The Development of an Instrument to Assess the Severity of Opiate Dependence

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PROJECT OVERVIEW

This project set out to devise a brief instrument to measure severity of dependence on opiates. A comprehensive assessment instrument was created with items encompassing all the elements of the drug dependence syndrome. Included with these dependence syndrome measures were questions examining subject demographics, quantity and frequency of opiate use and risk taking behaviour. The assessment questionnaire was administered to 219 heroin users attending detoxification and rehabilitation centres in the Sydney metropolitan area.

Following data collection, a principal components analysis of putative dependence items was conducted which revealed two factors accounting for 27% of variance. These factors isolated the withdrawal and withdrawal relief items. A second stage of analysis was then undertaken in the form of a canonical correlation. This revealed 17 items that were strongly associated with dependence and these were included in a reliability analysis to determine the most representative items for the final scale. This instrument, the Measurement of Opiate Dependence Scale ("MOODS") consisted of 25 questions and incorporated at least one measure for each element of the drug dependence syndrome (as defined by the DSM-III-R and ICD-10). There were no reinstatement measures in the final scale and the applicability of this element is discussed and ideas for future directions explored.

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INTRODUCTION

The dependence syndrome

There have been various models which have attempted to define the nature of drug and alcohol related problems. A prominent and influential concept was the disease model proposed by Jellinek (1). However, in recent years a new model has superseded Jellinek's formal classification, namely the drug dependence syndrome model. The notion of "syndrome" is nothing new, in fact it can be traced back to Thomas Sydenham's writings in the seventeenth century (2). Sydenham argued

> "that a careful observer of patients could note that certain sets of symptoms tended to co-occur. If these co-occurring sets of symptoms were seen repeatedly across a number of patients, this observance would suggest that the syndrome may represent more than a chance collection of symptoms." (pp. 169-170).

The original formulation of this model by Edwards and Gross (3) was to describe alcohol dependence. The alcohol dependence syndrome included seven elements as outlined in Table 1 below. Edwards and Gross describe the syndrome as a clustering of phenomena, rather than a standard set of symptoms. That is, not all the elements of the syndrome need to be present at all times and they need not have the same intensity.

Edwards and Gross (3) claim that since all these elements exist in varying degrees the syndrome has a range of severity. That is, the dependence syndrome is not an "all or none" phenomenon.

TABLE 1

Elements of the Alcohol Dependence Syndrome
1. Narrowing of the drinking repertoire
2. Salience of drinking behaviour
3. Subjective awareness of compulsion to drink
4. Increased tolerance to alcohol
5. Repeated withdrawal symptoms
6. Relief or avoidance of withdrawal by further drinking
7. Reinstatement after abstinence

In 1981, the World Health Organization (WHO) extended the concept of a dependence syndrome to opiates and other psychoactive substances. This drug dependence syndrome also includes seven elements as outlined in Table 2 below. These elements are similar to those in the alcohol dependence syndrome, with two amendments. Firstly, tolerance and withdrawal symptoms are included as part of the same element, labelled neuroadaptation. Secondly, a desire to stop drug use in the face of continued use is included as a new element (4).

It is worth examining what each of these elements mean in terms of the WHO nomenclature (4).

A narrowing in the repertoire of drug-taking relates to a stereotyping of the behavioural elements of drug-taking. Initially a drug-user may "fix" at parties or on Friday nights, responding to numerous cues signalling drug-taking. However, as dependence increases, drug-taking behaviour becomes increasingly

stereotyped. The patient will "fix" irrespective of which day of the week it is, their mood or their present company. As dependency progresses the daily behaviour becomes ritualised with drug-taking scheduled so as to avoid withdrawal symptoms and the further dependency increases, the more this occurs. (3)

TABLE 2

Elements of the Drug Dependence Syndrome

1. A relatively stereotyped drug-taking habit i.e. a narrowing of the repertoire of drug-taking behaviour
2. Salience of drug-seeking behaviour relative to other important priorities
3. A subjective awareness of compulsion to use a drug or drugs, usually during attempts to stop or moderate drug use
4. Evidence of neuroadaptation (tolerance or withdrawal)
5. Use of the drug to relieve or avoid withdrawal symptoms
6. A desire to stop drug use in the face of continued use
7. Rapid reinstatement of the syndrome after a period of abstinence

The second element in the dependence syndrome model is increased salience of drug seeking behaviour relative to other behaviours. As dependence progresses behaviours related to drug seeking (and taking) take priority over other behaviours which previously held importance. For instance when dependence is minimal, the person may religiously watch the Saturday afternoon football. However as dependence increases the football may be forsaken for a trip to their drug supplier. Further as dependency progresses income will

be devoted increasingly to drug use and less and less to other items such as clothing and food (3).

A subjective awareness of a compulsion to use a drug is related to the notion of a user's impaired control. This is described as an awareness in the individual that a further dose of the drug is irrational and, therefore, should not be taken, but the dose is still taken. This notion has been tied with the experience of craving where the user has a subjective need for the drug which to them is beyond control. It is postulated that as dependency increases the user's control will become more frequently impaired. It is this notion of impaired control that Edwards and Gross (3) claim is the core of their alcohol dependence syndrome.

The element of neuroadaptation refers to a combination of increased tolerance to drugs and the appearance of physical withdrawal symptoms. More specifically, it is concerned with the neuronal changes involved with physical dependence and tolerance. In WHO nomenclature used the term neuroadaptation is employed in place of physical dependence in order to avoid confusion about what constitutes physical dependence (4). Simply, neuroadaptation is said to have occurred if there is evidence of tolerance or if, following withdrawal of the drug, a withdrawal syndrome is observed. It is claimed (4) that once neuroadaptation has been developed and learning has occurred then the withdrawal effects can be modified by emotional states and can be evoked by environmental and emotional cues well after cessation of drug use.

Drug taking to avoid withdrawal symptoms is a further element of the dependence syndrome. At early stages of the syndrome users may endure minor withdrawal symptoms in order to finish a certain chore. However, as dependency manifests the person may take drugs at certain times to avoid any withdrawal symptoms. The level of a patient's dependence can be gauged by the timing of the first dose of the day. If the patient can finish the morning chores before the first dose then dependence is not very advanced. Alternatively, the first response upon waking in the morning may be to take a dose of the addictive substance or the patient may even wake in the middle of the night, taking a dose of the drug to ward off impending withdrawal symptoms. This indicates a more severe dependence on the substance. (3)

Drug dependent persons commonly express a desire to stop drug use while continuing to self administer the addictive substance. This element is concerned with the patient's feelings towards their drug taking. It suggests that as dependency increases and drug use continues the desire to stop drug use should grow stronger.

The final element described in the dependence model is a rapid reinstatement of the syndrome following a period of abstinence. It is suggested that time taken to return to the original level of drug intake after a period without drug use is a measure of the patient's dependence. For instance a moderately dependent person may take weeks or months to return to their previous level of dependence. However, a severely dependent person may revert to the preexisting level of use in as little as 72 hours. (3)

Following this acceptance by the WHO, the drug dependence syndrome was incorporated into the American Psychiatric Association's DSM-III-R (5) and the International Classification of Diseases 10th edition (ICD-10) (6). In these classifications impaired control was included as a separate element distinct from subjective compulsion, and continuation of use despite adverse consequences was also added. Reinstatement, which is regarded by many observers as a complex manifestation of dependence and not a discrete conceptual element, was excluded.

An important distinction made in original alcohol dependence syndrome formulations was between alcohol dependence and alcohol related disabilities. A person may lose his job because of drinking at work without suffering from the dependence syndrome. Edwards and Gross (3) suggest that there are secondary results from drinking and that even though dependence makes these more likely to occur, it is not required for their appearance.

This distinction is also carried over into the drug dependence syndrome model, with drug related disabilities being considered separate from dependence. The primary symptoms are those mentioned in the model and the assessment of dependence should not be clouded by the secondary results.

Value of the dependence syndrome model

Models of human disorders are useful only if they inform theory, influence assessment and management, or indicate how the condition will manifest with the passage of time. A key issue is

how the presence of dependence influences substance use and the likelihood of relapse after treatment.

There have been a number of studies investigating the relationship between dependence and relapse. In relation to alcohol dependence, Babor and colleagues (7) observed in a study of 266 patients that relapsers (those that had drunk any alcohol in the year of follow up) had higher life time levels of dependence than abstainers. However, this difference was only found for the males in the study and many other factors were found to influence relapse (social problems, psychiatric diagnosis, previous treatment). In a study of problem drinkers admitted to a general hospital, Saunders (8) reports that those classified as severely dependent who resumed drinking had mean urine alcohol levels of 0.15 g compared with 0.06 g among those with mild or moderate dependence.

Babor et al. suggest that in terms of the opiate dependence syndrome, there is evidence of a relationship with relapse. They claim that "readdiction liability is a direct function of the severity of the [dependence] syndrome before abstinence was begun" (9). Four reasons are provided for this suggestion. These are related to the high reinforcement potential of opiates; the development of tolerance and dependence through frequent use; the finding that withdrawal symptoms can be evoked through exposure to stimuli associated with drug use and finally the suggestion that stress makes heroin users especially vulnerable to relapse. They report a significant correlation ($r=0.34$) between drug

severity at commencement of treatment and drug severity at a seven month follow-up. This study was conducted on methadone maintenance clients using the ASI.

The dependence syndrome concept has been criticised from various sources. One of the major critics is Shaw (10). Shaw's arguments against the syndrome concept centre upon difficulties in validating some of the syndrome elements scientifically and the lack of any apparent clinical or research use. Shaw (10) suggests that the factors discovered in most questionnaire studies are little more than reflections of a number of psychobiologically related questions. By this (10) Shaw proposes that the psychobiological factors (withdrawal symptoms and relief drinking) form a core construct for a "universal pathology of problem drinking" (p39) and the other elements are superfluous. This assertion has, to some extent, been supported by a number of factor analyses on dependence questionnaires (11,12,13,14). Shaw (10) concludes by claiming that the development of a dependence syndrome approach would restrict and confuse medical treatment as the label of a severely dependent or moderately dependent person is not precise.

Hodgson and Stockwell (15) counter this argument against the syndromes usefulness by suggesting that the syndrome not be assessed on the basis of current clinical practice but rather should be judged on its effect in the development of new treatment strategies. Edwards himself claims that the syndrome model provides "a stimulus to further inquiry" (16). The adoption

of a new theory leads to new research and new ideas and further encourages understanding of drug and alcohol problems. Even in terms of current clinical techniques Hodgson and Stockwell (15) suggest that the dependence model can predict whether a patient can return to controlled use or whether they should remain abstinent. They (15) conclude that the syndrome be treated as a "working hypothesis" (p17) that enables the clinician to determine the past history of a substance abuser rather than providing a solution to their personal problems. Further to this the universal adaptation of the dependence syndrome in international classification systems in the period since the publication of Shaw's comments suggests that the dependence syndrome has found an international range of clinical use.

Further criticisms of the dependence syndrome concept have been forwarded by Heather and Robertson (18) and Thorley (21). Therefore it can be seen that while the dependence syndrome has some support, (15,17,18,20,21) it also has its fair share of opposition (10,19,22).

Measuring Dependence

Following the presentation of the alcohol dependence syndrome model several attempts were made to develop questionnaires to measure the level of a patient's dependence. These included the Severity of Alcohol Dependence Questionnaire (SADQ) (23) and the Alcohol Dependence Scale (24). The SADQ was designed to measure the central features of the alcohol dependence syndrome with particular attention to the physical factors. A factor analysis

of the SADQ found that there was a single dependence factor which accounted for a large proportion of the total variance during testing. This finding seemed to support the concept of a unidimensional alcohol dependence syndrome. Similar support for the unidimensional nature of the dependence syndrome was reported by Stripp et al (18). However it must be pointed out that both the SADQ and the ADS did not attempt to include all the elements of the dependence syndrome (25). Also, the ADS was derived from the Alcohol Use Inventory (26) which had been in use prior to the development of the dependence syndrome concept.

Caetano attempted to compare the DSM-111-R with the ICD-10 (27) and concluded that there is good agreement between dependence as measured by DSM-III-R and ICD-10 criteria. In an additional study, Grant (21) noted that because of the nature of the multiple components of dependence (as defined by DSM-III-R or ICD-10) a comprehensive profile of dependence in any individual, encompassing all conceptual elements is almost impossible to determine.

Chick also developed an assessment instrument to measure dependence (11). In his analysis impaired control and the narrowing of the drinking repertoire loaded as distinct dimensions separate from the other elements of the syndrome. This suggests (as Shaw (10) postulated) that perhaps not all the elements in the original model contribute to the syndrome or alternatively that some of these are difficult to measure.

Following the acceptance of the alcohol dependence syndrome as a model for dependence on other psychoactive drugs, attempts were made to assess its dimensions and whether dependence could be measured from responses to questionnaire items. Skinner and Goldberg (28) attempted to measure drug dependence in narcotic users using a questionnaire labelled the DAST-20 (this instrument attempts to assess the extent of involvement with any drug rather than being directed specifically at one substance, as were those described earlier). Skinner and Goldberg found a factor distinct from other factors, reflecting some elements of the drug dependence syndrome. The other factors isolated in their analysis represented social problems, medical problems, polydrug abuse and previous treatment (these are all domains that are separate to the dependence syndrome concept). The dependence factor included items measuring impaired control, a compulsion to use drugs and withdrawal symptoms. However, this questionnaire did not include items to measure narrowing of drug taking repertoire, tolerance, salience of drug seeking behaviour or readdiction liability. Therefore this study does not indicate whether all the elements proposed in the drug dependency model are indeed part of a single dependency factor.

Opiate Dependence Questionnaires

There have been a number of studies examining ways of assessing opiate use and dependence. Before citing the studies it is worth examining the possible reasons for developing a questionnaire to assess the extent of involvement with opiates and specifically the severity of dependence.

The first consideration is that an opiate dependence instrument would have considerable practical value. There is evidence (with respect to alcohol and cigarettes), that the severity of dependence can predict the severity of the withdrawal syndrome on cessation of substance use (29,30). The clinician can be guided on the type of detoxification required (medicated or non-medicated) and the appropriate setting (home, detoxification unit or general hospital). Secondly, the severity of dependence can provide an indication of the patient's prognosis. Reinstatement, which is one of the hallmarks of the dependence syndrome, implies that when drug use is resumed after a period of abstinence, the pattern and level of use quickly revert to that which existed before. As described above, persons classified as severely alcohol dependent maintain a 2-3 times higher alcohol intake after relapse than mildly dependent ones (8). In a six-year follow-up of opiate users, outcome was significantly worse in "addicts" (those who had used heroin daily before treatment) than in "non-addicts" (those who used opiates less than daily) (31). Thirdly, treatment goals and the type of treatment will likely differ according to the degree of dependence (32). Finally, there is a need to develop measures to suit the Australian clinical population that are brief, easy to administer, with suitable psychometric properties.

The second area in which an opiate dependence instrument would contribute is research. Sutherland et al. (12) advance this line of reasoning by identifying possible lines of theoretical research into the psycho-biological nature of dependence. Any

information which describes the degree of a condition in a systematic and valid way is useful in determining the nature of the condition. A measure of opiate dependence can aid in research into natural history and career of opiate use. Measures of severity of dependence through various stages of individual users drug history can provide useful information as to the rapidity with which dependence manifests. Examination of the patterns and variations of dependence could be used to predict future dependence (12). Such a questionnaire would also contribute to more refined treatment for opiate dependence. The degree of dependence may correlate with the effectiveness of methadone or the effectiveness of hospitalisation (12).

It can be seen, therefore, that the development of a valid and reliable questionnaire to measure severity of opiate dependence could have multiple beneficial uses.

The first scale to assess the severity of opiate dependence was developed in the Addiction Research Unit in London and was published shortly after the present study commenced. Sutherland and colleagues (12) devised a questionnaire for opiate dependence based on the SADQ, and labelled the scale the "Severity of Opiate Dependence Questionnaire" (SODQ). Like the SADQ this questionnaire deals mainly with symptoms of physical dependence. Sutherland et al. found, in a sample of 98 New York addicts, that there was one factor which contributed 40% of the total variance suggesting a dimensionality of opiate dependence (12). However, this study found, similarly to Chick (11), that the validity of

the concept of narrowing of repertoire of drug taking was doubtful, suggesting that this element may be superfluous to the syndrome or very difficult to operationalise.

Two further studies were conducted with the SODQ, among both British and American addicts. In the British study Phillips et al. (13) found that both the total and factor scores of the SODQ correlated significantly with the addicts' perception of their own dependence, suggesting strong concurrent validity. However contrary to Sutherland et al.'s (12) experience, they discovered two strong factors accounting for dependence in their factor analysis. The physical and affective withdrawal symptoms loaded

on one factor (accounting for 21% of total variance) and the withdrawal relief items loaded on another (17% of total variance).

Further, as with previous studies, this analysis found that the narrowing of repertoire question was not related to the total SODQ score. As mentioned earlier, this element is difficult to operationalise and this is even more true with opiate users. Opiate users usually have one preferred opiate and take others only when that opiate is unavailable. This means that the stereotyping of use associated with alcohol (from drinking various types of alcohol to drinking whisky every night) is not manifest in opiate users as diversity of use is not evident from the outset. Phillips et al. may have compounded this effect by using only one question to assess the element (13).

This study also found that reinstatement after abstinence was difficult to measure. This was because many addicts had not recently been abstinent. Phillips et al. (13) suggest that this element is not relevant to opiate users and should be left out of future opiate dependence questionnaires.

Finally Phillips et al. (13) proposed that there may be cultural differences in the nature of opiate dependence between British and American samples. This may be one explanation for the difference in findings between the two studies although it is contrary to Edwards and Gross' (3) model of a universal phenomenon.

The other study using the SODQ was a replication by Sutherland and colleagues of the original New York study, this time using 126 patients from the same clinic as their original study. This second study found similar results to the first in that only one strong factor emerged in the factor analysis (14). This study, therefore, did not account for the discrepancy between the New York and British patients which still requires explanation.

Burgess and colleagues (33) administered the SODQ to a sample of 114 opiate users in a rehabilitation unit in Australia. This study also found that rapidity of reinstatement did not factor as part of a dependence construct. The analysis also highlighted the deficiencies of the SODQ in that it does not measure compulsion to take drugs and salience of drug seeking behaviour. This study's findings replicated the psychometric features of the SODQ

found in previous studies with the same factor distribution as in Sutherland et al.'s first study and a similar Cronbach's alpha. Burgess et al (33) suggest in their conclusion that it is very important that an instrument be devised to measure all seven elements of the drug dependence syndrome in "order to evaluate thoroughly the postulates of the dependence syndrome (i.e. unidimensionality, generalizability)" (p1458).

It is apparent from the studies cited above that research is required to determine whether all elements of the generic dependence construct are applicable to opiate dependence. One purpose of the present study therefore was to assess the presence of each of the conceptual elements of the drug dependence syndrome among a representative sample of opiate users. The study would also assess the existence of any cultural differences in Australian opiate users compared with British and American ones.

Aims and objectives of the present study

The major aims of the study were to examine the applicability of the dependence syndrome construct to opiate use and then to develop a self administered questionnaire to measure the severity of opiate dependence which had sound psychometric properties and was suitable for use in Australian clinical practice.

Some specific objectives of this study were:

1. To develop an assessment instrument on opiate use which encompassed all the conceptual elements of dependence together with measures of the extent of opiate use and harmful consequences and related phenomena.

2. To determine the scale properties of these conceptual domains and the interrelationship between them and other parameters of opiate involvement.

3. To identify representative items from each domain and construct a brief assessment questionnaire suitable for Australian clinical practice.

STUDY DESIGN AND METHODS

Development of the assessment questionnaire

The draft version of the assessment questionnaire had its origins in work on the generic dependence syndrome conducted in the Addiction Research Unit in London. The principal investigator (JBS) had discussions with Professor G.Edwards and Dr M.Gossop between 1983 and 1985 regarding the derivation of a measure to assess the severity of opiate dependence. Subsequently a basic set of questions were devised by Dr Gossop based on the work of Stockwell et al (23). These were modified and extended by the present investigators (JBS, TS) with help from a psychometric consultant, Dr R.Homel. Following pilot studies, the questions were further modified to suit Australian conditions. The draft version also incorporated questions on certain elements of dependence not addressed in earlier studies. The draft questionnaire consisted of questions addressing the following areas:

(1) Socio-demographic variables

(2) Type of opiate(s) used

(3) Method of administration

(4) Quantity and frequency of use

(5) Stereotyping of use

(6) Salience of use

(7) Physical withdrawal symptoms

(8) Psychic withdrawal symptoms

(9) Drug-seeking behaviour

(10) Reinstatement

(11) Beliefs about opiate withdrawal

(12) The setting in which drug use takes place

(13) Self-perception of opiate use

(14) Continued use despite knowledge of harmful consequences

(15) Overdosing on opiates

(16) Activities users were prepared to engage in to obtain opiates; and

(17) Subjective desire to use opiates

The draft version of the questionnaire was provided to the following people for their comments:

1) clients admitted to the Detoxification Unit of Royal Prince Alfred Hospital,

2) clients admitted to the McKinnon Detoxification Unit, Rozelle Hospital,

3) lay staff members from these detoxification units (i.e ex users of opiates)

4) professional staff members from the Centre for Drug and Alcohol Studies, Royal Prince Alfred Hospital, and

5) staff members from the Department of Psychology, University of Sydney.

Following their comments on the draft version, modifications to the questionnaire were made to suit the present investigation. The modified questionnaire was then administered to clients admitted to the Detoxification Unit, Royal Prince Alfred Hospital. If any difficulties were noted in their comprehending any parts of the questionnaire, changes were made appropriately.

The final version of the assessment questionnaire was entitled QUestionnaire for OpiaTe Assessment ("QUOTA").

Subjects

For the purposes of the study it was important to obtain as representative a sample as possible of opiate users attending clinical facilities. Accordingly consecutive samples of patients admitted to five detoxification and rehabilitation services in metropolitan Sydney over a period of 15 months were taken.

The following centres were approached and arrangements made for data collection:

(1) Detoxification Unit, Royal Prince Alfred Hospital (Basement 82),
(2) McKinnon Detoxification Unit, Rozelle Hospital,
(3) Wisteria House Detoxification Unit, Cumberland Hospital ,
(4) Mosman Hospital Detoxification Unit, and

(5) Odyssey House, Campbelltown.

Four general inclusion criteria were applied:

(1) age between 18 and 40 years,

(2) must have used an opiate drug for at least six months,

(3) used opiates in the month prior to the administration of the questionnaire, and

(4) able to understand written English.

The suitability of a client to answer the questionnaire was first ascertained and exclusion criteria were applied at this point. exclusion criteria included the presence of severe opiate withdrawal, a withdrawal syndrome from any other drug, including alcohol, and the presence of major psychiatric disorder. Subjects were also excluded if they were undergoing assessment as part of a court assessment programme. Next, the clients were approached and informed as to the nature of the study. No-one was coerced into answering the questionnaire. Clients were assured that the questionnaire was totally confidential and results would not be divulged to the treatment agency. The questionnaire was administered individually. If clients had any difficulty in answering any questions, they were encouraged to clarify these with the co-investigator (TS) who administered the questionnaire. The average time taken to complete the questionnaire was between 30-45 minutes. The investigators undertook special efforts (34), to improve the validity of the subjects' self-report.

RESULTS

Demographic data

Two hundred and nineteen heroin users who were admitted to five detoxification and rehabilitation units completed the assessment questionnaire. Clients from the participating units showed a high degree of similarity and aggregate results only are presented. Their average age was 26.8 years (SD 5.6 years). The overall sex ratio (M:F) was 1.8 to 1 (this was the only variable that differed appreciably between units). Most were single ("never married" 47%: separated/divorced 20%) and 81% were unemployed. Most either rented a unit (17.5%), lived with their parents (21.3%) or lived in a hostel (17.5%).

Table 3

Demographic Data

Sex Ratio (M/F)	1.8 : 1
Mean Age (± S.D.)	26.8 ± 5.6 years
Marital Status:-	
Married/De Facto	73 (33%)
Divorced/Widowed	43 (20%)
Never Married	102 (47%)
Education Level:-	
Below School Certificate	105 (48%)
School Certificate	78 (36%)
H.S.C. or Above	36 (16%)
Employment Status	
Employed	42 (19%)
Pension	72 (33%)
Other (Unspecified)	97 (44%)
Residence:-	
Owned Residence	10 (5%)
Rental Residence	87 (40%)
Other	122 (56%)

Table 4

Parameters of Drug Use

Age started using opiates		18.0 ± 4.1 years
Age started using daily		19.8 ± 4.5 years
Age first felt addicted		21.1 ± 4.6 years
Heroin use per day (mg)**		942 ± 880 mg
Heroin use per day ($)		238 ± 186 dollars
Number of fixes per day		3.8 ± 1.8
Minimum number of IV fixes per day		1.7 ± 1.1
Maximum number of IV fixes per day		6.0 ± 2.3
Experienced withdrawal		200 (91%)
No. who believe they are addicted		216 (99%)
Needle Sharing: (past)	Never	41 (19%)
	Sometimes	93 (43%)
	Often	35 (16%)
	Always	49 (22%)
Needle sharing: (future)	No	152 (69%)
	Maybe	43 (20%)
	Probably	17 (8%)
	Definitely	7 (3%)
Overdoses:	Never	137 (63%)
	Sometimes	52 (24%)
	Often	17 (8%)
	Always	10 (5%)
Deal in drugs		126 (66%)

* This measure is the amount of heroin bought "off the street". It is not an estimate of the amount of pure heroin used.

Table 5

Experience of dependence syndrome symptoms

	Never	Sometimes	Often	Always
WITHDRAWAL				
Aches	11 (5%)	71 (32%)	76 (35%)	61 (28%)
Cramps	34 (16%)	94 (43%)	64 (29%)	27 (12%)
Nausea	17 (8%)	73 (33%)	92 (42%)	37 (17%)
Heart Pounding	35 (16%)	97 (44%)	65 (30%)	22 (10%)
Hot/cold flushes	13 (6%)	64 (29%)	93 (43%)	49 (22%)
Depression	4 (2%)	70 (32%)	88 (40%)	57 (26%)
Tense	7 (3%)	72 (33%)	87 (40%)	53 (24%)
Angry	9 (4%)	58 (27%)	101 (46%)	51 (23%)
Restless	1 (.5%)	42 (19%)	89 (41%)	86 (39%)
WITHDRAWAL RELIEF				
Opiates stop nausea	9 (4%)	32 (15%)	63 (29%)	115 (53%)
Opiates stop ache	12 (6%)	40 (18%)	56 (26%)	110 (50%)
SUBJECTIVE COMPULSION/IMPAIRED CONTROL				
Is your opiate use out of control	15 (7%)	50 (23%)	78 (36%)	76 (35%)
Does the thought of missing a dose worry you	9 (4%)	29 (13%)	68 (31%)	113 (52%)
TOLERANCE				
Do you need to take opiates more often now				
Not at all			23 (11%)	
A little more often			67 (31%)	
A lot more often			88 (40%)	
Very much more often			39 (18%)	

The subjects had been using opiates from a mean age of 18.0 years and had been doing so on a daily basis from 19.8 years. Heroin was the drug of choice in all except 15 cases. Other opiates used included methadone (n=37), pethidine (13), codeine (20), palfium (11), morphine (11), doloxene (8), percodan (3) and dilaudid (3). Multiple opiates were used by certain individuals. The average number of injections per day was 3.8 (with a range of 1 to 10). The average level of use was 942 mg per day; this refers to the street weight, not to the amount of pure opiate. The average value of heroin used daily was $238. Nearly all users considered

themselves dependent on opiates and 91% had previously experienced withdrawal. Of our sample 63% claimed that they had never experienced an overdose while only 13% stated that it occurred often or always. Finally, 81% had shared needles on at least one occasion. However 152 (69%) of subjects stated that they would never share needles in the future.

It can be seen from Table 5 that having multiple withdrawal symptoms was a near universal experience. Only one subject claimed that they never felt restless in the morning, no fewer than four claimed that they did not feel depressed and only 17 respondents stated that they were not nauseous upon waking. Further 91% of subjects felt that their heroin use was out of control at least some of the time and 96% said they worried about missing a dose. Finally 89% of respondents reported some degree of tolerance to opiates.

Factor Analysis

The major aims of this analysis were to examine the interrelationships of the conceptual elements of dependence and to provide a basis for the selection of items for a brief opiate dependence assessment instrument. Ten conceptual elements, involving 45 variables, were selected from the QUOTA questionnaire. The ten concepts were physical withdrawal symptoms, affective withdrawal symptoms, relief of withdrawal symptoms, narrowing of repertoire, tolerance, impaired control, subjective compulsion, continuation of use despite adverse consequences, salience and reinstatement after abstinence. Each

of these domains were measured with items rated on four point scales with the exception of some of the salience items which were measured with dichotomous response categories.

The first stage of the analysis involved examining whether these 45 variables formed coherent mathematical subsets consistent with their allocation to the elements of dependence. The specific goal of the analysis was to reduce the number of variables required in the measurement of the elements of dependence. The reduced set could then be included in the revised final version of the questionnaire (MOODS - Measurement Of Opiate Dependence Scale).

This stage was tested by performing an exploratory factor analysis on the correlation matrix for the entire set of 45 individual variables. At this point in the development of MOODS, the ten elements were not considered theoretically defined enough to warrant a confirmatory factor analysis approach.

The factor structure of these 45 variables was investigated using both image factor extraction and principal component extraction techniques. Following extraction, both orthogonal (varimax) and oblique (oblimin) rotations were performed to improve the interpretability of the obtained solution. All exploratory factor analyses were performed through SPSSX (35). Inspection of the various solutions revealed that the different extraction techniques, combined with the different rotations, resulted in very similar solutions. It has been suggested this is an indication of statistical robustness (12). The principal

component extraction with an oblique rotated solution will be reported here.

Table 6

Summary of Principal Components Analysis with Oblique rotation

Variable	Factor Loadings Factor 1	Factor 2
WITHDRAWAL SYMPTOMS (physical and affective)		
Body aches or feels stiff	0.57	-0.33
Notice heart pounding	0.47	-0.12
Feel sick	0.68	-0.16
Have hot and cold flushes	0.64	-0.17
Get stomach cramps	0.68	-0.11
Feel miserable or depressed	0.76	0.10
Feel restless and unable to relax	0.68	-0.10
Feel irritable or angry	0.72	0.13
Feel tense	0.84	0.01
RELIEF OF WITHDRAWAL SYMPTOMS		
Use opiates to stop aching	0.12	-0.83
Use opiates to stop feeling sick	0.11	-0.78
First thing I think of is to take some opiates	0.06	-0.75
First thing I do after I wake up is take some opiates	0.08	-0.65
Like to take my first dose within 2 hours of waking	0.07	-0.48
CONTINUED USE DESPITE ADVERSE CONSEQUENCES		
Continued using opiates while ill in bed	0.03	-0.47

Thirteen factors, identified with eigenvalues greater than 1.00, were extracted. This solution explained 67.5% of the total variance. However, the solution was dominated by the first factor, which accounted for 20.2% of the variance, while the second factor accounted for only 7.1% of variance and the third factor 5.7%. Although the third factor explained a similar

proportion of the total variance to the second factor, beyond the second factor the pattern matrix revealed that the remaining eight sets of variables were often mixed across factors. As well some of these factors were represented by three or fewer variables and were considered unreliable.

The main result of the factor analysis was that the first two factors retrieved the physical withdrawal symptom and affective withdrawal symptom concepts combined as the first factor and the relief of withdrawal symptom concept as the second factor. The only exception to this ordering was that two affective withdrawal symptoms ("I feel I would like to use opiates" and "I have a strong craving to use opiates") were not included on the first factor and one "continuation despite adverse consequences" item ("Have you continued to use opiates while ill in bed") was included on the second factor. The full pattern matrix for the principal components analysis is available in appendix B.

Canonical correlation analysis

Rather than further interpreting the obtained factor structure it was decided to utilize these results in a second stage of the analysis. This second stage in the reduction of the dependence variables was to perform a canonical correlation analysis using the information gained from the factor analysis. The goal of canonical correlation analysis is to understand the relationships between two sets of variables measured on an interval scale. It identifies linear combinations of the variables within each set such that these combinations have maximum correlation. In this

way canonical correlation parsimoniously describes the number and nature of mutually independent relationships existing between the two sets of variables (36).

Accordingly, the variables associated with physical withdrawal symptoms, affective withdrawal symptoms and relief of withdrawal symptoms were entered as one set of variables, with the remaining variables entered as the other set to the canonical correlation. The first set of variables, identified on the first two factors of the factor analysis, are core features of physical dependence. The second set contained those variables which had not been systematically ordered in the factor analysis but which were considered to contain information about dependence. It was desired to identify those variables in the second set which were highly associated with the first set. In this way the variables in the second set associated with dependence could be identified. The canonical correlation was performed in SPSSX.

Accordingly, the important variables measuring opiate dependence were identified in the second set through their correlation with the items identified from the factor analysis. It was not a goal of this research to name these dimensions of dependence.

Overall, there was a significant relationship between the two sets of variables (Wilks' lambda =0.001: approximate F=1.64; df=476, 1336; p=0.000). Wilks' dimension reduction analysis suggested that only the first four canonical correlations were statistically significant. The first canonical correlation was

0.83 (21.8% of variance); the second was 0.81 (18.8% of variance); the third was 0.75 (13.1% of variance) and the fourth was 0.70 (10.0% of variance). In total the four canonical variates accounted for 63.75% of the variance. These four canonical variates were found to be significant to an alpha of 0.05. The remaining 13 correlations produced were non-significant.

Data on the four pairs of canonical variates appears in Table 6. Shown in the table are the standardized canonical variate coefficients, percent of within-set variance accounted for by the variates and the canonical correlations.

Based on the four canonical variates there are 17 variables from the second set that were included in the revised scale along with the withdrawal items and the relief of withdrawal items from the first set. These 17 variables include: 6 salience items (actch, plan, store, preoccup, obtain, impt); 3 continued use despite adverse consequences items (infect, share, cont.); 1 Subjective Compulsion item (missfix); 2 narrowing of repertoire items (wayvary, amtvary); 3 tolerance items (often, quality, effect); 1 reinstatement item (everyday); and 1 impaired control item (control). (See appendix A).

Table 7

Canonical variates and standardized canonical Co-efficients for the four significant variates

First Canonical variate Canonical corr = 0.83 (22% of variance)

Dependent Variables (Withdrawal and withdrawal relief items)	Co-efficient		Independent Variables (Other dependence concepts)	Co-efficient
Depress	0.66	WITH	Impt	0.42 (Salien)
Like	0.35		Store	-0.36 (Salien)
Opsave	-0.56			
Stopsick	0.51			

Second canonical variate Canonical corr = 0.81 (19% of variance)

Heart	-0.60	WITH	Quality	-0.33 (Toler)
Tense	0.51		Cont.	-0.38 (Cont U)
Opsave	-0.31		Infect	-0.36 (Cont U)
Istdose	-0.41		Preoccup	0.43 (Salien)
Stopache	-0.32		Obtain	-0.46 (Salien)
			Store	-0.58 (Salien)

Third canonical variate Canonical corr = 0.75 (13% of variance)

Flush	-0.49	WITH	Amtvary	0.38 (Narrow)
Tense	-0.55		Effect	-0.38 (Toler)
Restless	0.34		Quality	0.35 (Toler)
Crave	-0.34		Control	-0.34 (Imp C)
Opsave	-0.56		Share	-0.32 (Cont U)
First	-0.46		Infect	0.46 (Cont U)
			Preoccup	-0.36 (Salien)
			Store	-0.34 (Salien)

Fourth canonical variate Canonical corr = 0.70 (10% of variance)

Wakeache	0.32	WITH	Wayvary	0.37 (Narrow)
Tense	-0.34		Often	0.32 (Toler)
Angry	0.42		Everyday	-0.40 (Reinst)
Istdose	-0.88		Missfix	-0.30 (Subj C)
Stopsick	0.41		Infect	-0.38 (Cont U)
Stopache	-0.36		Plan	0.46 (Salien)
Opfirst	0.48		Actch	0.50 (Salien)

Note: a cut-off co-efficient of 0.3 was used as suggested by Tabachnick & Fidell (p217) (36). See appendix A for explanation of variable names.

Final derivation of MOODS

Following the principal components analysis and the canonical correlation there were fifteen withdrawal and withdrawal relief items and twenty one questions representing other domains (note the "actch" variable was made up of 5 questions thus increasing the number of items from 17 to 21 that were revealed by the canonical correlation) that could be statistically justified to be present in MOODS. It was felt that this number of items was too lengthy for a brief scale and the scale was examined thoroughly to determine which twenty-five measures would best represent dependence. It was determined that a twenty-five item scale was the optimum size for providing ease of scoring while still being large enough to provide question representation to each of the dependence syndrome domains. At this point a reliability analysis was undertaken to determine the internal reliability of the scale. This analysis was performed in SPSS PC+. This analysis reported high internal consistency with a Cronbach's alpha of 0.84. The item to item - total correlations identified ten questions that if deleted would improve the internal reliability. These items were opsave (withdrawal relief), everyday (reinstatement), wayvary (narrowing of repertoire), quality (tolerance), effect (tolerance), store (salience), obtain (salience) and three of the measures making up actch (G,H,I). This new scale (of twenty-six items) revealed a Cronbach's alpha of 0.89. In order to prevent the scale from being overly represented by psychobiological questions the final item deleted (cramps-withdrawal) was chosen from the physical dependence items. This variable was selected as it had the lowest

item to item - total correlation of the physical dependence measures (withdrawal and withdrawal relief). The resulting Cronbach's alpha for the new twenty-five item scale was 0.88.

The final scale therefore is composed of twenty-five questions each with response categories comprising of four-point scales. Each response can be scored from 0-3 resulting in a total scale score for a given individual in the range of 0-75. All dependence syndrome domains (as defined by the DSM-III-R and ICD-10) are represented. Reinstatement which is not included in the DSM-III-R or ICD-10 definitions is the only element from the original dependence syndrome model not to be assessed by this scale. The dependence syndrome domains are represented as follows: withdrawal - 8 items, withdrawal relief - 5 items, salience - 5 items, continued use despite adverse consequences - 3 items, subjective compulsion/impaired control - 2 items, tolerance - 1 item, narrowing of repertoire - 1 item.

DISCUSSION

Opiate involvement of sample

Examination of the descriptive data reveals that our sample was not notably different from those of other studies of opiate users in treatment. Our subjects were slightly younger (mean age 26.8 yrs) than those studied by Sutherland et al. (30.3 yrs), Phillips et al. (28.3 yrs) and Burgess et al. (31.7 yrs) (12,13,33). However, their opiate use and experience of dependence and adverse consequences were remarkably similar. There were no significant differences in the number of injections per day, in age of first use, age of starting daily use and age at which subjects felt they had become addicted.

The only difference worthy of note is that our study did not find the same rapid progression from first use to addiction that was described in the other Australian sample (33). The Melbourne study found that an average age of first use was 20.0 yrs and that average age of feeling addicted was 20.7 yrs. Our study parallels the findings of the New York and British samples with the average progression taking a little over three years (first use - 18.0 yrs; first felt addicted - 21.1 yrs). It is possible that the Melbourne addicts may have been particularly prone to rapid development of dependence. Whether this is indeed so and reasons for this must remain the subject for future research. The mean amount of daily heroin use was also similar to that reported in treatment populations, but the large standard deviation indicating a wide range in the amounts injected by users must caution against accepting these figures as precise estimates. It

is not possible to compare estimates of amount taken across studies due to differences in measuring methods.

Examining the reports of withdrawal symptoms it is easy to see why these measures factor out repeatedly. All subjects reported at least one withdrawal symptom and for any given symptom, in most cases, 90% of subjects reported experiencing it (exceptions were cramps 84% and heart pounding 84%). With such a consistent response to these questions it is no surprise that they form the core of dependence syndrome scales. This consistent experience effectively reduces these questions, from an analysis perspective, to three point scales diminishing the amount of variation.

Reports of overdosing were received from 37% of our sample. Of the 54 cases who answered the question investigating the relationship between purity of heroin and their overdose 41 (78%) declared that unexpected purity was the cause of their overdose. Further 18 subjects claimed that other drugs may have been mixed with their heroin causing the overdose. This provides some insight into the "pot luck" nature of the purity of heroin on the streets and makes estimates of pure heroin intake difficult.

An examination of the needle sharing behaviour reveals that only 19% of our sample had never shared needles. This figure is similar to that of Wolk et al (37), who found that 20% of their subject population had never shared needles. Further Wolk et al. state that 30% of their sample shared needles daily. In our

sample 22% claimed that they "always" shared needles and this again suggests comparability between our results and theirs. Subjects recruited by Wolk et al. were obtained from new admissions to methadone programmes as well as from an inner Sydney AIDS clinic and from users who approached an inner Sydney needle and syringe exchange programme. This suggests some uniformity in needle sharing behaviour amongst users irrespective of where they are drawn from. In other words, users in detoxification units are indicative of users from other sources at least in terms of their reports on needle sharing behaviour.

Additionally, even though 78% of respondents claimed they had shared needles in the past only 31% stated that they would do so in the future. This finding mimics that of Morlet and colleagues (38) who found 86% of their sample had shared in the past but only 40% were doing so currently. Each of these results suggest that the AIDS awareness education that has been proceeding is reaching a large proportion of the intravenous drug using population. Further the availability of clean needles and syringes from Outreach programmes may be assisting in reducing the need for needle sharing.

Examination of activities that users engage to obtain money for drugs was undertaken as part of this study. In our sample 66% of subjects stated that they would deal in drugs in order to obtain money to finance their habit. In terms of gaining money, dealing in drugs was the most prevalent response. However, stealing drugs

directly (either from a mate or a dealer) was more common. This aspect of our research will be presented in greater depth in a future publication.

Development of MOODS

The purpose of this study was to develop a short assessment instrument (MOODS) for dependence that, if possible, incorporated all of the dependence syndrome items. Examination of the factor structure of the dependence items in the large questionnaire (QUOTA) revealed two strong factors. These factors represent withdrawal symptoms (both physical and affective) and relief of withdrawal drug taking (20.2% and 7.1% of the variance respectively). This is similar to the findings presented by the previous studies examining dependence using the SODQ (12,13,33). It is not surprising that these two factors emerged, as our questions dealing with these elements were based on the related items in the SODQ.

Following the canonical correlation analysis, a revised instrument was developed which encompasses all the dependence syndrome elements. These items were included in MOODS on the basis of their correlation with the withdrawal and withdrawal relief items in QUOTA. This was considered to be justified as these items have been repeatedly found to be associated with opiate dependence through factor analysis in previous studies (12,13,14,33). Each pair of canonical variates isolated had a correlation of 0.70 or greater suggesting a strong relationship

between the variables revealed by the canonical correlation and the measures of physical dependence included in the assessment instrument and in SODQ.

At the outset of the study, it was considered it might be possible to construct a questionnaire which would give equal weight to the various elements of dependence, and in addition would enable a dependence syndrome profile to be drawn for each user. The questionnaire we have developed is weighted heavily with withdrawal, withdrawal relief and salience items. Sanchez-Craig and Wilkinson (32) stated from their experience that they did not believe that it was possible to draw dependence syndrome profiles for individual users. As each element is represented by at least one questionnaire item, MOODS does provide the broadest measure of dependence, as defined in DSM-III-R and ICD-10, available at the moment. As some concepts are represented by only one item, the scale would best be used as an overall assessment of dependence severity rather than as a diagnostic tool to isolate dependence syndrome characteristics in a given individual.

One issue that requires attention is the lack of any distinct factors emerging which represent reinstatement after abstinence. These were found to load on a separate factor in the two studies by Sutherland et al. (12,14). Even following our canonical correlation analysis only one reinstatement item survived and this was found to be the least reliable item in the scale and was the first measure discarded following the reliability analysis.

Examination of past attempts to operationalise the rapid reinstatement element for opiate use reveals that this element may not be readily applied in an opiate using population. Phillips et al (13) found that over one third of their sample had not "experienced a recent period of abstinence". They subsequently omitted their reinstatement items due to low factor loadings. Burgess et al (33) also found difficulty with the reinstatement items. They reported that only one item measuring this element survived their initial analysis. Furthermore they found that scores on the reinstatement items failed to correlate with the total SODQ score. Burgess et al hypothesise from their results that perhaps rapidity of reinstatement is not a core dependence syndrome element (33).

An alternative explanation is that this phenomenon is highly culture dependent, or that the items used in this and other studies are culture bound. In the five studies which have examined reinstatement only the two American ones found that these items loaded on a distinct factor. This may be due to a number of reasons. Perhaps the supply situation is more variable in New York, leading to a greater number of users abstaining for a period of 2 weeks or more. The major problem found in our study and the British study was that a large number of our sample had never abstained for a period of greater than two weeks. Dobinson and Ward (39) found in their examination of Sydney heroin users that 23% of their sample had never abstained. Furthermore, their (39) definition of abstinence involved no use for a period of one week or more which is a more lenient criterion than that applied

by our study and those examining the SODQ questionnaire (two weeks or more was used for these studies).

Future research

It is now appropriate for the revised scale to be further examined to determine its internal reliability and validity. Currently this research is being undertaken with MOODS being administered to 200 detoxification clients to measure its reliability. Concurrent validity checks are also being undertaken through objective clinical measures of dependence. These include use of the Opiate Withdrawal Scale (40), the Objective Opiate Withdrawal Scale (41) and naloxone challenge. These measures will be used to measure the concurrent and predictive validity of MOODS. One issue to be addressed in this examination of MOODS is the time frame focussed on when measuring dependence. That is, are questions about a "typical period of opiate use" adequate to determine an individuals current state of dependence especially if this ypical period occurred greater than twelve months previously.

Further to this, the questionnaire has been modified to measure dependence in two separate populations. These populations are heroin users applying to commence methadone maintenance and chronic pain patients who are regular users of opioid analgesics. In the first population it is expected that there may be some response bias in answering MOODS due to a desire to appear more dependent and thus gain entrance to the programme. Therefore modifications have been made to accommodate this and following

administration to 200 applicants further adjustments will be made. In the second population, adjustments have been made for a number of reasons. First, the method of obtaining prescription analgesics is quite different to that of illicit heroin. Secondly, this populations responses will be confounded by their level of pain. Thirdly, patients in this group will not, in most cases, be seeking treatment for their painkiller use per se. Amendments have been made and will be concluded upon completion of responses by 100 patients using opioid painkillers. Results from these studies will be presented in future publications.

In addition, included as part of the original assessment questionnaire were some items examining situations which may precipitate opiate use. These items examined three situational domains in an attempt to devise a scale for measuring the likelihood of relapse to opiate use. Following analysis of these items an internally reliable scale was constructed. This derived scale comprised three distinct subscales, one for each of the situational domains. These scales measured the likelihood of using heroin during various types of negative emotional states, negative physical states and instances of social pressure. It is suggested that this scale can be used to determine a profile of high risk situations for an individual user and thus provide direction for the clinician in preparing coping strategies to prevent relapse. A complete description of this aspect of our study is currently in preparation (42).

Taking into account previous studies examining the dependence syndrome concept, it would appear that the withdrawal and withdrawal relief items are consistent, reliable measures of dependence as they are revealed amongst users in three different countries and from five different samples. However, on the basis of these results it would seem that all the dependence syndrome elements can be operationalised in such a way as to provide evidence of a relationship with dependence and to provide some systematic measure of its severity.

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Appendix A

M.O.O.D.S. (The revised scale)[1]

1. How old are you now?

2. What is your sex?

3. How old were you when you first used opiates?

4a. Have you been using opiates on a daily basis?

4b. If yes, how old were you when you first started taking opiates daily?

5a. How many days ago did you last take opiates?

IN THE FOLLOWING SECTIONS WE WOULD LIKE TO KNOW ABOUT A TYPICAL PERIOD OF OPIATE USE IN YOUR LIFE

6. How many times do you inject during a typical day?

1 2 3 4 5 6 7 8 9 10 or more

7. What would be the fewest injections you would have during a typical day?

1 2 3 4 5 6 7 8 9 10 or more

8. What would be the greatest number of injections you would have during a typical day?

1 2 3 4 5 6 7 8 9 10 or more

[1] The variable names from the analysis are included in brackets along with their dependence syndrome domain. Note there are no variable names included for the drug history variables.

9. How much opiate would you use each day? (Please write down the amount in grams, weights, milligrams or millilitres).

Heroin (smack) _____

Morphine _____

Methadone _____

Pethidine _____

10. Does the amount of opiate you take vary from day to day? (amtvary-NR)

Not at all	Varies a little	Varies a lot	Varies very much

PLEASE ANSWER EACH QUESTION BY CIRCLING ONE RESPONSE ONLY

On waking and before my first dose of opiates:

11. My body aches or feels stiff (wakeache-PW)

Never or Almost never	Sometimes	Often	Always or Nearly always

12. I feel sick (wakesick-PW)

Never or Almost never	Sometimes	Often	Always or Nearly always

13. I notice my heart pounding (heart-PW)

Never or Almost never	Sometimes	Often	Always or Nearly always

14. I have hot and cold flushes (flush-PW)

Never or Almost never	Sometimes	Often	Always or Nearly always

15. I feel miserable or depressed (depress-AW)

Never or Almost never	Sometimes	Often	Always or Nearly always

16. I feel tense or panicky (tense-AW)

Never or Almost never	Sometimes	Often	Always or Nearly always

17. I feel irritable or angry (angry-AW)

Never or Almost never	Sometimes	Often	Always or Nearly always

18. I feel restless or unable to relax (restless-AW)

Never or Almost never	Sometimes	Often	Always or Nearly always

PLEASE ANSWER EACH QUESTION BY CIRCLING ONE RESPONSE ONLY

19. In the morning, I use opiates to stop myself feeling sick: (stopsick-WR)

Never or Almost never	Sometimes	Often	Always or Nearly always

20. The first thing I think of doing when I wake up is to take some opiates: (first-WR)

Never or Almost never	Sometimes	Often	Always or Nearly always

21. When I wake up I take opiates to stop myself aching or feeling stiff: (stopache-WR)

Never or Almost never	Sometimes	Often	Always or Nearly always

22. The first thing I do after I wake up is to take some opiates: (opfirst-WR)

Never or Almost never	Sometimes	Often	Always or Nearly always

23. I like to take my first dose of opiates within two hours of waking up: (istdose-WR)

Never or Almost never	Sometimes	Often	Always or Nearly always

PLEASE ANSWER EACH QUESTION BY CIRCLING ONE RESPONSE ONLY

24. Did you think your opiate use was out of control? (control-IC)

Never or Almost never	Sometimes	Often	Always or Nearly always

25. Did the prospect of missing a fix (or dose) make you very anxious or worried? (missfix-SC)

Never or Almost never	Sometimes	Often	Always or Nearly always

PLEASE ANSWER EACH QUESTION BY CIRCLING ONE RESPONSE ONLY

Since using opiates regularly have you:

26. Spent less time reading newspapers or magazines? (actch-S)*

No change	A little less	A lot less	Very much less

27. Spent less time watching sports at a sports ground? (actch-S)*

No change	A little less	A lot less	Very much less

28. Would you say that opiates were an important part of your life? (impt-S)

Not at all Important	Quite Important	Very Important	The most Important

29. During this period have you been preoccupied with opiates virtually day and night, either using them or getting them? (preoccup-S)

Never or Almost never	Sometimes	Often	Always or Nearly always

30. Do you generally plan in advance how to get opiates? (plan-S)

Never or Almost never	Sometimes	Often	Always or Nearly always

PLEASE ANSWER EACH QUESTION BY CIRCLING ONE RESPONSE ONLY

31. Have you taken opiates when you were ill in bed (say from flu, infection, stomach trouble)? (cont.-CU)

Never or Almost never	Sometimes	Often	Always or Nearly always

32. Have you taken opiates when you had to share a needle? (share-CU)

Never or Almost never	Sometimes	Often	Always or Nearly always

33. Have you continued taking opiates when you thought the needle might be infected? (infect-CU)

Never or Almost never	Sometimes	Often	Always or Nearly always

PLEASE ANSWER EACH QUESTION BY CIRCLING ONE RESPONSE ONLY

34. Do you find you need to take opiates more often than you did 6 months ago to get the same effect? (often-T)

No	A little more often	A lot more often	Very much more often

* note that "actch" was a variable made up of a number of questions in the original questionnaire in a "yes/no" format. These questions have been modified into four point scales in the revised instrument.

Key to element codes

PW - Physical Withdrawal symptoms

AW - Affective Withdrawal symptoms

WR - Withdrawal relief drug taking

T - Tolerance

IC - Impaired Control

SC - Subjective compulsion

CU - Continued Use despite adverse consequences

S - Salience

NR - Narrowing of repertoire

R - Reinstatement

Items 10-34 constitute the dependence syndrome scale.

Appendix B

Pattern Matrix For Principal Components Analysis

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Tense (AW)	.841	.010	-.016	.026	-.061	.266	-.009	-.043
Depress (AW)	.775	.101	.038	.122	.045	.245	.156	.017
Angry (AW)	.717	.134	.079	-.029	.195	.056	.030	-.103
Restless (AW)	.677	-.097	.056	-.034	.145	.006	-.109	.025
Wakesick (PW)	.677	-.165	.051	.053	-.045	-.187	-.110	-.003
Cramps (PW)	.676	-.110	-.008	.064	.057	-.242	-.068	-.011
Flush (PW)	.639	-.175	.058	.018	-.090	-.124	.069	.046
Wakeache (PW)	.567	-.333	.012	-.123	-.128	-.109	.023	.030
Heart (PW)	.473	-.124	-.101	.045	.065	-.289	-.126	.160
Stopache (WR)	.122	-.825	.060	-.053	.096	-.094	.106	.016
Stopsick (WR)	.112	-.781	.107	-.009	-.046	-.100	.036	.019
Opfirst (WR)	.060	-.748	-.078	.048	.056	-.002	.049	-.262
First (WR)	.078	-.649	-.020	.021	-.007	.011	.079	.038
Istdose (WR)	.070	-.484	.177	.187	-.149	.188	.075	-.015
Cont. (CU)	.025	-.474	-.088	.311	-.042	-.019	.038	.093
Wishstop (SC)	.070	.012	.848	.013	-.092	.033	-.009	.009
Worryuse (SC)	-.002	.003	.809	-.051	.082	.027	-.062	.037
Control (IC)	.001	-.084	.587	-.066	-.135	-.025	.023	-.005
Share (CU)	.017	-.038	-.049	.845	-.019	.134	.022	.066
Infect (CU)	.011	.034	.010	.799	-.012	-.085	.015	-.058
Typvary (NR)	-.011	-.056	-.106	-.001	.810	-.072	.100	.046
Wayvary (NR)	-.003	-.038	-.118	-.119	.778	.052	-.049	-.008
Amtvary (NR)	.085	.062	.266	.143	.584	-.048	.066	-.031
Quality (T)	-.055	-.088	-.111	.048	.149	-.790	.051	.030
Better (T)	.081	.037	-.105	.156	.298	.520	-.057	.213

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Store (S)	-.028	.041	-.043	.101	-.007	-.070	.800	-.058
Opsave (WR)	.035	-.179	-.038	-.078	.129	.007	.786	.035
Morning (R)	-.021	.140	-.026	-.114	.031	-.010	.042	.824
Feelsick (R)	.015	-.049	.078	.208	.041	-.025	-.061	.798
Everyday (R)	-.092	-.104	.069	-.385	-.069	.278	.037	.459
Effect (T)	.004	-.047	.058	-.065	.162	.080	.012	.149
Repert (NR)	-.156	-.372	.073	.028	.253	.194	.046	-.196
Often (T)	.132	.082	.005	.115	.172	-.184	-.033	-.048
Highdose (T)	.149	-.027	.076	.214	.140	-.097	-.002	-.003
Less (T)	-.090	-.001	.184	.066	.309	-.080	.014	.028
Preoccup (S)	-.076	-.096	.188	.245	-.171	.045	.215	.027
Diffstop (IC)	.044	.287	.090	-.044	.134	-.250	.152	-.121
Like (AW)	.166	.058	-.054	-.057	.042	-.070	.146	.025
Crave (AW)	.153	-.158	.060	-.012	.047	.067	.035	-.090
Impt (S)	-.123	-.155	-.082	.174	-.151	.030	-.087	-.015
Missfix (SC)	-.027	-.134	.269	.153	.127	-.058	-.200	.025
Obtain (S)	-.093	.006	-.008	-.090	-.079	.217	.072	-.014
Plan (S)	-.019	-.026	.053	.024	-.052	-.019	.423	.151
Actch (S)	.070	-.090	-.036	.088	-.017	.064	.036	-.066
Cleanch (S)	-.057	.084	.132	.020	.191	-.013	-.126	-.012

	Factor 9	Factor 10	Factor 11	Factor 12	Factor 13
Tense (AW)	.023	.057	-.044	.100	-.010
Depress (AW)	-.077	.096	-.033	.062	.091
Angry (AW)	.109	.063	-.276	-.029	-.029
Restless (AW)	.171	-.103	-.277	-.040	-.002
Wakesick (PW)	-.170	.120	.014	-.023	-.017
Cramps (PW)	-.095	.052	.113	-.014	.043
Flush (PW)	-.054	-.022	.012	.015	-.028
Wakeache (PW)	.061	.047	.012	-.069	.031
Heart (PW)	.098	.057	.042	-.383	.064
Stopache (WR)	-.037	.006	.054	-.029	.067
Stopsick (WR)	-.014	.071	.101	-.093	.016
Opfirst (WR)	-.062	-.037	-.090	.033	-.012
First (WR)	.027	-.027	-.258	.014	.012
Istdose (WR)	.085	.060	-.170	-.057	-.262
Cont. (CU)	.051	-.111	-.295	.117	-.022
Wishstop (SC)	.018	-.091	.070	.036	-.019
Worryuse (SC)	.054	.059	.106	-.068	.046
Control (IC)	-.283	.066	-.299	.106	.098
Share (CU)	.077	.094	.019	-.007	-.018
Infect (CU)	-.034	.117	.063	.088	.168
Typvary (NR)	.122	.079	.047	.012	.136
Wayvary (NR)	-.201	.000	-.087	.067	-.058
Amtvary (NR)	-.053	.024	.009	-.009	.015
Quality (T)	-.074	.137	.000	.172	-.095
Better (T)	-.316	-.091	.068	-.079	-.068
Store (S)	.026	-.066	-.054	-.145	-.051
Opsave (WR)	.020	.081	.043	.082	-.040
Morning (R)	.004	.098	-.060	.061	.022
Feelsick (R)	.134	-.204	.066	-.173	-.134
Everyday (R)	-.017	.253	.088	.297	-.005
Effect (T)	-.720	.048	.125	-.114	-.135
Repert (NR)	.379	.114	.023	-.028	-.076
Often (T)	-.016	.741	-.054	-.063	-.044
Highdose (T)	-.079	.686	-.036	-.014	-.116
Less (T)	-.356	-.495	-.028	.125	-.079
Preoccup (S)	.026	.384	-.185	-.009	.134
Diffstop (SC)	.236	-.337	.266	-.008	-.191
Like (AW)	.058	.033	-.811	.034	-.029
Crave (AW)	.180	-.016	-.701	-.073	.038
Impt (S)	-.227	.247	-.529	-.115	.005
Missfix (SC)	.045	.131	-.325	-.265	.027
Obtain (S)	-.056	.128	.032	-.826	.019
Plan (S)	-.211	-.142	-.201	-.489	.109
Actch (S)	-.072	-.022	.085	.019	.854
Cleanch (S)	.198	-.090	-.062	-.070	.718