of the main component and the Eigenvalue for each of the scales.

Table 7.18 - Principal Component Analysis - scales of the IDR (n=202).

Scale	Variance	Eigenvalue
Typical Drinking Day	41 %	4.09
Typical Drinking Month	47 %	4.70
Last Six Months of Drinking	43 %	3.86
After Two days without a drink	42 %	3.27
After Two weeks without a drink	47 %	3.42

There was a second small factor in all scales that accounted for 13-20% of the variance and with Eigenvalues varying from 1.2 to 1.5. However, when a Factor Analysis with Image extraction in Varimax and Oblimin rotation were tried it failed to produce a meaningful solution. A one-factor solution was adopted using items loading higher than .35 on the first factor, as shown in Table 7.19. All the items with negative wording which, for the Principal Component Analysis, did not have their scores reversed, had negative signs on the main factor.

Table 7.19 - Inventory of Drinking Repertoire - items and loadings on the Principal Component Analysis of the five scales

Scales	Loading
Typical Drinking Day	
1 - First thing in the morning I have a drink	.79
2 - I drink my first drink of the day at lunch time	-.72
3 - I drink my first drink of the day in the evening	-.67
4 - Within a couple of hours after my first drink in the morning I have to have another drink	.62
5 - I drink all day long	.70
6 - During the day I go without a drink for 4 or 5 hours	-.52
7 - I do all my drinking for the day in just a couple of hours	-.58
8 - Before I go to bed I have to have a couple of drinks	.58
9 - I go to bed without having had a drink in the last hour or so	-.56
10 - I wake up in the middle of the night to have a drink	.58
Typical Mouth of Drinking	
1 - I have had my first drink as soon as I woke up	.82
2 - I drank my first drink at lunch time	-.56
3 - I drank my first drink in the evening	-.61
4 - After my first drink in the morning, I had a few drinks within a couple of hours	.58
5 - I drank throughout the day	.78
6 - I went without a drink for hours	-.80
7 - I had a couple of drinks before I went to bed	.63
8 - I stopped drinking two or three hours before I went to bed	-.54
9 - I woke up in the middle of the night to have a drink	.66
Last Six Months of Drinking	
1 - I had a drink in the morning	.71
2 - I started drinking at lunch time	-.51
3 - I drank only in the evenings	-.60
4 - I drank from morning until night every single day	.82
5 - I stayed dry most of the time	-.67
6 - I had a few days completely dry	-.70
7 - I have gone to bed quite drunk almost every night	.63
8 - I stopped drinking two or three hours before I went to bed	-.54
9 - I have woke up in the middle of the night and have had a drink	.82
After Two Days Without a Drink	
1 - First thing in the morning I had a drink	.83
2 - I drank my first drink of the day in the evening	-.80
3 - Within a couple of hours after my first drink in the morning I had to have another drink	.82
4 - I drank all day long	.84
5 - I did all my drinking for the day in just a couple of hours	-.78
6 - Before I went to bed I had a couple of drinks	.77
7 - I woke up in the middle of the night to have a drink	.74
After Two Weeks Without a Drink	
1 - First thing in the morning I had a drink	.80
2 - I drank my first drink of the day in the evening	-.35
3 - Within a couple of hours after my first drink in the morning I had to have another drink	.72
4 - I drank all day long	.80
5 - I did all my drinking for the day in just a couple of hours	-.79
6 - I went to bed at night quite drunk	.68
7 - I woke up in the middle of the night to have a drink	.71

7.4D - Correlations of the IDR scales with the SADQ and SSADQ

In order to respond to two of the scales of the IDR, respondents need a period of two days and two weeks without a drink. Of the two hundred and two patients that have completed the "Long-form", eighty four had neither two days or two weeks without a drink during the period considered, and were unable to answer the two relevant scales. Therefore, the next analysis is based on one hundred and eighteen patients that answered all five scales.

A total score for each scale was created by adding up all the items, having reversed the items with negative wording. As Table 7.20 shows, all the total scores of the scales, except the Typical Drinking Day scale, had a high correlation with each other and with the total score of the IDR. Except for the marked correlations all the others were significant at $p < .001$. All individual scales and also the total IDR correlated significantly ($p < .001$) with the total score of the SADQ and SSADQ.

Table 7.20 - Correlations of the scales* of the Inventory of Drinking Repertoire, the SADQ and the SSADQ (n=118).

	DAYTOT	MONTOT	SIXTOT	AF2DAY	AF2WE	IDR	SADQ
DAYTOT							
MONTOT	.29						
SIXTOT	.17 ♦	.70					
AF2DAY	.26	.45	.46				
AF2WE	.22 ♦	.45	.52	.52			
IDR	.46	.83	.82	.72	.75		
SADQ	.24	.52	.63	.41	.52	.66	
SSADQ	.21 ◇	.58	.72	.41	.45	.66	.73

* Abbreviation of the Scales

Typical Drinking Day (DAYTOT)

Typical Drinking Month (MONTOT)

Last Six Months of Drinking (SIXTOT)

After Two days without a drink (AF2DAY)

After Two weeks without a drink (AF2WE)

Inventory of Drinking Repertoire (IDR) - Total score

♦ $p < .03$.

◇ $P < .01$.

The total scores of the individual IDR scales showed a good range of values. When all the five scales had the 42 items added up to form a total score of the Inventory of Drinking Repertoire (IDR) these scores showed an adequate spread along a continuum of severity, as can be seen in Figure 7.10.

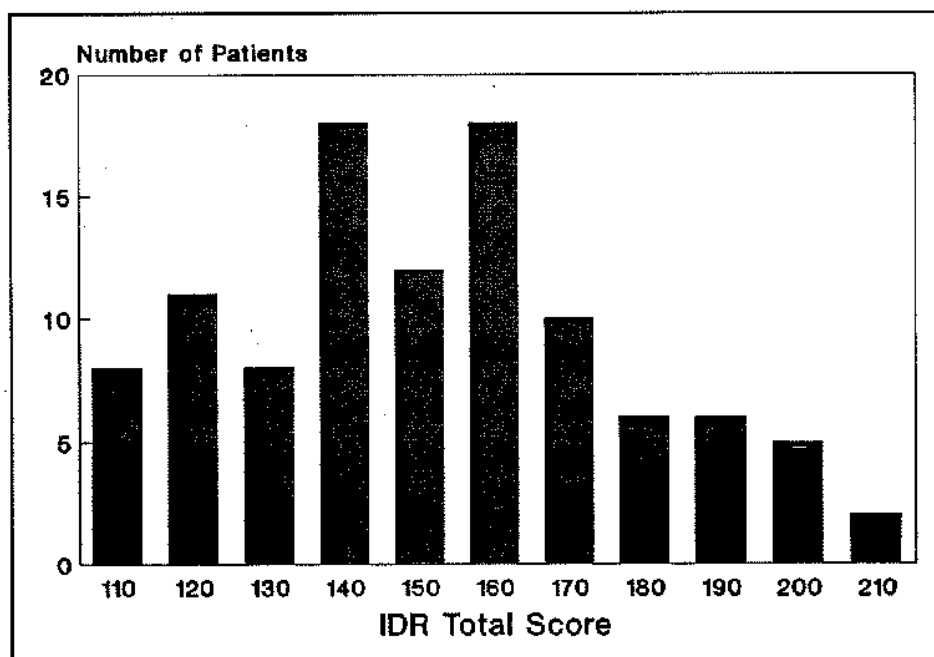


Figure 7.10 - Distribution of the total scores of the Inventory of Drinking Repertoire (n=118).

7.5 - Statistical Analysis of the Modifiers of Drinking Behaviour Questionnaire - (MDBQ)

Unlike the previous two questionnaires analyzed the MDBQ enabled the respondents to assess in more detail whether or not each item had occurred and also the intensity of its effect. As a consequence the item analysis was organised in two stages. In the

first stage there was an analysis of the frequency of occurrence of the items and then impact on drinking behaviour, and in the second stage an item analysis was performed as in the previous sections.

7.5A - Percentage of occurrence of the items

The first stage of the item analysis was to assess the frequency of occurrence for each item in a typical drinking month in the previous six months of drinking. The items showed a great deal of variation in terms of occurrence; some items had happened to fewer than 50% of the 202 patients. Table 7.21 lists the ten items that had the lowest frequency of occurrence. It shows how diverse those items were, varying from very specific ones such as 'When I have to look after my child' to very general ones such as 'When I am doing my hobby'. It also shows that these low frequency items were from every area covered by the questionnaire (Table 4.1).

Table 7.21 - Items of the MDBQ with low frequency of occurrence (n=202).

Items	Percentage of occurrence
- When I have to look after my child	37
- When I have to drive a car	46
- When I have fear of becoming unemployed	55
- When I just get sick of the drink, even the smell of it	57
- When I go to see my parents	60
- When I am doing my hobby	61
- When I am in the company of my wife/husband	64
- When I stay away hiding	65
- When I have a blackout	66
- When I fight not to drink	67

Table 7.22 lists the items that had the highest frequency of occurrence. This table shows that the items were also quite diverse, from very specific items such as 'When my stomach is unsettled' to very general ones such as 'When I keep myself busy'. These, too, came from every area represented in the questionnaire (Table 4.1).

Table 7.22 - Items of the MDBQ with high frequency of occurrence (n=202).

Items	Percentage of occurrence
- When I visit someone important	89
- When my stomach is unsettle	90
- When I have to do things that I have to remember exactly	91
- When I'm doing something pleasant	91
- If I have to sort things out	91
- When I have someone to talk to	91
- If I have to do something in a proper frame of mind	91
- When I keep myself busy	92
- When I don't feel well	92
- When I have no money at all	92

The next stage was to assess the influence that each item had on drinking behaviour. The fact that the situation represented in an item had happened was not evidence that had affected the respondent's drinking. One of the possibilities among the answers categories was that it could also have increased the drinking. A frequency analysis of the 'made me drink more' answer category showed that this possibility rarely occurred. Most of the 72 items of the questionnaire had frequencies of less than 5% in that category. The items that a had higher occurrence are shown in Table 7.23; they were from several of the areas of the questionnaire.

Table 7.23 - Items of the MDBQ with high frequency in the answer category 'made me drink more' (n=202).

Items	Percentage of occurrence
- When I am afraid of becoming unemployed	14
- When I have a hangover	19
- When I am in a strange place distant from home	21
- When I have pressures from close friends or relations not to drink	22
- After reactions of members of my family	25
- When I stay indoors	32

As the aim of the analysis was to identify situations that decreased drinking and as the answers to the category that made the person drink more were not very frequent, it was decided to collapse this category with the answer category 'did not happen to me' so as to eliminate it from the next analysis. A further analysis was then carried out to study situations that lead to a decrease in drinking. When the frequency of occurrence of each item was related to its impact in decreasing drinking behaviour, a complex

pattern appeared. Some of the less frequent items such as for example 'When I have to look after my child', when they happened, they were among the items that reduced drinking most. Table 7.24 list the items with highest influence on drinking. On the other hand, the opposite was also true; items that happened to many respondents, such as 'When I have someone to talk to', 'When my mind is preoccupied with something else' reduced drinking very little. However, as the main aim was to produce a multiple-item scale and not rely too much on single-item responses, we progressed with the analysis.

Table 7.24 - Items of the MDBQ with high influence on drinking behaviour (n=202).

Items
When I go to see my doctor
When drink wasn't available
When I'm doing a job where I'm not allowed to drink
When I visit someone important
When I fight not to drink
When I am expecting to see someone important
When I have to look after my child

7.5B - Item analysis and Selection

Item-scale correlations and item variances and means

The correlation matrix of the 72 items of the MDBQ showed a variation between a minimum of $-.06$ and a maximum of $.68$. The corrected item total correlations varied from $.22$ to $.78$ and the SMC from $.24$ to $.66$. Twenty items were excluded because they had coefficients lower than $.3$ for both indices and also poor performance in terms of item variances and means.

Internal Consistency Reliability

The Cronbach's alpha for the remaining 52 items was .93, with most of the items having higher than .3 in terms of corrected item-total correlation and SMC. One important aspect at this stage was a certain asymmetry between the areas in terms of number of items. As the Cronbach's alpha value was very high for the scale it was possible and appropriate to reduce the number of items even further. The best five or six items in each area were chosen; this created the final version of the questionnaire with 27 items (Table 7.26). In this latest version, the corrected item-total correlation and the SMC were all higher than .36, and the Cronbach's alpha was .91.

7.5C - Factor Structure of the MDBQ

A Principal Component Analysis was carried out using SPSS-PC on the twenty seven items of the final version of the questionnaire. It extracted six factors with the variances and Eigenvalue as shown in Table 7.25. All the items loaded in the range of .44 to .74 on the first factor (Table 7.26).

Table 7.25 - Variance and Eigenvalues of the PCA of the MDBQ (n=202)

Variance	Eigenvalue
1 - 35.0%	9.48
2 - 7.6%	2.05
3 - 5.5%	1.49
4 - 4.8%	1.29
5 - 4.1%	1.09
6 - 3.8%	1.01

A Factor Analysis was carried out with Maximum Likelihood as extraction and Varimax as rotation. The analysis with five or six factors failed to present interpretable factors and the scree test criteria suggested that four as a more appropriate number. A four factor solution was adopted and accounted for 45.3% of the variance. The four factors were readily interpretable by item content and are shown in Table 7.26. The first factor had eleven items with loadings higher than .35. These were items mainly related to two areas namely 'Environmental Demand' and 'Social

Pressure'. This factor clearly reflects environmental demands related to daily activities and in interpersonal contacts as a form of constraint to drinking. The second factor, reflects cognitions used to regulate alcohol consumption. The third factor has items representing symptoms of intoxication from alcohol and minor physical complaints. The fourth factor involves the constraints to the availability of drink in terms of the money and places for drinking.

Table 7.26 - MDBQ - loadings in the PCA and Factor Analysis

AREAS	Loading PCA	F I	F II	F III	F IV
ENVIRONMENTAL DEMAND					
- When I have to be fit to work	.45	.35			
- If I have to do something in a proper frame of mind	.75	.64			
- When I have to deal with money	.70	.66			
- If I have to sort things out	.68	.64			
- If I have to do something constructive	.72	.69			
- When I have to do things that I have to remember exactly	.74	.55			
SOCIAL PRESSURE					
- When I am with people who are not drinking	.67	.50			
- When people come around to visit me	.60	.50			
- When I am in the company of my family	.62	.39			
- When I am expecting to see someone important	.60	.62			
- When I go to see my doctor	.48	.42			
PERSONAL COPING					
- When I have to force myself to stay dry	.51	.38	.44		
- When I intend to make an effort to stay dry	.48		.70		
- When I said to myself "I wont drink today"	.66		.52		
- When I fear that I cause my body too much harm	.67		.68		
- When I fight not to drink	.54		.65		
INTOXICATION - PHYSICAL SYMPTOMS					
- When I get too drunk	.43			.54	
- When my stomach is unsettled	.52			.63	
- When I'm topped up	.53			.35	
- When I try drinking but I vomit	.48			.52	
- When I'm so drunk that I can't put things together	.51			.52	
- When I have a headache	.57			.41	
AVAILABILITY					
- When I have no money at all	.41				.52
- When I need the money for something more important	.61				.43
- When I am not in the places where I usually drink	.55				.55
- When my money is getting low	.63				.69
- When drinking isn't available	.55				.52

7.5D - Correlations of the MDBQ total score with the IDR, SSADQ and SADQ

As the Principal Component Analysis showed one major dimension on which all the items loaded highly in addition to the four extracted factors, and there was an intention of having a general measurement of the questionnaire, a total score of the questionnaire was created as the sum of the 27 items. Figure 7.11 shows a histogram of the distribution of this total score, showing a wide range of values.

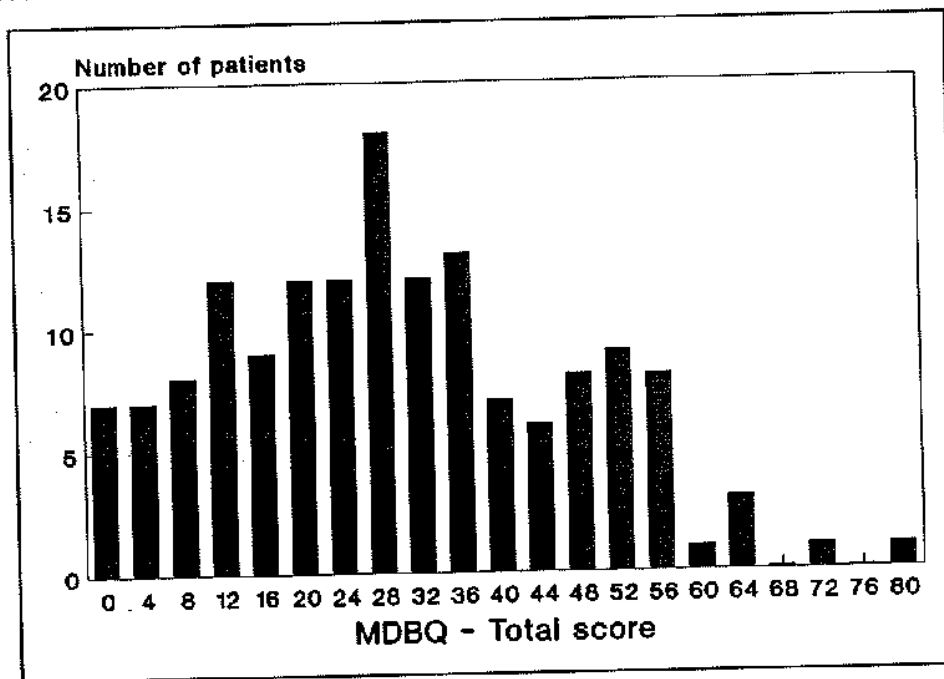


Figure 7.11 - Distribution of the Total Score of the Modifiers of Drinking Behaviour Questionnaire (n=202).

The MDBQ total score correlated at significant levels with the total scores of the IDR, SADQ and SSADQ (Table 7.27). In relation to the individual scales of the IDR the MDBQ correlated at significant levels ($p < .001$) with the MONTOT, SIXTOT and the total of the IDR, but was non significant with the DAYTOT scale.

Table 7.27 - Correlations of the MDBQ with IDR, SSADQ and SADQ (n=202).

Scales	MDBQ total score
DAYTOT	-.01 (n.s.)
MONTOT	-.40
SIXTOT	-.43
AF2DAY	-.32 (p < .003)
AF2WE	-.32 (p < .003)
IDR	-.41
SADQ	-.32
SSADQ	-.41

7.6 - Statistical Analysis of the Alcohol Withdrawal Scale - (AWS)

In this last section of the results a statistical analysis of the AWS will be presented, following a similar sequence to the previous analyses. At the end, the correlation of the several elements of the ADS measured in this project in the form of questionnaires (SSADQ, IDR, MDBQ and SADQ) will be compared.

7.6A - Checking the response patterns

As discussed in Chapter 5, the Alcohol Withdrawal Scale (AWS) had for each symptom two answer categories, where one category assessed the frequency of the symptom and the other its intensity. An initial analysis was conducted examining the frequency with which each symptom happened in a typical month of drinking. Only 10 symptoms occurred in less than 80% of the patients as shown in Table 7.28.

Table 7.28 - Less frequent alcohol withdrawal symptoms (n=202).

Items	Percentage of Occurrence
- See strange objects	34
- Hear funny noises	45
- Difficulty in breathing	58
- Light hurts my eyes	58
- Chest pains	63
- Muscle cramps	69
- Indigestion	72
- Dizziness, can't stand up	74
- Think people are against me	75
- Headaches	78

There was a high correlation between frequency and severity for each of the symptoms, with a minimum of .70 and a maximum of .91, with a mean correlation of .82. This high correlation between the two levels of answer categories showed that it would be possible to combine the two levels of measurement. New indices were created by the product of the frequency and severity of the symptoms and the following analysis is based on them.

7.6B - Item Analysis and Selection

Item-scale correlations and item variances and means

The inter-item correlation of the AWS showed a variation from a minimum of .13 and a maximum of .78. The corrected inter-item correlation varied from .26 to .82 and the SMC from .22 to .78. Ten items were excluded because they had coefficients lower than .3 for both indices and presented poor variances and item means. After these exclusions all the items presented corrected item-total correlations and SMCs higher than .45.

Internal Consistency - Cronbach's alpha (α)

The values of Cronbach's alpha for the initial scale was .96 and after the exclusion of the 10 items it became .95.

7.6C - Factor structure of the AWS

A Principal Component Analysis was carried out on the remaining 22 items. Four factors were extracted that accounted for 64.3% of the variance (Table 7.29). Before rotation all the items had loadings greater than .43 on the first factor.

Table 7.29 - Variance and Eigenvalues of the AWS (n=202).

Variance (%)	Eigenvalue
43.9	9.65
7.9	1.74
6.8	1.49
5.7	1.23

A Factor Analysis was carried out using Maximum Likelihood as extraction with a Varimax rotation that produced a four factor solution that were readily interpreted (Table 7.30). Factor I was mainly related to the main symptoms of alcohol withdrawal and was labelled 'Withdrawal Disturbances'. Factor II had a majority of physical symptoms and was labelled 'Physical Disturbances'. Factor III had only affective symptoms and was labelled 'Affect Disturbances'. Factor IV had only three items related to psychoperception and was labelled 'Psychoperceptual Disturbances'. Each of the four factors was considered as a separate scale and internal consistency reliability coefficients calculated. The aim of having each factor as an independent scale was to assess its relevance in the relation to the other questionnaires. Table 7.30 shows the factor loadings, Eigenvalues, variances and Cronbach's alpha for each factor. A Principal Component Analysis and Factor Analysis was carried out, based separately on the frequency and severity of the symptoms of the AWS separately, and showed similar results.

Table 7.30 - Factor loadings, Eigenvalue and Cronbach's alpha of the AWS (n=202).

SYMPTOMS	F I	F II	F III	F IV
Sweating	.56			
Bad sleep	.56			
Craving	.61			
Hands shaking	.81			
Shaking inside	.66			
Whole body shaking	.60			
Nausea		.61		
Dizziness		.64		
Headache		.45		
Light hurt the eyes		.52		
Vomit		.60		
Chest pain		.60		
Difficulty in breathing		.67		
Irritable			.59	
Tired			.52	
Guilty			.55	
Angry			.59	
Think people against me			.59	
Anxious			.55	
Nightmares				.47
Hear funny noises				.70
See strange objects				.89
Eigenvalue	3.62	3.22	2.87	1.91
Percentage variance	16.0	14.0	13.0	8.6
Cronbach's alpha	.88	.86	.82	.83

Two hundred and two patients completed the scale. These 22 items were added up to form a total score of the AWS. The four subscales of the AWS that represented the four factors extracted correlated highly with each other and with the AWS total, all significant at $p < .001$ (Table 7.31). As figure 7.12 shows, the total score of the scale had a distribution along a continuum.

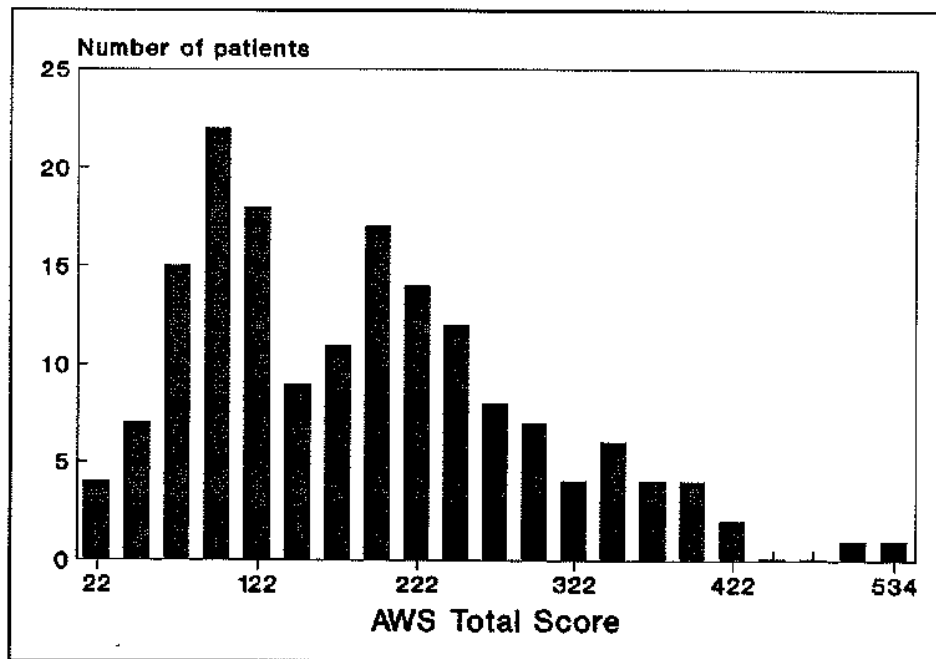


Figure 7.12 - Distribution of the total score of the AWS (n=202)

7.6D - Correlations of the AWS with the IDR, MDBQ, SSADQ and SADQ

In this final section the correlations of the AWS with the other questionnaires are presented (Table 7.31). The total score of the AWS correlated strongly with the other questionnaires at significant levels, with $p < .001$. Even the SADQ, when had its items related to withdrawal symptoms eliminated, also correlated strongly with the AWS. Some of the individual scales of the IDR (DAYTOT, AF2DAY and AF2WE) had relatively low correlations, but they were significant at $p < .001$. The correlations of the four subscales of the AWS with the other questionnaires were relatively similar with most reaching significant levels. However, there is a tendency for the 'Affect

'Disturbance' factor in correlate at lower levels than the other AWS factors subscales in particular with the correlations with the IDR scales.

Table 7.31 - Correlations of the AWS with IDR, MDBQ, SSADQ and SADQ

Scales	AWS Total	'Withdrawal'	'Physical'	'Affect'	'Psychoperceptual'
AWS Total		.90	.86	.84	.72
'Withdrawal'			.67	.67	.58
'Physical'				.58	.59
'Affect'					.51
'Psychoperce'					
DAYTOT	.28	.21	.33	.14 ♦	.29
MONTOT	.45	.50	.38	.24	.35
SIXTOT	.65	.68	.53	.45	.48
AF2DAY	.30	.30	.20 ◇	.10(ns)	.32
AF2WE	.31	.36	.23 ◇	.16 ♦	.29
IDR	.57	.58	.46	.31	.48
SADQ	.75	.75	.60	.60	.56
SADQ*	.70	.73	.57	.54	.59
SSADQ	.70	.75	.51	.56	.50
MDBQ	-.39	-.40	-.36	-.24 ◇	-.26 ◇

SADQ* - without the items 1-8 (physical and affective withdrawal)

◇ $p < .01$; ♦ $p < .06$

Chapter 8 - Discussion

Chapter 8 - Discussion

The aim of this thesis was to contribute to the validation of the Alcohol Dependence Syndrome (ADS) by improving the measurement of four of its elements; namely, subjective awareness of compulsion to drink, drinking repertoire, salience of drink-seeking behaviour, and alcohol withdrawal symptoms. This has involved an explicit methodological critique of previous attempts at measurement which often relied on a single item to assess the complexity of behaviour and psychometric aspects of these elements. The structure of this discussion chapter follows six main headings.

The first section discusses the sample used in the study and compares the socio-demographic and drinking behaviour characteristics with previous clinical studies of alcohol dependent patients. The second section discusses the method used to assess the element subjective awareness of compulsion to drink, the results of the statistics used, how the data helped to expand previous descriptions, and the relationship of this element to the other elements of the ADS. In the third section the two methods used to measure drinking repertoire are evaluated in terms of their methodology, how the description of the element has been expanded, and the evidence for its high correlation with the other elements of the ADS. In the fourth section the method used to measure salience of drink-seeking behaviour in the form of modifiers of drinking behaviour is assessed in terms of its structure and contribution to the validity of the ADS. In the fifth section the element alcohol withdrawal symptoms is assessed in terms of its factor structure compared to previous studies, and its correlation with the other elements of the ADS. The sixth section summarises and discusses the contributions of the new questionnaires to validation of the construct and to the diagnosis and classification of the ADS.

8.1 - The Sample used in the study

The first question to be answered about this study is whether the sampling procedure used achieved a balanced group of alcohol dependent patients. As in the case of most studies with clinical populations of alcohol dependent patients, this study used a selection process based on a convenience sample of individuals attending clinical facilities. This kind of sample selection seems to produce a similar pattern in most studies of clinical samples. They have a similar composition in relation to socio-demographic characteristics, previous drinking behaviour and distribution of severity of alcohol dependence (Edwards et al, 1977; Polich and Armor, 1980; Chick, 1980; Skinner, 1981; Hesselbrock et al, 1983; Chick et al, 1988; Drummond, 1990; Caetano, 1990; Babor et al, 1992). The sample description in Chapter 7 clearly suggests that the main socio-demographic characteristics of age, male/female ratio, family status, employment, and previous involvement with treatment were in accordance with the above cited studies.

The design of the study took particular care to avoid over-sampling chronic patients in terms of drinking behaviour and severity of dependence. Several indicators suggest that the sample had reasonable variation on those variables. As the data about drinking behaviour were assessed in great detail in the interview it was possible to show this variation. The sample had a great variety of drinking behaviours on three main variables; number of months drinking regularly in the morning (Figure 7.1), drinking in the previous two years (Table 7.4), and in a recent typical drinking day (Figure 7.2 and Table 7.5). The measurement of dependence by the SADQ also showed a large degree of variation although, as expected in a sample attending clinical facilities, there was a tendency towards greater severity of dependence (Figure 7.3).

The study sample was contacted through different clinics in order to increase the diversity of the patients. Although each of the clinics that formed part of the study may have contributed a particular group of patients, overall the distribution was similar to that of most other studies of clinical populations. The fact that a large sample was used certainly reduced the possibility of any particular bias that the clinics may have

had. Another important aspect of the sample selection was the good response rate by the patients and the relatively low number of refusals and non-respondents. Altogether the characteristics of the sample showed that the sampling procedure successfully achieved a balanced group of alcohol dependent subjects.

8.2 - The Subjective Altered State and the Validation of the ADS

In Chapter 2 the evolution of ideas concerning the subjective aspect of dependence on alcohol was discussed. Previous attempts to measure this element using a single-item approach and without a clear theoretical link with the concept of ADS did not produce any advance in terms of measurement. The new questionnaire, Subjective Severity of Alcohol Dependence Questionnaire (SSADQ) is a more empirically generated construct, based on the learning theory basis of the ADS, and using a larger number of items. Three aspects of the measurement of this element need to be discussed. First, how the method used in the study improved its phenomenological description. Second, the assessment of evidence of the dimensionality of the subjective altered state and its theoretical significance. Third, how this new measurement of the subjective altered state contributes to the validation of the ADS.

The method used during the pilot study to generate the SSADQ items involved an hypothetico-deductive approach combining a detailed pilot study with patients and a theory that linked the concept of expectancy to the alcohol withdrawal symptoms associated with dependence. The pilot study showed that the subjective element was a complex phenomenon that had at least seven areas (Table 2.2). The areas identified clearly had what in psychometric terms is called face validity, i.e. their meaning was related to the concept of dependence and in particular to expectations about withdrawal symptoms. The items were regarded by the patients as relevant and apparently representative of the construct. They were relevant because all of them were within the domain of subjective experience related to the use of alcohol; in particular they included three areas clearly linked to withdrawal symptoms. They were representative because the items represented or reproduced in reasonable proportion and balance the

essential characteristics of the relevant universe of items identified by the pilot study.

The advantage of this process of item generation was that it allowed the subjective element to be expanded beyond the descriptions of loss or impairment of control, compulsion to drink, and craving as previously employed, and without using these technical terms. Indeed, during the pilot study very few patients spontaneously referred to these ideas to describe their experience. When queried they tended to explain their experiences without relying on these technical terms. This tendency to use non-technical terms to describe subjective experience is clearly seen in the seven areas identified in the study. The areas also gave a wider coverage to the construct without focusing on specific symptoms, unlike previous descriptions which tended to delimit this element to a small number of criteria. For example, in the original description Edwards and Gross (1976) concluded that the key subjective experience could be described as a compulsion to drink. Edwards et al (1976) in a WHO document described this element in more detail as having three components (impairment of control, craving, and drink-centredness). More recently the ICD-10 adopted a combination of two criteria: 'a strong desire or sense of compulsion to take the substance' and 'difficulties in controlling substance-taking behaviour in terms of its onset, termination, or levels of use'.

The main limitation of these definitions and descriptions is that they were not empirically based and they focused on a few symptoms, such as compulsion, craving and loss of control, which, despite having an accurate theoretical meaning, lack clear criteria for measurement. The best way to improve measurement of this element is not just to propose a theoretical description but also to develop a research design to test the theory so that measurement can be improved in the light of research. To this end research in the present study focused on the development of an explicit theory of the subjective element of the ADS based on expectancies and a research design to test the theory. As far as the assessments of subjective states in psychopathology are concerned, the research coincides with the suggestion recently made by van Praag (1992). He suggested that the best way to improve measurement of the subjective element in psychiatry would be through a sustained attempt to expand and refine

diagnostic concepts and corresponding psychometric instruments. One consequence of this more empirically based description of the subjective element of the ADS is that the original name, subjective awareness of a compulsion to drink, becomes inaccurate. A better name chosen from among those already in use is subjective altered state, as in the WHO (Edwards et al, 1976) document. This describes the experience and the essence of the phenomenon without making specific assumptions about psychopathological mechanisms.

Though closely linked, the seven areas identified are different components of a unidimensional construct. Statistical analysis of the items of the SSADQ presented convincing evidence that the original pool of items were all measuring the same subjective altered state. Several factors contributed to the strength of the statistical analysis. The combination of a comprehensive and large item pool representing the subjective altered state and a suitable number of respondents to the questionnaire (420 respondents to 100 items) allowed a fruitful analysis. The analyses of the original 100 items pool by different statistical methods showed that the items correlated highly with each other and that they had excellent internal consistency, as measured by the Cronbach's alpha. Despite the great reduction in the number of items in order to make the questionnaire more convenient to use, the analysis of the final 28 items still revealed the same high level of internal consistency.

As would be expected in a questionnaire with such high levels of internal consistency, the seven areas correlated highly with each other (Table 7.8). One possible criticism of this high correlation among the areas would be that, due to the high level of internal consistency, the areas described were artificially identified and there was really only one large area representing the construct. However, as shown in Table 7.8, there were differences in the levels of correlation between the seven areas, which were distinctive enough to suggest that they were assessing different features of the construct. For example, the area 'Difficulty in stopping drinking once started' had proportionally lower correlations with the other areas. Therefore, the areas were assessing different expectancies related to subjective experience with alcohol. It can also be seen that three of the seven areas were directly linked to expectations related to withdrawal

symptoms, whereas the remaining four were related to different but correlated areas of subjective experience.

While the areas of the subjective altered state offer possible components of the construct, the dimensionality can only be properly demonstrate by a multivariate technique. Principal Component Analysis was the technique of choice because it can empirically demonstrate that the interrelationships among items are consistent with the theoretical internal structure of the construct. The results convincingly showed that a single factor structure represented the data, and that it accounted for a large percentage of the variance at a level similar to other questionnaires measuring dependence (SADQ, SADD). This one factor solution on the PCA (Table 7.9) and the fact that the scale created by the 28 items of the SSADQ (Table 7.10) yielded a total score with adequate variability along a continuum, suggests that this group of items was measuring a subjective altered state construct.

The demonstration of the unidimensional structure of the subjective altered state provides important support to the theory of the ADS construct. It shows that a group of expectancies about alcohol and its withdrawal symptoms is a unidimensional construct which can be assessed by a questionnaire with good psychometric properties. However, the analysis of the structure of the questionnaire does not show how closely these expectancies are related to other aspects of the ADS. The next step was to assess the relation of the SSADQ with other measures of the ADS construct to evaluate by correlational analysis how much it is related to the other elements. Several lines of evidence showed that it is intimately related to the ADS. The total score of the SSADQ was compared with the total score of the SADQ and showed a correlation of .73 ($p < .001$). Moreover, when each of the individual areas of both questionnaires were assessed (Table 7.11) there was a remarkably high correlation between them. The high correlation occurred not only between those areas of the two questionnaires that were similar, such as between the 'Need' area of the SADQ and all areas of the SSADQ. Moderate to high correlations were also found for all areas of the SADQ, and in particular for the SADQ total score with all areas of the SSADQ.

Although the SADQ has been widely used and has become almost a standard against which all new instruments measuring alcohol dependence have to be compared, it cannot be taken as an absolute measure of the ADS construct. The main reason for this is that it measures only three of the seven ADS elements. A more theoretical approach in relation to the dependence construct requires assessment of the interaction between the SSADQ and the other elements of the ADS. Central to the ADS theory is the notion that the subjective element is related to the behaviour and psychobiological components of dependence. When the SSADQ was evaluated for its correlation with the behavioural aspects of dependence as represented by the total score of the Inventory of Drinking Repertoire (IDR) it revealed a substantial correlation of .66 ($p < .001$) (Table 7.20). Similar levels of correlation were found with all the individual scales of the IDR, the exception was the Typical Drinking Day scale, which correlated at .21 ($p < .01$). These high correlations of the individual scales and the total scores of the IDR suggest a very close relationship between patterns of drinking behaviour and the subjective element of the ADS.

There has been a tendency for studies assessing expectancies about alcohol to evaluate their association with actual drinking behaviour. The results show that they are closely related (Connors, 1986; Connors et al, 1987; Stacy, Widaman & Marlatt, 1990). The high correlations between the group of expectancies associated with alcohol dependence (SSADQ) and the drinking behaviour (IDR) give additional support to this association. Furthermore, as the models on which the two questionnaires were based made explicit the influence of the withdrawal symptoms on the cognitive and behavioral components of the ADS, the results also support the hypothesis that the withdrawal symptoms may be an intervening variable common to the behavioral and cognitive components of the ADS.

Further support for the association of the SSADQ and the withdrawal symptoms was given by its correlation with the total score of the Alcohol Withdrawal Scale (AWS) which was .70 ($p < .001$) (Table 7.31). This high correlation between the withdrawal symptoms and the cognitive element of the ADS indicates that there may be a basic learning mechanism involving both elements. The correlational analysis cannot be

taken as confirmation of causality. However, the combination of the design of the SSADQ which was based on the influence of withdrawal symptoms on the creation of expectancies, and this high correlation between the two questionnaires provide evidence for a common factor operating among these two elements of the ADS.

In a more detailed analysis of the contribution of the individual group of withdrawal symptoms to the expectancies represented in the SSADQ, a complex pattern emerged, (Table 7.31). On the one hand all four factors identified in the AWS analysis showed a high correlation with the SSADQ, suggesting that most of the symptoms may play a role in the development of the subjective experience. On the other hand the 'Withdrawal Symptoms' factor had the highest correlation of all with .75 ($p < .001$). This group of symptoms has been associated previously with higher alcohol consumption and frequency of drinking (Hershon, 1977; Hesselbrock, 1983). The present study not only confirms that this group of symptoms has the highest correlation with other behaviours associated with alcohol dependence, but it particularly correlated with the cognitive aspect of the ADS in the form of the SSADQ.

However, it is important to stress that the four factors of the AWS correlated at high levels with the SSADQ, indicating that, despite differences of intensity, they all correlated significantly with the subjective experience. Even the 'Psychoperceptual Disturbances' factor that has not traditionally been considered as involved in the learning process of the ADS, had a correlation of .50 ($p < .001$). Indeed in the early description of the ADS by Edwards and Gross (1976), or in more recent ones such as the DSM-IV and ICD-10, these symptoms are not considered relevant to the ADS. A more detailed discussion about this finding is presented in section 8.5.

The SSADQ also correlated at a moderate level of $-.41$ ($p < .001$) with the Modifiers of Drinking Behaviour Questionnaire (MDBQ) (Table 7.27). This fact has a quite different relevance to the theory and validation of the ADS because the design of the MDBQ was different to that of the other questionnaires. Four of the five questionnaires had withdrawal symptoms in their items (SADQ, AWS) or in the theoretical model of their design (SSADQ, IDR). The MDBQ on the other hand focused on

variables which could deter drinking by environmental pressure, cognitive mechanisms, physical symptoms or availability influence. This negative correlation between these two different elements support the idea that they were assessing different but related aspects of the ADS. The theoretical implication is that it suggests that the mechanisms involved in the ADS goes beyond the withdrawal symptoms and related phenomenon. Adaptive mechanisms involved in dependent drinking play also a part on the description of the ADS.

8.3 - Drinking Repertoire and the validation of the ADS

As has been discussed in Chapter 3 the drinking repertoire is one of the elements of the ADS that is more difficult to measure. It is particularly unsuited to the excessive oversimplification of a single-item approach in questionnaires, or an assessment based only on quantity and frequency of alcohol consumed. In this thesis an expanded model of drinking behaviour was proposed (Chapter 3, section 3.9) in which previous assumptions about drinking repertoire were made more explicit. The discussion that follows reviews the evidence from the two measurement used and shows how effectively the expanded model was assessed by these two methods. This is followed by a discussion of the way in which this improved measurement of repertoire and its relationship with other elements of the ADS contributes to the validation of the ADS.

Three main aspects of the research presented in this thesis concerning drinking repertoire contribute to making its measurement convincing. First, the model makes much more explicit the components of drinking behaviour that theoretically have to be measured, compared to earlier ideas based on the original description of narrowing of drinking repertoire by Edwards and Gross (1976). These components are based on a theory of the ADS in which drinking to relieve withdrawal symptoms is a key factor. The great attraction of the proposed model of drinking repertoire is that it brings together several components other than quantity and frequency of drinking, and takes into account the influence of the withdrawal symptoms. Second, unlike the original description which did not attach a time reference to the phenomenon of the drinking

repertoire, but presented it as a general narrowing tendency of the drinking behaviour over the period in which dependence progressed, the model of drinking repertoire presented here makes explicit a specific period of time over which the behaviour is to be evaluated. The practical importance of this time-reference is that it allows a more precise measurement. Third, the model was tested by a combination of interview data and questionnaire, which allowed a comprehensive assessment of the behaviours involved and made possible different forms of comparison with other variables and questionnaires.

The Drinking Repertory Interview (DRI), the structured interview used for data collection, had similarities and differences with previous instruments. The similarities are that it used many techniques to improve reliability and validity that have been used and developed by previous authors. The structure of the data collection was especially designed to improve subject motivation, and to facilitate the clarity of the task and the cognitive process, specifying in particular the period of assessment of the behaviour. The difference from previous studies was the use of an explicit model of drinking behaviour which was theory driven and made a commitment to target specific components of drinking behaviour, with four variables to be assessed for each week (number of drinking days, morning drinking, spread of drinking, and quantity of alcohol consumed). This combination of careful interview technique, detailed focus on the drinking behaviour based on a distinct set of four variables and a time period of a week as a unit of assessment, greatly improved the strength of the method.

One finding of the early analysis of the interview data which demonstrated the strength of the method was the identification of 146 different patterns of drinking amongst the 202 patients interviewed. One of the risks of using a new method to categorise drinking behaviour in a population of heavy drinkers is that it might identify only a small number of patterns due to a ceiling effect. However, the method used was capable of identifying these large numbers of different patterns of drinking, showing great discriminative power. It was not necessarily expected that the method would identify a great diversity of patterns within each individual. The fact that 82.5% of the patients had only one or two patterns showed that the individual patient had a tendency

to keep to a stable pattern of drinking over the period considered. An alternative explanation is that the relatively short period of 26 weeks was not long enough to identify changes in drinking patterns over time. Therefore, the information for the individual cannot show the narrowing of repertoire over time but can show how narrow the actual repertoire is over this period of 26 weeks.

If the first stage of the analysis showed the discriminative power of the method, the next stages brought the interview data under sharp scrutiny. The transformation of the categorical system of scores for each week to a continuous system through a canonical correlation can be considered as a successful first step. It showed the ability of the method to identify values for each variable, and in particular for the total score for each week which ranged along a clear continuum of severity (Figure 7.6). This finding indicates that the combination of the method of data collection and the statistics used was able to distinguish patterns of drinking behaviour as a continuous variable.

The determining test of the expanded model assessed by the interview was done by the identification of the six clusters of drinking behaviour (Figure 7.7) in which the four variables were combined in a meaningful way. The clusters convincingly identified a range of drinking patterns that varied from a very narrow repertoire (cluster I) to a wider repertoire (cluster VI). This progression can be more easily seen when considering only the sequence of clusters I, III, IV and VI. They showed a very clear increase in the canonical scores of the four variables, representing a widening of the repertoire. All four variables progressed steadily from a narrow repertoire and low canonical scores (cluster I) to a wide repertoire and high canonical scores (cluster VI). This progression of scores shows that the four variables were equally able to vary along a continuum within the clusters. Moreover, it also shows that the four variables were related to each other, so that the lower the frequency of morning drinking (higher canonical scores), the lower the frequency of the spread of drinking, of the amount of alcohol consumption and of the number of drinking days.

The importance of the identification of this sequence of drinking behaviour is worth emphasizing. It empirically reveals that, within a pool of patterns of drinking behav-

jour of a group of alcohol dependent individuals, their behaviour within drinking weeks can be grouped according to a progression of severity based on four different behaviour variables. The orderly progression of the behaviour patterns and the fact that they were empirically derived make the findings convincing. On the clinical side this sequence shows that, within this pool of weeks, morning drinking, spread of drinking, alcohol consumption and frequency of drinking are interlinked. As the number of drinking days in a week increases, there is also an increase in quantity consumed, in morning drinking and in the spread of drinking in that week.

The other two clusters identified (clusters II and V) are not so straightforward to interpret, and introduce some noise into the system. They have a less congruent sequence of values for the four variables. Cluster II has high frequency of morning drinking but proportionally lower spread of drinking, alcohol consumption and drinking days. Cluster V has no morning drinking, with relatively high frequency of spread of drinking, alcohol consumption and drinking days. However, these two clusters represented a very small number of weeks; indeed they were the clusters with the lowest numbers of weeks (16 and 11 respectively) out of 325 analyzed. As they were relatively rare among the patterns identified and represent a kind of drinking behaviour not very often found clinically, it is fair to consider them as unstable patterns of drinking present in the sample. They were possibly transitional patterns which the patients may have used for a short period before embarking on one of the other four patterns identified.

The data analysis discussed so far shows that the interview was able to identify a clear continuum of drinking patterns and brings the idea of the drinking repertoire closer to the model proposed. Even stronger support for the notion of repertoire emerged when the six clusters of drinking behaviour were used to represent the actual behaviour of the patients and the severity of their alcohol dependence as measured by the SADQ. Figure 7.9 shows that when the drinking behaviour of the patients was grouped according to their main pattern of drinking, the six clusters formed a sequence from high to low scores on the SADQ. This sequence of narrowing of repertoire according to degrees of dependence measured by the SADQ confirms the strong basis of the

chosen method of measuring the behavioral component of the ADS. It shows that these clusters of drinking behaviour were meaningfully related to severity of dependence.

An analysis was carried out to show the relation between the identified clusters of drinking behaviour and patterns of abstinence. The specific aspect of the model of repertoire to be assessed was whether, as the repertoire narrows, the behaviour presented by the patient is reduced to only two patterns, heavy drinking or abstinence. Figure 7.8 suggests that there is a tendency for the narrow repertoire represented by cluster I to have relatively more abstinence when compared to the wide repertoire of cluster VI. However, the interview data were not designed specifically to examine this particular phenomenon. The results can only be interpreted as suggestive, in particular because the way in which the information about these clusters was organized did not allow significance tests to be carried out on the data. This interesting exploratory analysis needs further research in order to produce more definitive data.

In addition to the interview method, a questionnaire was designed to measure drinking repertoire, the Inventory of Drinking Repertoire (IDR). Unlike the interview, the IDR, used several time reference periods so that each of the five scales represented a specific period which was assessed along the flexibility/rigidity continuum. A low score on each scale indicated that drinking repertoire was flexible, meaning that there was no rigid pattern of drinking, whereas a high score meant a more rigid pattern of drinking behaviour. Statistical analysis consistently identified a unidimensional structure in the five scales, showing that the continuum of drinking repertoire could be identified over different periods of time. The main evidence for the identification of this unidimensional flexibility/rigidity was that Principal Component Analysis showed that each scale had a single principal component accounting for 41-47% of the variance (Table 7.18). The scales also possessed good internal consistency as measured by coefficient alpha (Table 7.17), and their total scores varied along a continuum of severity.

As each scale represented one particular aspect of the drinking repertoire it was expected that each one would correlate at least moderately with every other as an indication that they were assessing similar phenomena. All scales except the Typical

Drinking Day scale had moderate to high correlations, significant at $p < .001$, with every other scale, with values between .45 and .70 (Table 7.20). All of them correlated highly, between .46 and .83, with the total score of the combination of the five scales in the form of the IDR. Even the Typical Drinking Day scale correlated at .46 ($p < .001$) with the IDR total score. This high intercorrelation among the five scales, and the fact that the inventory also had its total score distributed along a continuum, were good indicators that it was measuring drinking repertoire over this five different periods.

The Typical Drinking Day scale correlated poorly with the other four scales of the IDR, in particular with the Last Six Months of Drinking scale. It also correlated poorly with the SADQ, SSADQ, MDBQ and the AWS. One possible interpretation is that the behaviour on a recent typical drinking day in the previous two months before treatment in a sample of individuals recently admitted to treatment may well be non-representative of the drinking behaviour over longer periods. An escalation of previous and more stable patterns may have occurred immediately before admission. Alternatively, the memory of the drinking episodes that influenced the admission to the clinic may be different to the more stable patterns of previous behaviours.

The importance of having such a sound measure of the behavioural element of the ADS in the form of a questionnaire, is that it facilitated comparison with the other elements. All the correlational analysis showed that the IDR was closely related to the other elements of the ADS construct. It had a high correlations with the SADQ at .66 ($p < .001$), with all the five scales, except the Typical Drinking Day, correlating at similar levels (Table 7.20). It correlated highly with the SSADQ as discussed in section 8.3, and also had a correlation of $-.41$ ($p < .001$) with the MDBQ. The crucial correlation regarding the drinking repertoire model used was between the IDR and the withdrawal symptoms. The IDR had a high correlation of .57 ($p < .001$) with the total score of the AWS, with the four factors having significant correlation (Table 7.31). Compared to the previous studies of Hershon (1977) and Hesselbrock et al (1983), the present study showed higher correlation of the withdrawal symptoms with drinking behaviour. This happened probably because the IDR uses a more detailed profile of

drinking behaviour. However, similarly to the SSADQ the highest correlation was with the 'Withdrawal Symptoms' factor at .58 ($p < .001$), and the lowest was with the 'Affect Disturbance' factor at .31 ($p < .001$).

8.4 - Modifiers of Drinking Behaviour and the Validation of the ADS

The element salience of drink-seeking behaviour of the ADS was operationalised by a group of items representing five different areas that contribute to modify drinking behaviour which have been identified in the literature, as discussed in detail in Chapter 4. In addition to describing the element, the present study also investigates empirically the group of situations which are involved in the regulation of drinking behaviour in alcohol dependent subjects. The discussion that follows evaluates the method used in the study to generate the items, and how it revealed the complexity of the phenomena that modify drinking behaviour. It is followed by a discussion of the analysis used to identify the underlying structure of the Modifiers of Drinking Behaviour Questionnaire (MDBQ) and how the study contributes to the validation of the ADS.

The method used to identify the areas and the items to assess this element was a combination of literature review and pilot work with alcohol dependent subjects. The literature review showed that there were very few studies that specifically examined the factors that decrease drinking in a clinical population. Moreover, there has been a relative neglect of the study of factors that restrain drinking behaviour in any kind of population. Based on these studies and on the relatively few studies of clinical populations it was possible to identify five areas to be tested in the study.

The pilot work was able to confirm empirically the identification of these five areas. It also revealed that there was a substantial group of items that decreased drinking behaviour for some patients but which could not be grouped in a new area. The pilot study therefore revealed the richness of situations in which drinking may be restrained, showing the potential of this area of research to advance the understanding of dependence. It makes a substantial contribution to the description of the salience of

drink-seeking behaviour element of the ADS, compared to the early very generalised descriptions. Edwards and Gross (1976), for example, describe it as 'failure of unpleasant consequences to deter', 'gratification of the need for drink may become more important'. Even the more behaviourally oriented descriptions proposed by the DSM-IV and ICD-10 are at a very general level and are unable to identify the areas which influence drinking behaviour.

The complexity of the measurement of this element goes beyond identification of the areas. The initial analysis of the items of the MDBQ showed that there was a remarkable difference in the frequency of occurrence of, and therefore of exposure to, each of the situations represented by each item. Moreover each item, when it did occur, also had variable effects in decreasing drinking. However, despite the intricacy of these two components, frequency of exposure and effect of each item, the analysis of the factor structure of the questionnaire was carried out.

Factor Analysis revealed four factors that accounted for a substantial 45.3% of the variance. These four factors were readily interpretable because they followed very closely the areas identified in the literature review and in the pilot study (Table 7.26). The items on the first factor concerned with the two related areas of environmental and social pressures to stop drinking. This factor is clearly associated with those situations in daily life in which the individual has to respond to pressures from work, family and social life which demand some degree of restriction in drinking to avoid gross intoxication. The second factor is related to mechanisms of personal coping and cognitive strategies used to restrain drinking. The third factor was a set of items concerned with intoxication and other physical symptoms which contribute to a decrease of drinking. The fourth factor was related to how the availability of drink influences consumption.

The fact that these four factors were orthogonal shows that they have independent effects and justifies the claim that within a clinical population there are at least four factors contributing to the modification of drinking behaviour; namely, environmental, cognitive, physical and availability. As there was no theoretical reason to expect that

any of the individual factors extracted had a special effect in relation to the ADS construct, and as there was an interest in having a general measure of modifiability of drinking, it was decided to analyze only the total of the items. The total score of the 27 items selected created a general measure of modifiability of drinking behaviour in which all the items selected loaded highly on the first principal component of the PCA (Table-7.26). This group of items (Modifiers of Drinking Behaviour Questionnaire - MDBQ) had good internal consistency (coefficient alpha = .91) and a total score with a continuous distribution. The combination of the high loadings on the first component of the PCA with high levels of internal consistency makes the questionnaire a statistically sound measure of the modifiability of drinking.

The contribution of the MDBQ to the validity of the Alcohol Dependence Syndrome can be assessed at two levels. At the level of the measurement of the element salience of drink-seeking behaviour it showed in greater detail than before the factors that contribute to modify drinking. The second level of analysis is the relationship of this element with the other elements of the ADS. The MDBQ correlated moderately with all the other questionnaires in the study (Table 7.27). The only non-significant correlation was with the Typical Drinking Day scale. The level of correlation was similar with all questionnaires indicating that, although the correlation was moderate, it was consistent with the behavioural, subjective and psychobiological aspects of the ADS.

The MDBQ, when compared with the behavioral component of the ADS represented by the IDR, had a moderate correlation of $-.41$ ($p < .001$) (Table 7.26). This suggests that, as the drinking repertoire narrows fewer situations have sufficient influence to stop drinking. The SSADQ also had a moderate correlation of $-.41$ ($p < .001$) with the MDBQ (Table 7.26), suggesting that the subjective experience of being dependent on alcohol reduces the influence of the situations that would deter drinking. The AWS too was moderately correlated $-.39$ ($p < .001$) with the MDBQ (Table 7.30), with all four factors showing similar levels of correlation. This further suggests that intensity of withdrawal symptoms distorts the influence of situations that deter drinking. The congruity of the negative correlation of the MDBQ with all four questionnaires shows that the behaviour measured was distinct from the core cognitive, behavioural and

physiological components of the ADS. It gives additional support to the idea that there are mechanisms involved in dependence other than the withdrawal relief. The correlations between the MDBQ and the other questionnaires opens a small window in the assessment of these mechanisms.

The degree of correlation of the MDBQ with other measures in the study was lower than was the case with any of the other questionnaires used. Several factors may have contributed to such a difference. First, it is possible that the combination of literature review and pilot study identified only part of the construct. It may well be that there were other areas, not identified, that can also contribute to the modification of drinking behaviour. The fact that there were many items identified during the pilot study that could not be fitted into any of the five areas, supports this possibility. The decision during the pilot work to keep only those areas that had strong support in the literature was appropriate, given the time and resource limitations of the study. Second, one difficulty in the assessment of the items was the lack of detailed information on frequency of exposure to the situations represented in each item. Although a compromise was found during the pilot study, the analysis of frequency of occurrence of each item showed that there was a complex pattern: some items with low occurrence had strong effects while other items with high occurrence had low effects.

The development, design and statistical analysis of the MDBQ reveals the complexity of the factors that influence drinking behaviour. The success of the MDBQ in measuring this complex of phenomena is mixed. On the one hand it was possible to identify the four factors proposed, and these correlated moderately with the other elements of the ADS. On the other hand there were methodological difficulties as described above. The MDBQ can be considered as an useful step in making more explicit the basis from which measurement of this element can begin. The way ahead lies in the development of a more comprehensive model with a larger and more complete number of areas, and able to deal more adequately with the frequency of exposure to each situation.

8.5 Alcohol Withdrawal Symptoms and the Validation of the ADS

The alcohol withdrawal symptoms are the element of the ADS that has been studied in most detail. In the original description of the ADS, Edwards and Gross (1976) referred to the wide spectrum of these symptoms, with four key symptoms: tremors, nausea, sweating, and mood disturbances. Despite this recognition of the range of symptoms, as discussed in Chapter 5, identification by Factor Analysis of the exact organisation of these symptoms is still in dispute. The importance of achieving a more precise description of this element is justified by the central role given to these symptoms in the theory of dependence. The following discussion starts with an assessment of the method used to measure alcohol withdrawal symptoms, and evaluates the similarities and differences with methods used in previous studies. This is followed by a discussion of the expanded factor structure of the symptoms in terms of their contribution to the validation of the ADS.

The method employed to measure the alcohol withdrawal symptoms differs in two important ways from those used in previous studies. The first and perhaps more important difference was the greater number of patients used in the multivariate analysis. All previous studies had used samples of 100 or fewer patients with an average of thirty items assessing the withdrawal symptoms. As discussed in Chapter 6, the proportion of subjects to variables necessary for Factor Analysis is controversial, but the consensus is that a proportion of 4:1 is the minimum acceptable. The present study had 202 subjects and 32 items dealing with withdrawal symptoms, giving a proportion of 6:1. This larger sample permitted the use of a multivariate technique to evaluate the structure of the data and provided a test of previous factor solutions. The second important difference to previous studies was that the frequency and intensity of the symptoms were assessed simultaneously. The results showed that most symptoms had a high frequency over a recent month of drinking, with 22 out of the 32 symptoms occurring in more than 80% of the patients. Moreover, when the frequency and severity of the symptoms were assessed, the results showed that they correlated highly with each other. The combination of these two scores was used to create the Alcohol

Withdrawal Scale (AWS), which had excellent internal consistency with high values of Cronbach's alpha.

The combination of an adequate number of patients and a more complete set of symptoms provided a privileged opportunity to examine the factor structure of the withdrawal symptoms. The PCA extracted four factors that accounted for a large proportion of the variance (64.3%), higher than in most previous studies and similar to that found by Gross et al (1974). After rotation, four factors were easily identified which had similarities and differences to previous studies. As in the study by Hesselbrock et al (1983), one of the factors identified and labelled by Hershon (1977) as 'Physical Disturbances' was split into two factors, labelled 'Physical Disturbances' and 'Withdrawal Symptoms'. A third factor labelled 'Affect Disturbances', also found in most previous studies, was identified. The main divergence from previous studies was the identification of a fourth factor, related to psychosensory symptoms (nightmares, hearing funny noises and seeing strange objects) which was labelled 'Psychoperceptual Disturbances'.

This 'Psychoperceptual Disturbance' factor contains only three symptoms but its identification was unambiguous, representing 8.6% of the variance with an Eigenvalue of 1.91. The three symptoms clearly represent a clinical phenomenon that differs from the other three factors. An important question to be answered is why previous studies have failed to identify this separate factor. One possibility is that because these studies used small samples of patients they could not detect the variance of these items, in particular because they had a relatively low frequency (Table 7.28). Only a larger sample, as used in the present study, would be able to identify it.

The fact that withdrawal symptoms assume such a central role in the theory of alcohol dependence has led some authors to explore their contribution to mediating drinking behaviour related to alcohol dependence. Hershon (1977) indicated that drinking behaviour was associated with a particular group of symptoms related to the 'Physical Disturbances' factor. Hesselbrock et al (1983) showed that the 'Withdrawal Symptoms' factor had high correlations with frequency and quantity of drinking. These

authors were examining different ways of testing the theoretical assumption that withdrawal symptoms have a role in influencing drinking behaviour by means of a learning process. The evidence in the literature for this association is far from clear (Edwards, 1991; Chick, 1993), but it represents a key area for the validation of the theory of the ADS.

The design used in the present study, in which four elements of the ADS were transformed into questionnaires, provided a good opportunity to evaluate the importance of withdrawal symptoms in relation to the other elements and to provide further evidence for the theory of ADS. Two aspects particularly concerned with the withdrawal symptoms deserve to be examined. One is the correlation of the total score of the AWS with the other questionnaires the other is how each of the four factors identified correlated with the other questionnaires.

As discussed in previous sections, the alcohol withdrawal symptoms represented by the AWS total score correlated highly with the other questionnaires (Table 7.31). The four factors extracted from the AWS had also significant correlations with the other elements of the ADS. However, there were some differences regarding the degree of correlation, in particular with regard to the 'Withdrawal Symptoms' and the 'Affect Disturbance' factor. The 'Withdrawal Symptoms' factor was the group of symptoms that consistently correlated at a higher degree than the other three factors with all the other questionnaires. Furthermore, it had a tendency to have an even higher correlation than the total AWS score. On the other hand there was a tendency for the 'Affect Disturbance' factor to correlate at lower levels with all the other questionnaires, and in particular with the scales of the IDR. Another relevant finding in this correlational analysis was that the 'Psychoperceptual Disturbance' factor also correlated at similar levels with the other elements of the ADS.

This pattern of correlations contributes to those early findings (Hershon, 1977; Hesselbrock et al, 1983) in which withdrawal symptoms correlated with some behaviours related to alcohol dependence. The present study goes further because it has the advantage of having three of the elements of the ADS with more organised

assessment. It was not only frequency or quantity of drinking that related to the withdrawal symptoms but a comprehensive group of variables representing drinking repertoire, a group of expectancies representing the cognitive element and a group of situations that modify drinking behaviour.

8.6 - Summary of the thesis and its contribution to the Validation of the ADS

As discussed in Chapter 1 validation is essentially a continuing and independent process in which studies are intended to test hypotheses regarding a construct and in which evidence is accumulated for or against the construct. The analysis of evidence for or against a construct is a complex matter that cannot be assessed in a simplistic manner. This thesis aimed to test models of measurement of four of the individual elements of the ADS and to assess their network of correlations as a form of empirical test of the ADS construct. The dual approach of assessing the theory on which the ADS construct and its elements are based and the empirical data emerging from the study was considered essential to the validation process. The importance of the measurement of the ADS is that, as a hypothetical construct (Millon, 1991) it is a latent variable with no single operation to define it, so that all previous attempts at measurement can be considered as preliminary ones that can be improved by better theory and research design.

The central approach to the design of the research was that complex constructs such as the ADS can only be adequately assessed using several scales with multiple items. Therefore, each of the elements was assessed by a scale composed of a collection of items. As the ADS is still at an early stage of definition and description, a more precise series of assumptions in relation to each element improves the construct definition. The model proposed for the measurement of each element was based on the assumption that more precise measurement can only be achieved through the interaction of explicit theory and empirical research. This approach considerably enhanced the empirical basis of the elements of the ADS and consequently its validation. In this section the evidence provided by the research will be discussed in relation to the validation of the construct ADS.

The combination of theory and research design has produced an important improvement in the ability to conceive and measure the subjective element of the ADS. It was theoretically proposed that in the development of alcohol dependence the frequent experience of withdrawal symptoms may help to create a particular group of expectancies that are different from earlier ones without the withdrawal symptoms. The research design used an extensive pilot study to identify this group of expectancies and a large sample of alcohol dependent subjects to answer the SSADQ. The statistical analysis of the SSADQ provided convincing evidence that this group of expectancies forms a unidimensional construct which has seven different areas. This unidimensionality supports the claim that the items of the SSADQ are actually measuring a cognitive phenomenon involved in alcohol dependence. Two other main aspects contributed to the validation of the ADS in respect of its subjective component. First, as this element becomes more explicitly defined it makes the description of the ADS more empirically and theoretically precise. It is not merely a list of expectancies that describes this element but a group of items that has empirical and theoretical links with the ADS construct. Second, the high correlation between the SSADQ, IDR and AWS suggests that the subjective element is closely linked to the behavioural and physiological components of the ADS.

The design and measurement of the drinking repertoire element were also based on a theoretical model in which the components of the drinking behaviour were influenced by the withdrawal symptoms. The variables proposed to assess the element went beyond the traditional ones of quantity and frequency of drinking. The model was tested in a research design using two methods of measurement, interview and questionnaires, each of them with different strengths. The interview method (DRI) provided a more detailed analysis of four variables, showing that frequency of morning drinking, spread of drinking, alcohol consumption and number of drinking days are associated measures of a drinking repertoire over a period of a week. The cluster analysis identified six groups of drinking patterns which clearly show that these four variables interrelate with each other and together varied along a continuum from a narrow to a wide drinking repertoire. Moreover, these drinking patterns were closely related to the severity of alcohol dependence as measured by the SADQ.

The questionnaire method (IDR) was able to identify the continuum of severity of drinking behaviour over different time periods. All the five questionnaires had a unidimensional structure identified by the Principal Component Analysis, showing drinking behaviour along a flexibility/rigidity continuum. Moreover, the combination of these five questionnaires created an inventory that had high correlations with the SADQ and with the SSADQ and AWS. The combination of interview and questionnaire improved the measurement of the behavioural element of the ADS in two ways. First, as drinking is a key behaviour in the ADS it assumes a crucial value in the validation process and thus there was a need for a detailed assessment of the variables involved. The two methods presented congruent evidence that drinking behaviour can be assessed along a continuum of severity in which morning drinking, spread of drinking, quantity and frequency of drinking are the key variables to assess. Second, this more precise measurement of the drinking repertoire element permitted a series of correlational analyses that showed that it is highly correlated with the subjective and physiological components of the ADS.

The contribution of the alcohol withdrawal symptoms element to the validation of the ADS was mainly due to its improved measurement with the use of a large number of patients and more detailed response categories. This improvement resulted in the emergence of a more plausible factor structure with four factors clearly identifiable. This better factor structure allowed an improved assessment of the associations of each individual factor of the withdrawal symptoms with the other elements of the ADS. Unlike previous studies that examined the correlation of the withdrawal symptoms only with the drinking behaviour, the present study allowed a wider assessment of correlations with several elements of the ADS. It showed that the withdrawal symptoms were highly correlated with the cognitive and the behavioural aspects of the ADS.

Each of these above three elements measured provided evidence for the construct validation of the ADS. However, it has been pointed out that in terms of a hypothetical construct the strongest evidence of validation comes from assessment of the network of theoretically determined indicators (Messick, 1989). Specifically about the ADS,

several authors (Babor, 1986, 1992; Edwards, 1990) have suggested that the clarification of the relationship between the cognitive, behavioural and physiological elements of the ADS is an essential step towards validation of the syndrome. The present study showed that the correlations among them were high, with the IDR correlating at .66 with the SSADQ and at .57 with the AWS, and the AWS correlating at .70 with the SSADQ. These three correlations show that the elements are closely related to each other, giving support to the theory of the ADS construct that assumes that these three elements cluster together. Although the learning mechanism involved in the ADS is still a matter for further research, the present study by making theoretical assumptions for the design and measurement of the elements and by showing these positive correlations between them, has strengthened the theory.

The element salience of drink-seeking behaviour, unlike the other three elements, was measured by generating a group of situations which influence drinking behaviour (MDBQ). The assumption was that the failure of those situations to modify drinking behaviour was related to the degree of dependence. The study identified four factors: environmental, cognitive, physical, and availability factors which are clearly involved in modifying drinking behaviour. The important aspect of the MDBQ is that the model used in its measurement was not directly related to the withdrawal symptoms. It allowed an expansion of the relationship between the core behaviours of the ADS with other behaviours. It showed that the combination of the four factors deterring drinking in the form of the MDBQ were inversely correlated with the core elements of the ADS. The importance of this relationship is that it presents evidence of a wider pattern of correlations of the ADS beyond the influence of the withdrawal symptoms and related phenomena.

As has been discussed, this thesis has achieved a more precise phenomenological description of four of the elements of the ADS. It has also given greater support to the theory behind the ADS construct. One of the implications of this improved phenomenological description and theoretical definition may be for the use of the ADS construct in the classification systems that have adopted it as a diagnostic category.

At the beginning of this thesis it was described the transformation which the discipline of Psychopathology has undergone in the past three decades due to better measurement and the use of standardised diagnostic criteria. One consequence of this transformation, which has been extremely influential in clinical practice and in research, is the use of diagnostic criteria by the main classification systems DSM and ICD. One of the major achievements of this area of research was the development of specific and explicit diagnostic criteria that substantially improved the reliability of diagnoses. However, the success of this area of research has also created many new questions concerning the nature and validity of the clinical constructs. One important aspect of the validity issue in classification is a distinction between the psychopathological concepts and their clinical identification (Morey and McNamara, 1987; Millon, 1991).

Millon (1991) in a general discussion of scientific concepts, argues that there is a difference between the core of a concept and its identification properties. The core of a concept comprises extremely important, possibly defining attributes and specifies how a concept relates to other concepts. The identification properties, on the other hand, comprise highly predictive, but possibly nonessential, attributes that are used to categorize the phenomenon. The distinction between identification properties and the core of a concept is analogous to the one in psychopathology between diagnosis and definitions of clinical constructs (Morey & McNamara, 1987). The use of the DSM and ICD diagnostic criteria are operational definitions for the identification of the clinical construct of interest and therefore are indicators of the hypothetical classification construct, but they are not the construct itself. The diagnostic criteria identify a hypothetical construct whose meaning is not exhausted by a listing of the criteria. The hypothetical construct always includes surplus meaning that arises from the theory in which it is grounded. The DSM and ICD diagnoses are no more the essence of the construct than a test score is the essence of intelligence; rather, they are an operationalization of the concept, which may or may not be valid (Morey & McNamara, 1987).

The Alcohol Dependence Syndrome construct has been adopted by the main classification systems DSM and ICD, and a debate has been generated about the best way in which the ADS could be represented in these classifications (Rounsaville et al, 1986;

Rounsaville et al, 1989; Grant, 1989; Schuckit, 1991; Grant & Towle, 1991). The distinction between the diagnostic use of the ADS and its definition as a construct can help in the debate about how successful the diagnostic criteria used in these classifications have been in incorporating the ADS construct, and also how further work can help these diagnostic criteria to represent the ADS construct more fully. At the centre of this distinction is the appropriate phenomenology used to identify the ADS construct.

The phenomenology that is optimal in clinically identifying the presence of a disorder is often the same phenomenology that is optimal in describing (or defining) the disorder, but this will not always be the case (Morey & McNamara, 1987). There are many difficulties in the way the DSM and ICD have operationalised the ADS. As the main objective of a classification is diagnosis, there has been a tendency in the DSM and ICD to use criteria for the identification of the ADS that are more likely to be reliable, using behaviours that are easily demonstrable (Van Praag, 1992). The emphasis on diagnosis over definition of the ADS has resulted in a distorted description in which some of the criteria are inadequately explicit or, conversely, are overly concrete in their operational definitions (Grant, 1989). Moreover, they have oversimplified the construct by excluding important elements of the ADS construct such as the narrowing of the drinking repertoire. This may lead to problems of construct underrepresentation that can adversely affect diagnostic validity.

Although these classification systems have generated a substantial amount of research exploring different diagnostic criteria, they have had little impact on the creation of better definitions of the elements of the ADS. The emphasis on agreement of identification of the elements has delayed further development of the theoretical definition of the ADS. The way ahead, and the one that this thesis has taken, is to have independent means of research to uncover the core of the ADS construct through a better understanding of the content and structure of the elements for future use as diagnostic criteria. This thesis has explored some of the elements that have been found more difficult to absorb by the diagnostic criteria of the DSM and ICD systems. By providing better descriptions and by clarifying the theoretical components of these elements the phenomenology used for identification of the ADS may come closer to the

phenomenology used in research which has provided a better definition of the construct.

Despite progress in the validation of the ADS in the last seventeen years, to which this thesis has also contributed, the process of validation of the ADS is likely to be a slow one, characterized by the gradual elaboration of the elements and causal mechanisms involved by means of analytical studies and hypothesis-testing research. The construct validation of the ADS can follow several paths but the understanding of its internal structure is the one which is likely to be the most fruitful. Whatever the path to be followed, the theory of alcohol dependence should be subjected to a rigorous programme of research aimed at better operational measures and more intensive hypothesis testing.

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Appendix A

Date: ___/___/___ Interviewer: _____ CODE No: _____ Initials: _____

A - DEMOGRAPHIC INFORMATION

A1 - Date of birth : ___/___/___

A2 - Sex : 1 - Male. 2 - Female

A3 - Family Status :

- 1 - Living with spouse and children
- 2 - Living with spouse without children
- 3 - Living with children
- 4 - Living with parents and others members of family
- 5 - Living with parent(s)
- 6 - Living with friends or members of family
- 7 - Living with flatmates
- 8 - Living alone

- Number of Children living with patient: _____

- Number of people living with patient: _____

A4 - Present Residence :

- 1 - Owner occupier
- 2 - Rented/council (flat, house)
- 3 - Rented room/digs
- 4 - Staying with relations/friends
- 5 - Alcoholism or other hostel
- 6 - Squatting
- 7 - Homeless/Sleeping rough
- 8 - Other or unknown

- Name of the Job : _____

- Describe the work : _____

- 1 - Employed
- 2 - Housewife
- 3 - Retired not working
- 4 - Unemployed less than 6 months
- 5 - Unemployed 6 months or more
- 6 - Disabled not working
- 7 - Casual work
- 8 - Training/student

Last Six Months :

- 1 - Working full time - 5 days a week
- 2 - Working full time - < 5 days a week
- 3 - Working part time - 5 days a week
- 4 - Working part time - < 5 days a week
- 5 - Non-regular working days

A6 - Country where spent childhood

- 1 - England
- 2 - Scotland
- 3 - Ireland
- 4 - _____

A7 - Time living in London

- 1 - < 1 year
- 2 - 2-5 years
- 3 - 5-10 years
- 4 - > 10 years

A8 - Number of admissions for treatment of alcoholism :

- 00 - none
- 01 - 1 admission
- 02 - 2 admissions
- 99 - not known

A9 - Attendance to AA in the last 6 months

- | | |
|-----------|---------------|
| 0 - none | 4 - 37-48 |
| 1 - 1-12 | 5 - 49-60 |
| 2 - 13-24 | 6 - >61 |
| 3 - 25-36 | 9 - not known |

A10 - Please can you tell us if you have sought or been taken for treatment for your drinking to any of the following agencies.

- 0 - No never
 - 1 - Yes, in the last two years
 - 2 - Yes, previously
-
- a - General Practitioner ____
 - b - General Hospital - Inpatient Unit ____
 - c - General Hospital - Out patient Unit ____
 - d - Psychiatric Hospital - Inpatient Unit ____
 - e - Psychiatric Hospital - Outpatient Unit ____
 - f - Alcoholics Anonymous ____
 - g - Detoxification Unit ____
 - h - Residential Hostel ____
 - i - Other counselling service ____

B - DRINKING HISTORY

As best you can, indicate how old you were when these events happened. If unsure, do your best and estimate your age. (If the question does not apply code 99)

HOW OLD WERE YOU

- 1 - When you first took one or more drinks ? ____
- 2 - When you began to get drunk regularly? (at least once a week) . ____
- 3 - When you began to drink most days of the week ? . ____
- 4 - When you first drank 8 pints of beer or half bottle of Scotch in one day ? . ____
- 5 - When you started to realize that alcohol gave relief (eg. from hangovers, tension, anxiety, "shakes" or other problems) ? ____
- 6 - When you first thought you had a drinking problem ? ____
- 7 - When family or friends said you had a problem with drinking ? ____
- 8 - When you first had a drink in the morning ? ____
- 9 - When you began to drink regularly first thing in the morning ? ____
- 10- After you began to drink in the morning, longest period without a drink ? . ____
- 11- When you began to drink all day long (from morning until evening) most days of the week ?

- 12- When you began to try cutting down your drinking ? ____
- 13- When you first tried to stop drinking (eg. go on the wagon) ? . ____

IN THE LAST TWO YEARS . . .

- 1 - Longest period without any drink at all ? ____
- 2 - Longest period drinking less than 5 pints a day ? ____
- 3 - Time period drinking most days of the week ? ____

IN THE LAST SIX MONTHS

- 1 - Longest period without any drink at all ? ____
- 2 - Longest period drinking less than 5 pints a day ? ____
- 3 - In a Typical Drinking Day, time between awoken and first drink ? ____
- 4 - In a Typical Drinking Day, speed of ingestion of the first drink ? ____
- 5 - In a Typical Drinking Day, gr of alcohol ingested ? ____
- 6 - Last day of drinking ? ____

SCORE OF DRINKING BEHAVIOUR - LAST SIX MONTHS

	1	2	3	4	5	6
Number of weeks drinking	___	___	___	___	___	___
Number of weeks abstinent	___	___	___	___	___	___
Pattern of drinking	___	___	___	___	___	___
Pattern of abstinence	___	___	___	___	___	___
Pattern of consumption (1)	___	___	___	___	___	___
Pattern of consumption (2)	___	___	___	___	___	___
Morning Drinking	___	___	___	___	___	___
Spread of drinking (1)	___	___	___	___	___	___
Spread of drinking (2)	___	___	___	___	___	___

Week



Monday Tuesday Wednesday Thursday Friday Saturday Sunday

<i>July</i>	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	1	2	3	4	5
<i>August</i>	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	1	2
<i>September</i>	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30

Appendix B

Code Number

**Addiction Research Unit
Institute of Psychiatry
101, Denmark Hill
London SE 5 8 AF**

CONFIDENTIAL

We are asking for your co-operation in a large-scale study of drinking behaviour. There are no right or wrong answers, we are only interested in YOUR OWN views and experiences.

The information you give us will be treated in STRICT CONFIDENCE, and you will not be asked to give your name.

THANK YOU

INSTRUCTIONS

On the following pages we are interested to know about your drinking in recent months. We realise how variable drinking can be for each person, but we would like you to think back to the most recent period of about 2 months when you were still drinking and choose a drinking day in those 2 months that was typical for you, a day that gives us a good idea of how you usually spent your drinking day.

I - TYPICAL DRINKING DAY

INSTRUCTIONS

We are interested in knowing more about your drinking behaviour. There are some questions about a TYPICAL DRINKING DAY, that is, what a typical day of drinking in the last two months of drinking has been like for you. There are no right or wrong answers, we just want to know as much as possible about YOUR DRINKING. Please read each statement, then ring the number that best describes your experience

DURING A TYPICAL DRINKING DAY . . .

	NEVER ↓	RARELY ↓	SOMETIMES ↓	USUALLY ↓	ALWAYS ↓
First thing in the morning I have a drink	1	2	3	4	5
I go to bed at night quite drunk	1	2	3	4	5
I drink all day long	1	2	3	4	5
I gulp down my first drink in the morning	1	2	3	4	5
I drink my first drink of the day in the evening	1	2	3	4	5
After a few hours without a drink I can sip and savour my next drink	1	2	3	4	5
I stop drinking two or three hours before I go to bed	1	2	3	4	5
Within a couple of hours after my first drink in the morning I have to have another drink	1	2	3	4	5
I do all my drinking for the day in just a couple of hours	1	2	3	4	5
I don't drink at all during the night	1	2	3	4	5
I sip my first drink of the day nice and slowly	1	2	3	4	5

DURING A TYPICAL DRINKING DAY

	NEVER ↓	RARELY ↓	SOMETIMES ↓	USUALLY ↓	ALWAYS ↓
2 - During the day I go without a drink for 4 or 5 hours	1	2	3	4	5
3 - I wake up in the middle of the night to have a drink	1	2	3	4	5
4 - I take my first drink of the day less than five minutes after waking up	1	2	3	4	5
5 - I do all my drinking for the day in a short period of time	1	2	3	4	5
6 - Before I go to bed I have to have a couple of drinks	1	2	3	4	5
7 - I can do a lot of things before having my first drink of the day	1	2	3	4	5
8 - If I stay dry for a couple of hours, I quickly gulp down my first drink after that	1	2	3	4	5
9 - I go to bed without having had a drink in the last hour or so	1	2	3	4	5
10 - I drink my first drink of the day about an hour after waking up	1	2	3	4	5
11 - After having a few drinks in the morning I go without a drink for many hours	1	2	3	4	5
12 - If I wake up in the middle of the night I go back to sleep without having a drink	1	2	3	4	5
13 - I drink something nearly every hour from morning till late at night	1	2	3	4	5
14 - I drink my first drink of the day at lunch time	1	2	3	4	5

INSTRUCTIONS

Now we would like you to think about the **LAST SIX MONTHS** of your drinking. We would like you to choose a month in the **LAST SIX MONTHS** that was typical for you in this period.

II - TYPICAL MONTH OF DRINKING

INSTRUCTIONS

In this part we are interested to know more about your TYPICAL MONTH OF DRINKING, that is what a typical month of drinking has been like for you in the LAST SIX MONTHS. Please, read each statement, then ring the number that best describes your experience .

II - TYPICAL MONTH OF DRINKING . . .

	NEVER ↓	RARELY ↓	SOMETIMES ↓	MOST DAYS ↓	EVERY DAY ↓
I drank my first drink in the evening	1	2	3	4	5
I drank throughout the day	1	2	3	4	5
I woke up in the middle of the night to have a drink	1	2	3	4	5
I had my first drink as soon as I woke up	1	2	3	4	5
I drank my first drink in the morning very slowly	1	2	3	4	5
After drinking in the morning I went without a a drink for many hours	1	2	3	4	5
I drank my first drink about an hour after waking up	1	2	3	4	5
I didn't drink at all during the night	1	2	3	4	5
I had a couple of drinks before I went to bed	1	2	3	4	5
I did not have a drink all day and evening	1	2	3	4	5
After a few hours without a drink I quickly gulped down my first drink	1	2	3	4	5

ING A TYPICAL MONTH OF DRINKING

	NEVER ↓	RARELY ↓	SOMETIMES ↓	MOST DAYS ↓	EVERY DAY ↓
Stopped drinking two or three hours before I went to bed	1	2	3	4	5
Had a drink every hour or so	1	2	3	4	5
Woke up with a drink in the morning	1	2	3	4	5
Didn't have a drink in the morning	1	2	3	4	5
Had not had a drink for several hours before going to bed	1	2	3	4	5
Drank only in the evenings	1	2	3	4	5
Went without a drink for several hours	1	2	3	4	5
Went to bed quite drunk	1	2	3	4	5
Woke up in the middle of the night and I did not have a drink	1	2	3	4	5
Drank only in the morning	1	2	3	4	5
After a few hours without a drink I drank my first drink very slowly	1	2	3	4	5
After my first drink in the morning, I had a few more drinks within a couple of hours	1	2	3	4	5
Drank my first drink less than five minutes after waking up	1	2	3	4	5
Did all my drinking for the day in a couple of hours	1	2	3	4	5
Drank my first drink at lunch time	1	2	3	4	5

MODIFIERS OF DRINKING BEHAVIOUR DURING A TYPICAL DRINKING MONTH

INSTRUCTIONS

Most days you drink in your own way, but sometimes something happens, which may cause you to make a change in your drinking habits, or not to drink at all. Here is a list of things that might influence your drinking. Please refer to a TYPICAL DRINKING MONTH in the last six months.

How might the following situations affect your drinking in a TYPICAL DRINKING MONTH ?

How did it usually affect your drinking ?

- 1 - When I keep myself busy
- 2 - When I don't feel well.....
- 3 - When I visit someone important
- 4 - When I have someone to talk to
- 5 - When I have to be fit to work.....
- 6 - When I have no money at all.....
- 7 - When I have a hangover.....
- 8 - When I get too drunk
- 9 - When I go to see my doctor.....
- 10 - When I stay indoors
- 11 - When I am relaxed.....
- 12 - When the pubs close

	↓ 0	↓ 1	↓ 2	↓ 3	↓ 4	↓ 5
<i>Did not happen to me</i>						
<i>Did not affect my drinking</i>						
<i>Reduced my drinking a little</i>						
<i>Reduced my drinking quite a lot</i>						
<i>Stopped my drinking for a few hours</i>						
<i>Made me drink more</i>						

How did it usually affect your drinking ?

?

How might the following situations affect your drinking in a TYPICAL DRINKING MONTH ?

- 13 - When I make up my mind to do something
- 14 - When people come around to visit me
- 15 - When I try to limit myself.....
- 16 - When my stomach is unsettled
- 17 - When I need the money for something more important
- 18 - When I'm doing my hobby
- 19 - When I have to force myself to stay dry
- 20 - When I'm topped up
- 21 - When I have black outs
- 22 - When I try drinking but I vomit
- 23 - When I am afraid of becoming unemployed
- 24 - When I intend not to get too drunk
- 25 - When I am not in the places where I usually drink
- 26 - When I feel content with my life
- 27 - After reactions of members of my family

	↓	↓	↓	↓	↓	↓
	0	1	2	3	4	5
13 - When I make up my mind to do something	0	1	2	3	4	5
14 - When people come around to visit me	0	1	2	3	4	5
15 - When I try to limit myself.....	0	1	2	3	4	5
16 - When my stomach is unsettled	0	1	2	3	4	5
17 - When I need the money for something more important	0	1	2	3	4	5
18 - When I'm doing my hobby	0	1	2	3	4	5
19 - When I have to force myself to stay dry	0	1	2	3	4	5
20 - When I'm topped up	0	1	2	3	4	5
21 - When I have black outs	0	1	2	3	4	5
22 - When I try drinking but I vomit	0	1	2	3	4	5
23 - When I am afraid of becoming unemployed	0	1	2	3	4	5
24 - When I intend not to get too drunk	0	1	2	3	4	5
25 - When I am not in the places where I usually drink	0	1	2	3	4	5
26 - When I feel content with my life	0	1	2	3	4	5
27 - After reactions of members of my family	0	1	2	3	4	5

ew hours

How did it usually affect your drinking ?

How might the following situations affect your drinking in a TYPICAL DRINKING MONTH ?

	↓	↓	↓	↓	↓	↓
	Did not happen to me	Did not affect my drinking	Reduced my drinking a little	Reduced my drinking quite a lot	Stopped my drinking for a few hours	Made me drink more
28 - When the off-licenses are closed	0	1	2	3	4	5
29 - If I have to do something in a proper frame of mind.....	0	1	2	3	4	5
30 - When I have to deal with money	0	1	2	3	4	5
31 - When I sleep during the day	0	1	2	3	4	5
32 - If I have to sort things out.....	0	1	2	3	4	5
33 - When I'm so drunk that I can't put things together	0	1	2	3	4	5
34 - When I just do not enjoy drink anymore	0	1	2	3	4	5
35 - When everything is going well	0	1	2	3	4	5
36 - When I'm eating	0	1	2	3	4	5
37 - When I'm in the company of my family	0	1	2	3	4	5
38 - When I keep myself away from people who drink	0	1	2	3	4	5
39 - When my money is getting low	0	1	2	3	4	5
40 - If I have to do something constructive.....	0	1	2	3	4	5
41 - When I have to drive a car	0	1	2	3	4	5
42 - When my mind is preoccupied with something else	0	1	2	3	4	5

How might the following situations affect your drinking in a TYPICAL DRINKING MONTH ?

How did it usually affect your drinking

- 43 - When I feel that I'm not physically able to drink
- 44 - When I have enough alcohol inside me
- 45 - When I am in the company of my wife/husband
- 46 - When I am expecting to see someone important
- 47 - When I'm at work
- 48 - When I have to go somewhere where I have to stay dry
- 49 - When I can't get the first drink down, because I vomit straight away.....
- 50 - When I intend to make an effort to stay dry
- 51 - When I am with people who are not drinking
- 52 - When I stay away hiding
- 53 - When I'm doing a job where I'm not allowed to drink
- 54 - When I just get sick of the drink, even the smell of it

Did not happen to me
Did not affect my drinking
Reduced my drinking a little
Reduced my drinking quite a lot
Stopped my drinking for a few hours
Made me drink more

	0	1	2	3	4	5
43 - When I feel that I'm not physically able to drink	0	1	2	3	4	5
44 - When I have enough alcohol inside me	0	1	2	3	4	5
45 - When I am in the company of my wife/husband	0	1	2	3	4	5
46 - When I am expecting to see someone important	0	1	2	3	4	5
47 - When I'm at work	0	1	2	3	4	5
48 - When I have to go somewhere where I have to stay dry	0	1	2	3	4	5
49 - When I can't get the first drink down, because I vomit straight away.....	0	1	2	3	4	5
50 - When I intend to make an effort to stay dry	0	1	2	3	4	5
51 - When I am with people who are not drinking	0	1	2	3	4	5
52 - When I stay away hiding	0	1	2	3	4	5
53 - When I'm doing a job where I'm not allowed to drink	0	1	2	3	4	5
54 - When I just get sick of the drink, even the smell of it	0	1	2	3	4	5

How did it usually affect your drinking ?

How might the following situations affect your drinking in a TYPICAL DRINKING MONTH ?

	↓	↓	↓	↓	↓	↓
	0	1	2	3	4	5
55 - When I have pressures from close friends or relations not to drink	0	1	2	3	4	5
56 - When I have to do things that I have to remember exactly	0	1	2	3	4	5
57 - When I go to see my parents	0	1	2	3	4	5
58 - When I have a meal	0	1	2	3	4	5
59 - When I have a headache	0	1	2	3	4	5
60 - When I am doing something pleasant	0	1	2	3	4	5
61 - When drink isn't available	0	1	2	3	4	5
62 - When I am in a strange place, distant from home	0	1	2	3	4	5
63 - When I said to myself "I won't drink today"	0	1	2	3	4	5
64 - When I am going for a walk	0	1	2	3	4	5
65 - When I fear that I cause my body too much harm	0	1	2	3	4	5
66 - When I have to look after my child	0	1	2	3	4	5
67 - When I have to do business	0	1	2	3	4	5
68 - When I have to walk the streets alone	0	1	2	3	4	5
69 - When I have to wake up early	0	1	2	3	4	5
70 - When I am doing my hobby	0	1	2	3	4	5
71 - When I fight not to drink	0	1	2	3	4	5
72 - When I have an interview with someone important	0	1	2	3	4	5

Did not happen to me
 Did not reduce my drinking
 Reduced my drinking a little
 Stopped my drinking quite a lot
 Made me drink more

S.S.A.D.Q.

INSTRUCTIONS

Listed below are a number of things people think, feel or do when they are drinking. Please think back to your experience in a TYPICAL MONTH OF DRINKING in the LAST SIX MONTHS. There are no wrong or right answers, so please read each statement and then circle the number that best expresses your own experience. Please tell us how you usually feel.

TYPICAL MONTH OF DRINKING I usually feel that . . .

		STRONGLY DISAGREE	DISAGREE	UNCERTAIN	AGREE	STRONGLY AGREE
		↓	↓	↓	↓	↓
1- Drinking is priority number one for me	1	2	3	4	5	
2- Without a drink I can't remember things	1	2	3	4	5	
3- I feel insecure without a drink	1	2	3	4	5	
4- A few drinks in the morning help to steady me	1	2	3	4	5	
5- I have to top myself up all day long	1	2	3	4	5	
6- Once I start drinking I just carry on	1	2	3	4	5	
7- My performance is worse after a drink	1	2	3	4	5	
8- If I have one or two drinks I'll go on	1	2	3	4	5	
9- Drink is the thing that keeps me going	1	2	3	4	5	
10- Drink is often far from my mind	1	2	3	4	5	
11- I need to drink only on special occasions	1	2	3	4	5	
12- I feel relaxed when I go to a place where there is no drink	1	2	3	4	5	
13- I drink to get rid of the shakes	1	2	3	4	5	

TYPICAL MONTH OF DRINKING I usually feel that ...

	STRONGLY DISAGREE	DISAGREE	UNCERTAIN	AGREE	STRONGLY AGREE
	↓	↓	↓	↓	↓
- I feel bad-tempered until I get a drink	1	2	3	4	5
- It is easy for me to have only one drink and then stop	1	2	3	4	5
- I know exactly how I can get drinks all day long	1	2	3	4	5
- I don't feel any better with alcohol	1	2	3	4	5
- I dread going to a place where there is no drink	1	2	3	4	5
- I can be sociable without having anything to drink	1	2	3	4	5
- There is nothing in my life more important than drink	1	2	3	4	5
- It is very difficult to have only one or two drinks and then stop	1	2	3	4	5
- I can lead a normal life without drink	1	2	3	4	5
- Sometimes I would do anything to get a drink	1	2	3	4	5
- In the morning, drinking is a must for me	1	2	3	4	5
- I often don't know when I will have my next drink	1	2	3	4	5
- When I drink I have a feeling of being dominated, I have to do it	1	2	3	4	5
- When I am drinking, I leave long gaps between drinks	1	2	3	4	5
- I can't stop drinking if there is still drink around	1	2	3	4	5
- Drink always comes first	1	2	3	4	5

TYPICAL MONTH OF DRINKING I usually feel that . . .

	STRONGLY DISAGREE	DISAGREE	UNCERTAIN	AGREE	STRONGLY AGREE
	↓	↓	↓	↓	↓
If I can't get a drink when I need to, I stay calm	1	2	3	4	5
Without drink I would find it difficult to function	1	2	3	4	5
When I am involved in important things such as work or my family, I do not drink	1	2	3	4	5
If I have to do something difficult I don't do it until I have had a drink	1	2	3	4	5
I walk out of situations where I can't get a drink	1	2	3	4	5
After my first drink of the day I feel much better	1	2	3	4	5
I space out my drinks to avoid feeling awful	1	2	3	4	5
When I am drinking, I know exactly when to stop	1	2	3	4	5
I avoid having a drink during the day	1	2	3	4	5
I feel insecure after having a drink	1	2	3	4	5
If I can't get a drink when I need to, I get into a panic	1	2	3	4	5
I can do things better after a drink	1	2	3	4	5
During most of the day I can go without a drink	1	2	3	4	5
I can do a lot of things without a drink	1	2	3	4	5
I can wait until it is the right time to have a drink	1	2	3	4	5

TYPICAL MONTH OF DRINKING I usually feel that . . .

STRONGLY DISAGREE
DISAGREE
UNCERTAIN
AGREE
STRONGLY AGREE

	1	2	3	4	5
When I feel agitated I have to drink in order to feel myself again	1	2	3	4	5
I always have to drink more than one or two drinks	1	2	3	4	5
The more I drink, the more I want to drink	1	2	3	4	5
Getting a drink in the next couple of hours doesn't worry me	1	2	3	4	5
I need to drink only for a short while	1	2	3	4	5
I can wait calmly until my next drink	1	2	3	4	5
I can enjoy life without a drink	1	2	3	4	5
I have many important needs in my life and alcohol is not the most important	1	2	3	4	5
I frequently feel that nothing else matters, except having a drink	1	2	3	4	5
I use alcohol to get me through the day	1	2	3	4	5
After I have a few drinks I know that I will need more	1	2	3	4	5
I need a drink in the morning to make me feel better	1	2	3	4	5
I drink at regular intervals during the day, so I can function normally	1	2	3	4	5
I am powerless over alcohol	1	2	3	4	5

a TYPICAL MONTH OF DRINKING I usually feel that . . .

	↓	↓	↓	↓	↓
	1	2	3	4	5
		STRONGLY DISAGREE	DISAGREE	UNCERTAIN	AGREE
			STRONGLY DISAGREE	DISAGREE	UNCERTAIN
				AGREE	STRONGLY AGREE
I make sure that I can have a drink at any time during the day	1	2	3	4	5
My life starts when I have my first drink of the day	1	2	3	4	5
I get very anxious if anything looks like getting between me and my next drink	1	2	3	4	5
I need to drink only for a few days a week	1	2	3	4	5
The only real need in my life is my need for drink	1	2	3	4	5
I neglect many things in my life because drink is more important to me	1	2	3	4	5
In order to do something, I have to have a drink first	1	2	3	4	5
When I need a drink and cannot get it , I feel as if I'm dying	1	2	3	4	5
At night, I usually bring my drink into the bedroom, so I can have it at any time	1	2	3	4	5
I know exactly where I can get a drink first thing in the morning	1	2	3	4	5
When I'm drinking I always drink more than I want to	1	2	3	4	5
I don't mind if I have to go for hours without a drink	1	2	3	4	5
I have to have a few drinks before going to a place where there may be no drink	1	2	3	4	5
Alcohol in the morning makes me feel worse	1	2	3	4	5

TYPICAL MONTH OF DRINKING I usually feel that . . .

		STRONGLY DISAGREE	DISAGREE	UNCERTAIN	AGREE	STRONGLY AGREE
		↓	↓	↓	↓	↓
feel on edge while waiting for the opportunity to have a drink	1	2	3	4	5	
can concentrate quite well without a drink	1	2	3	4	5	
there are more important things in my life than drink	1	2	3	4	5	
can be involved in many activities without a drink	1	2	3	4	5	
doesn't worry me if I go to a place where there is no drink	1	2	3	4	5	
wake up early, I worry if I can't get a drink	1	2	3	4	5	
when I make up my mind, I can have a couple						
drinks and stop	1	2	3	4	5	
drinking is like being given an injection that revives you	1	2	3	4	5	
can't get a drink when I need one, I just wait till later	1	2	3	4	5	
need to drink to feel I can socialize with others	1	2	3	4	5	
all my activities during the day are involved with drink	1	2	3	4	5	
need a drink to do even the most trivial every-day things	1	2	3	4	5	
in some social situations I feel trapped and anxious						
because I can't get a drink	1	2	3	4	5	
don't need to drink when I wake up	1	2	3	4	5	
my drinking is always under my control	1	2	3	4	5	
my whole life revolves around getting my next drink	1	2	3	4	5	
although I feel dreadful in the morning, I don't have a drink	1	2	3	4	5	
drink controls me	1	2	3	4	5	

a TYPICAL MONTH OF DRINKING I usually feel that . . .

STRONGLY DISAGREE
DISAGREE
UNCERTAIN
AGREE
STRONGLY AGREE

	1	2	3	4	5
I can't have just one drink	1	2	3	4	5
I always need to be sure that there is drink around	1	2	3	4	5
If I drink in the morning I feel awful	1	2	3	4	5
It is easy for me to wait for hours between drinks	1	2	3	4	5
I choose where I'm going during the day so I can have a drink at any time.	1	2	3	4	5
When I have been drinking for a while, I feel safe	1	2	3	4	5
When I am dry, the only thought that I have in my head is to get some alcohol inside me	1	2	3	4	5
While I am drinking, my thoughts are on where my next drink is coming from	1	2	3	4	5
Having only one drink is not worthwhile	1	2	3	4	5
One or two drinks are enough for me	1	2	3	4	5

Thank You.

SYMPTOMS CHECKLIST

INSTRUCTIONS

We are interested to know what kind of symptoms you may have had after a few hours without a drink in a TYPICAL MONTH OF DRINKING. This period without a drink can be hours of sleep at night or a day-time period during which for one reason or another you stayed dry. Please note that for each symptom you have to answer two questions : "How Often" and "How Severe".

In a TYPICAL MONTH OF DRINKING when I stayed without a drink for a few hours I FELT ...

SYMPTOMS	HOW OFTEN ?					HOW SEVERE?				
	Never	A few days	Many days	Most days	Every day	Not at all	Slight	Moderate	Severe	Very Severe
1 Depressed	1	2	3	4	5	1	2	3	4	5
2 Indigestion	1	2	3	4	5	1	2	3	4	5
3 Irritable	1	2	3	4	5	1	2	3	4	5
4 Tired	1	2	3	4	5	1	2	3	4	5
5 Craving	1	2	3	4	5	1	2	3	4	5
6 Restless	1	2	3	4	5	1	2	3	4	5
7 Bad sleep	1	2	3	4	5	1	2	3	4	5
8 Confused	1	2	3	4	5	1	2	3	4	5
9 Sweating	1	2	3	4	5	1	2	3	4	5
10 Weak	1	2	3	4	5	1	2	3	4	5
11 Guilty	1	2	3	4	5	1	2	3	4	5
12 Panicky	1	2	3	4	5	1	2	3	4	5

In a TYPICAL MONTH OF DRINKING WHEN I stayed without a drink
for a few hours I FELT ...

SYMPTOMS	HOW OFTEN?					HOW SEVERE?				
	Never ↓ 1	A few days ↓ 2	Many days ↓ 3	Most days ↓ 4	Every day ↓ 5	Not at all ↓ 1	Slight ↓ 2	Moderate ↓ 3	Severe ↓ 4	Very Severe ↓ 5
cannot face the day	1	2	3	4	5	1	2	3	4	5
gry	1	2	3	4	5	1	2	3	4	5
appetite	1	2	3	4	5	1	2	3	4	5
hands and fingers shake	1	2	3	4	5	1	2	3	4	5
nausea, feeling sick	1	2	3	4	5	1	2	3	4	5
dizziness, can't stand up	1	2	3	4	5	1	2	3	4	5
headaches	1	2	3	4	5	1	2	3	4	5
palpitations, racing heartbeat	1	2	3	4	5	1	2	3	4	5
think people are against me	1	2	3	4	5	1	2	3	4	5
stinging hurts my eyes	1	2	3	4	5	1	2	3	4	5
nightmares	1	2	3	4	5	1	2	3	4	5
anxious	1	2	3	4	5	1	2	3	4	5
sneezing	1	2	3	4	5	1	2	3	4	5
muscle cramps	1	2	3	4	5	1	2	3	4	5
itchy inside	1	2	3	4	5	1	2	3	4	5
stomach pains	1	2	3	4	5	1	2	3	4	5
difficulty in breathing	1	2	3	4	5	1	2	3	4	5
hearing funny noises	1	2	3	4	5	1	2	3	4	5
whole body shakes	1	2	3	4	5	1	2	3	4	5
seeing strange objects	1	2	3	4	5	1	2	3	4	5

INSTRUCTIONS

In this part we will carry on asking you about your **LAST SIX MONTHS OF DRINKING**, but now without any specific time period. In other words, we would like you to concentrate on the last six months of drinking as a whole

III - LAST SIX MONTHS OF DRINKING

INSTRUCTIONS

In this part we are interested in what happened with your drinking during your **LAST SIX MONTHS OF DRINKING**. Please read each question, then ring the number that best describes your experience during this period

MY LAST SIX MONTHS OF DRINKING . . .

	NEVER ↓	RARELY ↓	SOME WEEKS ↓	MOST WEEKS ↓	EVERY WEEK ↓
I had a drink in the morning	1	2	3	4	5
I had only a few drinks	1	2	3	4	5
I did not drink at all during the night	1	2	3	4	5
I drank only for a couple of days	1	2	3	4	5
I have gone to bed quite drunk almost every night	1	2	3	4	5
I was completely dry	1	2	3	4	5
I drank my first drink in the morning very slowly	1	2	3	4	5
I drank first thing in the morning	1	2	3	4	5
Some days I drank heavily and others days I drank nothing at all	1	2	3	4	5
I drank only in the evenings	1	2	3	4	5

IN MY LAST SIX MONTHS OF DRINKING

	NEVER ↓ 1	RARELY ↓ 2	SOME WEEKS ↓ 3	MOST WEEKS ↓ 4	EVERY WEEK ↓ 5
11 - I drank throughout the day					
12 - I went to bed without having had a drink in the previous few hours					
13 - I had a few days completely dry					
14 - I gulped down my first drink in the morning					
15 - I stopped drinking two or three hours before I went to bed					
16 - I started drinking at lunch-time					
17 - I had a few drinks before going to bed					
18 - I have woken up in the middle of the night and have had a drink					
19 - I drank only in the morning					
20 - I drank from morning until night every single day					
21 - I stayed dry most of the time					

IV - DRINKING AFTER TWO DAYS COMPLETELY DRY

INSTRUCTIONS

In this part we are interested in what happened to your drinking after you experienced a period of two or three days during which you were completely dry. Please think back to what happened to you within the last six months of your drinking. If you didn't have a few dry days in your last six months of drinking, put a tick in the circle below and answer the questions based on your experience in the last two years. If you also didn't have a few dry days in the last two years, put a tick in the square below and go straight on to page 25.

I didn't have a period of two or three days without a drink in the last six months

I didn't have a period of two or three days without a drink in the last two years.

AFTER A COUPLE OF DAYS COMPLETELY DRY,
WHEN I STARTED TO DRINK AGAIN ...

	NEVER	AFTER A FEW WEEKS	AFTER A WEEK	AFTER A COUPLE OF DAYS	ON THE FOLLOWING DAY
	↓	↓	↓	↓	↓
drank my first drink of the day in the evening	1	2	3	4	5
gulped down my first drink in the morning	1	2	3	4	5
drank all day long	1	2	3	4	5
went to bed at night quite drunk	1	2	3	4	5
first thing in the morning I had a drink	1	2	3	4	5
did all my drinking for the day in just a couple of hours	1	2	3	4	5
within a couple of hours after my first drink in the morning I had to have another drink	1	2	3	4	5

**FTER A COUPLE OF DAYS COMPLETELY DRY,
HEN I STARTED TO DRINK AGAIN . . .**

	NEVER ↓	AFTER A FEW WEEKS ↓	AFTER A WEEK ↓	AFTER A COUPLE OF DAYS ↓	ON THE FOLLOWING DAY ↓
During the day I went without a drink for 4 or 5 hours	1	2	3	4	5
Drank my first drink of the day at lunch time	1	2	3	4	5
Drank something nearly every hour from morning till late at night	1	2	3	4	5
Drank my first drink of the day about an hour after waking up	1	2	3	4	5
Stayed dry for a couple of hours, I gulped down my first drink after that	1	2	3	4	5
Before I went to bed I had to have a couple of drinks	1	2	3	4	5
Did all my drinking for the day in a short period of time	1	2	3	4	5
Took my first drink of the day less than five minutes after waking up	1	2	3	4	5
Woken up in the middle of the night and had a drink	1	2	3	4	5

V - DRINKING AFTER A PERIOD OF TWO WEEKS COMPLETELY DRY

INSTRUCTIONS

Please think back to what happened to you in the last six months of your drinking, after you had been dry for TWO WEEKS. If you didn't have a period of at least TWO WEEKS completely dry in your last six months of drinking, tick the circle below and answer the questions based on your experience when you had this period without a drink in the last TWO YEARS. If you also didn't have TWO WEEKS without a drink in the last TWO YEARS, put a tick in the square below and go straight on to page 27.

I didn't have a period of two weeks without a drink in the last six months

I didn't have a period of two weeks without a drink in the last two years

AFTER A PERIOD OF AT LEAST TWO WEEKS COMPLETELY DRY, WHEN I STARTED TO DRINK AGAIN . . .

	NEVER	AFTER A COUPLE OF MONTHS	AFTER A MONTH	AFTER A COUPLE OF WEEKS	IN THE FIRST WEEK
	↓	↓	↓	↓	↓
	1	2	3	4	5
I drank my first drink of the day at lunch time	1	2	3	4	5
I drank something nearly every hour from morning till late at night	1	2	3	4	5
I drank my first drink of the day about an hour after waking up	1	2	3	4	5
If I stayed dry for a couple of hours, I gulped down my first drink after that	1	2	3	4	5
Before I went to bed I had to have a couple of drinks	1	2	3	4	5
I did all my drinking for the day in a short period of time	1	2	3	4	5

AFTER A PERIOD OF AT LEAST TWO WEEKS COMPLETELY DRY,
WHEN I STARTED TO DRINK AGAIN . . .

	NEVER	AFTER A COUPLE OF MONTHS	AFTER A MONTH	AFTER A COUPLE OF WEEKS	IN THE FIRST WEEK
	↓	↓	↓	↓	↓
I took my first drink of the day less than five minutes after waking up	1	2	3	4	5
I woke up in the middle of the night to have a drink	1	2	3	4	5
During the day I went without a drink for 4 or 5 hours	1	2	3	4	5
I didn't drink at all during the night	1	2	3	4	5
I did all my drinking for the day in just a couple of hours ...	1	2	3	4	5
Within a couple of hours after my first drink in the morning I had to have another drink	1	2	3	4	5
I drank my first drink of the day in the evening	1	2	3	4	5
I gulped down my first drink in the morning	1	2	3	4	5
I drank all day long	1	2	3	4	5
I went to bed at night quite drunk	1	2	3	4	5
First thing in the morning I had a drink	1	2	3	4	5

S.A.D.Q.

Please recall a TYPICAL PERIOD OF HEAVY DRINKING in the last 6 months.

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

DURING THAT PERIOD OF HEAVY DRINKING:	NEVER OR ALMOST NEVER	SOMETIMES	OFTEN	NEARLY ALWAYS
	↓	↓	↓	↓
I woke up feeling sweaty	0	1	2	3
My hands shook first thing in the morning	0	1	2	3
My whole body shook violently first thing in the morning if I didn't have a drink	0	1	2	3
I woke up absolutely drenched in sweat	0	1	2	3
I dreaded waking up in the morning	0	1	2	3
I was frightened of meeting people first thing in the morning	0	1	2	3
I felt at the edge of despair when I awoke	0	1	2	3
I felt very frightened when I awoke	0	1	2	3
I liked to have a morning drink	0	1	2	3
I always gulped my first few morning drinks down as quickly as possible	0	1	2	3
I drank in the morning to get rid of the shakes	0	1	2	3
I had a very strong craving for drink when I awoke	0	1	2	3

CONTINUED)

	NEVER OR ALMOST NEVER	SOMETIMES	OFTEN	NEARLY ALWAYS
- I drank more than 1/4 bottle spirits a day (or 4 pints beer/1 bottle table wine)	0	1	2	3
- I drank more than 1/2 bottle spirits a day (or 8 pints beer/2 bottles wine)	0	1	2	3
- I drank more than 1 bottle spirits a day (or 15 pints beer/4 bottles wine)	0	1	2	3
- I drank more than 2 bottles spirits a day (or 30 pints beer/8 bottles wine)	0	1	2	3

Imagine the following situation:

You have been COMPLETELY off drink for a FEW WEEKS

You then drink VERY HEAVILY for TWO DAYS

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

THE MORNING AFTER :

- I would start to sweat
- My hands would shake
- My body would shake
- I would be craving for a drink

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A LOT
- I would start to sweat	0	1	2	3
- My hands would shake	0	1	2	3
- My body would shake	0	1	2	3
- I would be craving for a drink	0	1	2	3