

**Clinical and Psychosocial Predictors of  
Attendance and Drug Use in Heroin Users  
Undergoing Treatment**

by

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

## Abstract

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The main aim of this thesis is to evaluate the Theory of Planned Behaviour's ability to identify predictors of intention and behaviour. The population of interest are heroin users; the behaviours are attendance at treatment services and heroin use during drug treatment. The thesis is divided into four broad sections.

First, a literature review considers the impact of heroin use on the individual and society; the relevance of drug treatment to enable reductions of drug related harms and the predictors associated with poor treatment outcomes. It goes on to provide justification for the use of the TPB over other models of behaviour change and discusses the limitations associated with its application. The TPB is shown to be a useful predictor of behaviour and intentions in general, although there is no research considering the prediction of attendance for drug treatment and future heroin use.

Secondly, a qualitative study explores whether the TPB is an appropriate framework for predicting behaviour in this population by undertaking interviews designed to investigate whether drug users can think about stopping drug use in relation to TPB constructs. A review of previous qualitative research and findings from this study suggest that the TPB would be an appropriate framework for use in this domain.

Thirdly, two studies provide data to support the usefulness of the TPB as a predictor of treatment attendance and heroin use intentions and behaviour. Evidence reveals the inclusion of clinical variables adds additional variance to the TPB; subjective norm is found to be a significant predictor of behaviour and the use of objective measures of behaviour provide further validation for the predictive ability of the TPB. Longitudinal data support the predictive validity of the TPB predictors over a three and six-month period.

Finally, key findings from the thesis are discussed, as are limitations of the studies included. Future directions for research are suggested, concluding with a summary of how this thesis extends and supports previous TPB research.

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“Nothing ever comes to one, that is worth having, except as a result of hard work.”

Source: Booker T Washington (1856-1915).

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# **Chapter 1**

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# **Chapter 1 - Predictors of Heroin Use Behaviour and Models of Behaviour Change**

## **1.1 Introduction**

### **1.1.2 The Impact of Heroin use**

Heroin use is illegal but none the less the use of heroin is widespread in many countries and the related harms impact not only on the individual but also on their families and society.

The problems relating to heroin use are complex and entwined with risks resulting from the direct use of the drug, for example; intoxication, physical dependence, route specific dangers, and drug associated risks; psychological and social problems, blood borne viruses and criminal involvement. Chronic dependant use of heroin use can further increase the risk of social exclusion, heroin related morbidity and drug related deaths (Department of Health 2001).

Drug treatment is seen as an effective way to reduce drug related problems and mortality (Gibson et al 2008) yet for many heroin use does not stop with the start of treatment with a significant proportion continuing to use illicit drugs regularly and failing to respond to drug interventions (Best & Ridge 2003)

### **1.1.3 A National Drug Strategy**

The UK's Updated National Drug Strategy (Home Office 2002a) pays particular attention to targeting class A substances, in particular heroin and crack-cocaine, one of the aims being to enable problem drug users to access treatment. It is estimated that for every £1 spent on treatment, at least £9.50 is saved in crime and health costs (Home Office 2002a), suggesting that getting drug users into treatment is the best way of improving their health and ability to lead fulfilling lives.

Due to the nature of risk associated with illicit drug use the National Treatment Agency for Substance Misuse (NTA, a special Department of Health Trust) sets targets to ensure that drug users wanting treatment are able to access this as quickly as possible and be retained in treatment for a sufficient period that they may experience long-term benefit (NTA 2006).

### **1.1.4 Drug Treatment**

The aim of treatment is to reduce drug related harm, reduce the amount of illicit substances used and ultimately achieve abstinence. Treatment services offer individuals with opiate dependency the opportunity to access replacement treatments as an alternative to illicit drug use.



Methadone, a synthetic opioid agonist<sup>1</sup>, and buprenorphine, a mixed antagonist-agonist<sup>2</sup> synthetic opioid, are the most popular choices for drug treatment. Though methadone is the most widely used and researched, treatment for opiate dependency, buprenorphine has been found to be at least as effective as methadone as a maintenance treatment (West, O'Neal & Graham 2000).

Heroin substitutes, methadone and buprenorphine, are seen to be successful in reducing physical withdrawal states and offer positive outcomes in terms of reductions in drug use, injecting risk behaviours, improved social and psychological functioning (Barnett, Rodgers & Bloch 2001, Mattick et al 2003). Used as maintenance treatments, whereby constant doses of medication are given to suppress opiate withdrawal, over the medium to long-term, or as reduction programmes with the expectation that the dose will gradually reduce and the individual will be withdrawn from and become abstinent from prescribed drugs (Seivewright 2000). Drug treatment also incorporates the management of acute opiate withdrawal<sup>3</sup> (Gowing, Ali & White 2000), though post-treatment outcomes of acute opiate withdrawal are often poor, in comparison to maintenance outcomes, with treatment drop out or continued heroin use common (Horspool et al 2008).

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<sup>1</sup> Agonist; a drug that binds to receptor cell triggering a response i.e. produces an opiate effect similar to that of heroin.

<sup>2</sup> Antagonist-agonist; drug that binds to a receptor cell triggering a response but that also inhibits further cell triggering i.e. produces an opiate effect but stops any subsequent opiate drug binding at the receptor, hence any additional opiates used will be ineffective.

<sup>3</sup> Opiate withdrawal programmes, or detoxification, are used to alleviate the acute symptoms of withdrawal from dependent drug use with the aim of abstinence, usually conducted over a much shorter time period than reduction or maintenance treatments.

Drug treatment can be effective in reducing drug use and other problem behaviours but despite this a proportion of drug users in treatment continue to use illicit drugs and estimates of continued drug use during treatment range from between 20% and 70% (Best & Ridge 2003, Belding et al 1998)

### **1.1.5 Drug Treatment Outcomes**

Treatment services are not identical in their structure and operation and outcome studies show that the level of effectiveness varies widely with most services monitoring their own outcomes (Marsden, Gossop & Stewart 2003). The National Treatment Outcome Research Study (NTORS) investigated outcomes among drug users attending 54 treatment services across the UK. Generally, patients receiving medical treatment, methadone in particular, have shown some reductions in heroin and other drugs at 6-months (Gossop et al 1997), and at 4-5 year follow-up (Gossop et al 2003). Consequently, attracting drug users into and retaining them in treatment is a high national priority (Home Office 2002a).

Studies of treatment outcomes generally focus on the ability of the treatment under investigation to reduce or improve pre-treatment variables. Few studies report or suggest the reasons for non-compliance with treatment, continued drug/alcohol use and the pre-treatment variables that could be predictive of poor treatment outcomes and ongoing drug use. Thus limiting the ability to identify those most at risk, at the outset of drug treatment.

## **1.2 Predictors of Continued Drug Use**

Ongoing drug use and drug use during treatment presents a challenge to clinicians and in order to meet the challenge most effectively, the variables that predict continued drug use must first be identified. Several treatment outcomes studies report that ongoing drug use is a strong predictor of poor treatment compliance (Gossop, Duncan & Marsden 2003) and treatment dropout altogether (Booth, Crowley & Zhang 1996).

Brewer et al (1998) conducted a meta-analysis of predictors of continued drug use during and after treatment for opiate addiction. The review included 69 studies from which 28 independent variables were identified. The results found that none of the variables included in the study were strongly predictive of continued drug use. Those variables with weak to moderate associations with continued drug use are heavy pre-treatment drug use, prior treatment episodes, association with other drug users, short treatment episodes and those that dropped out of treatment. In addition stress/life events were also mildly positively associated with continued drug use (Brewer et al 1998).

These results are also fairly consistent with an earlier review conducted by Alemi et al (1995). The main differences being in the study by Alemi et al (1995) poly-drug use and criminal behaviour were moderately predictive of continued heroin use but these same variables showed a weak association in the Brewer et al (1998) analysis. As these meta-analyses are over a decade old, the following sections under the headings; (i) demographics, (ii) family and peer influence, (iii)



pre-treatment drug use, (v) criminal behaviour and legal problems and (v) treatment history, are up dated with more recent outcome studies to identify consistent results or highlight any additional variables that may be significant predictors of continued drug use during treatment.

### **1.2.1 Demographics**

Drug users who are younger, single and have no permanent residency tend to experience poorer treatment outcomes (McLellan et al 1994; Moos, Nichol & Moos 2002). Whilst those who are unemployed are more likely to continue to use drugs than those in employment though Brewer et al (1998) suggests that the research in this area is conflicting.

There is some evidence that gender per se has little bearing on continued drug use during treatment (Moos, Nichol & Moos 2002) but the influence of sexual partners on their drug use can effect the outcome of treatment process. Women with drug using partners can be 5 times more likely to use drugs compared with women whose partner is a non-drug user (Tuten & Jones 2003). Anglin et al (1987) indicate that women may benefit more from having their partner in treatment with them.

### **1.2.2 Family and Peer Influences**

Moderate associations were found by Brewer et al (1998) with regards to continued drug use and other drug users and that association with other drug using peers is a strong indication of ongoing drug use.

Schroeder et al (2001) found peer drug use to be the strongest predictor of continued drug use above drug treatment and demographic variables. At one-year follow-up 69% (236) of participants associating with drug using peers were still using drugs on a daily basis. Termorshuizen et al (2005) also found higher rates of ongoing heroin use during methadone treatment in individuals who associated with other drug users or had drug using partners.

### **1.2.3 Pre-treatment Drug Use**

Brewer et al (1998) found moderate associations with continued drug use in participants in treatment with a long history of opiate use. Also those individuals that began using at an early age were more likely to continue using illicit drugs during treatment than those with shorter histories or late onset drug use.

Gossop, Duncan and Marsden (2003) reported that the strongest predictor of heroin use at 6 months is heroin use at 1 month and participants that dropped out of treatment and were lost to follow-up were more likely to be opiate injectors that also injected cocaine. The frequency of intravenous use and crack smoking was also higher in the participants that dropped out (Booth, Crowley & Zhang 1996). Best et al (1999) suggests that opportunistic drug users are more likely to use drugs during treatment than those using drugs purely to stop physical withdrawals.

Factors associated with 12-month heroin abstinence was investigated by Darke et al (2005) and they report that abstinent participants (14%) were more likely to have been classed as 'treatment ready', had no previous treatment history, have used heroin less frequently at baseline and less likely to have been daily injectors or using crack-cocaine.

#### **1.2.4 Criminal Behaviour and Legal Problems**

Legal status and ongoing criminal involvement have concurrent positive associations with continued drug use (Brewer et al 1998) and low rates of criminal involvement are reported by Darke et al (2005) as being correlated with improved rates of abstinence. This is in contrast to Moos, Nichol and Moos (2002) who reported no significant differences in continued drug use between those attending treatment a voluntary basis or those mandated to treatment by the criminal justice system.

#### **1.2.5 Treatment History**

Hser et al (1999) found relatively poor outcomes among treatment-experienced patients, which were related to increased unmet need, and less compliance with treatment than those entering treatment for the first time (supported by Brewer et al 1998, Darke et al 2005). Those with no prior periods of abstinence were also more likely to continue using (Brewer et al 1998). Distance was also a factor for attendance, with those travelling the furthest more likely to discontinue treatment (Beardsley et al 2003).



### **1.2.6 Summary of Findings**

The reported literature on predictors of ongoing drug use and treatment attrition is somewhat inadequate. The above examples, including two meta analyses (Alemi et al 1995, Brewer et al 1998), report no consistent drug or treatment variables that are predictive of continued drug use over numbers of studies hence the body of evidence needed in which to build models that identify those at most risk is poor. The implication of this being that drug treatment services are really stabbing in the dark when it comes to allocating resource and focusing intervention on behaviour change when those individuals most likely to have the worst outcomes cannot be identified at the outset of treatment.

One reason could be that drug treatment studies, from which we gather the evidence base, report different outcome measures. Brewer et al (1998) identified 28 independent variables, ranging from 71% to 7% consistency across measures. Those variables most commonly reported were demographics, for example, age (61%), Gender (64%), ethnicity (71%), and employment (53%). Duration of drug use and treatment completion was reported by 53% and 61% respectively. 21 out of the 28 variables identified by Brewer et al (1998) reported lower than 20% consistency across studies, for example pre-treatment levels of heroin use was only reported by 6 out of 28 studies (20%) included in the meta-analysis.

Interestingly those variables most frequently reported are not significant predictors of ongoing drug use hence treatment outcome studies are potentially missing important features of ongoing drug use. One category missed by all the

studies included in this section is psychological variables and the impact attitudes and cognitions may have on drug treatment outcome.

### **1.3 Psychological Determinants of Drug Use**

Gossop, Duncan and Marsden (2003) suggest treatment involves more than just attending treatment sessions it also requires the active participation of the client and may be regarded as having both an objective component (e.g., amount of therapeutic contact) and a subjective component (e.g., cognitive involvement, motivation for treatment).

Davies (1992) suggests that people use drugs for their own reasons, for example, because they like it or have no reason to stop and that when asked about their use of drugs by researchers or treatment services it is functional for them to report that they are ‘addicted’, compelled to use due to withdrawals and driven into drug use by forces out of their control. Thus treatment services view heroin users as helpless drug addicts and consequently present themselves to treatment services with that agenda<sup>3</sup>. Hence, engaging drug users into prescribed treatment is only part of the picture, Pendergast et al (2002) raises the question of how the treatment process can be improved.

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<sup>3</sup> Davies’ (1992) application of attribution theory examines the way in which people explain why things happen. The basis of attribution theory is the desire to understand how people arrive at explanations for their own and for other people’s behaviour (Heider 1958). See Davies’ (1992) *“Myth of Addiction”* for his application of this theory to illicit drug use and how attributions can change across the course of ‘addiction’.

Surprisingly little is known about the process of treatment as it is actually delivered (Pendergast et al 2002) and research attention to the associations and interactions between patient characteristics, cognitions and treatment variables are limited. In view of what Davies (1992) might be suggesting cognitive predictors should be viewed as an important aspect of treatment outcome. As discussed, few studies have been identified that examine individuals' cognitions and behaviour to examine whether this is a determinant of continued drug use during treatment. Models of behaviour change seem to have been neglected in this area.

Psychosocial variables such as attitudes and motivation may provide a more direct assessment of behaviour and be more amenable to change. Attitudes and beliefs about the outcomes of behaviour are central to social cognition models. The following section will review and assess the efficacy of utilising a psychosocial framework for predicting ongoing heroin use. By understanding the psychological determinants of heroin use during treatment the development of interventions, aimed at modifying cognitions, could help improve outcomes.

#### **1.4 Models of Behaviour Change**

Numerous models of health behaviour exist and this section will review those models that have been specifically applied to drug using populations to assess the applicability of their use as a framework to predict heroin behaviour.

Database searches<sup>4</sup> resulted in limited application of health behaviour models to drug use, retrieving only two models had been specifically applied to drug using populations; the Transtheoretical Model (Prochaska & DiClemente 1986; TTM) and the Theory of Planned Behaviour (TPB; Ajzen 1991). The remainder of this section will concentrate only on reviewing these two models, as no baseline evidence exists for the application of other models.

#### **1.4.1 The Transtheoretical Model**

The transtheoretical model (TTM; Prochaska & DiClemente 1986), originally developed for smoking cessation, specifies five stages that people move through on their journey of behaviour change (see Figure 1): precontemplation (not considering change), contemplation (considering change in the future), preparation (planning to change), action (has made changes) and maintenance (maintained change over a prolonged period of time – usually 6 months). There are ten processes<sup>5</sup> that facilitate the progression through these stages of change (Prochaska & Velicer 1997) and the different stages are associated with different beliefs<sup>6</sup>. The model also includes a relapse phase which can happen at any time resulting in the individual moving back into an earlier stage; this cycle may be

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<sup>4</sup> Database searches included Web of Knowledge/Web of Science, Medline, Pubmed, CINAHL, PsycLit and hand searches of meta-analysis. Word searches included the specific behaviour change models, i.e., transtheoretical model or stage of change model, and 'illicit drugs' 'substance use' 'heroin' 'opiates' 'methadone' 'crack-cocaine' 'cocaine' 'ecstasy' 'amphetamine' 'LSD' and 'cannabis'. Consideration could be given to extending this search to other addictive behaviours for example alcohol or smoking however, the rationale for limiting this to drug use was to examine whether an evidence base exists for application of social cognitive models to illicit drug using behaviours as this is the main focus of the thesis.

<sup>5</sup> The 10 processes of change; consciousness raising, counter conditioning, dramatic relief, environmental re-evaluation, helping relationships, reinforcement management, self liberation, self evaluation, social liberation and stimulus control.

<sup>6</sup> Decisional balance and self-efficacy: namely the assessment of the pros and cons of the behaviour and the self-confidence in the ability to change.



repeated several times before someone achieves successful long-term behaviour change (Prochaska & DiClemente 1986). Hence, progression through the stages is viewed as cyclical rather than linear.

The majority of research on the TTM and substance misuse has centred on the classification of individuals according to their stage of change with few studies focusing on the actual process of change (Migneault, Adams & Read 2005).

#### **1.4.1.1 TTM Applied to Drug Use**

A recent study by Gossop, Stewart and Marsden (2006) tested the application of the TTM and its ability to predict drug use over time based on stage of change. One thousand and seventy five opiate users seeking drug treatment were recruited, with 753 (70%) of those individuals followed up at 1-year. A multiple regression analysis was conducted and results were unable to find any significant associations between the readiness for change measures and drug use outcomes. The strongest predictor of drug use at follow-up was drug use at intake.

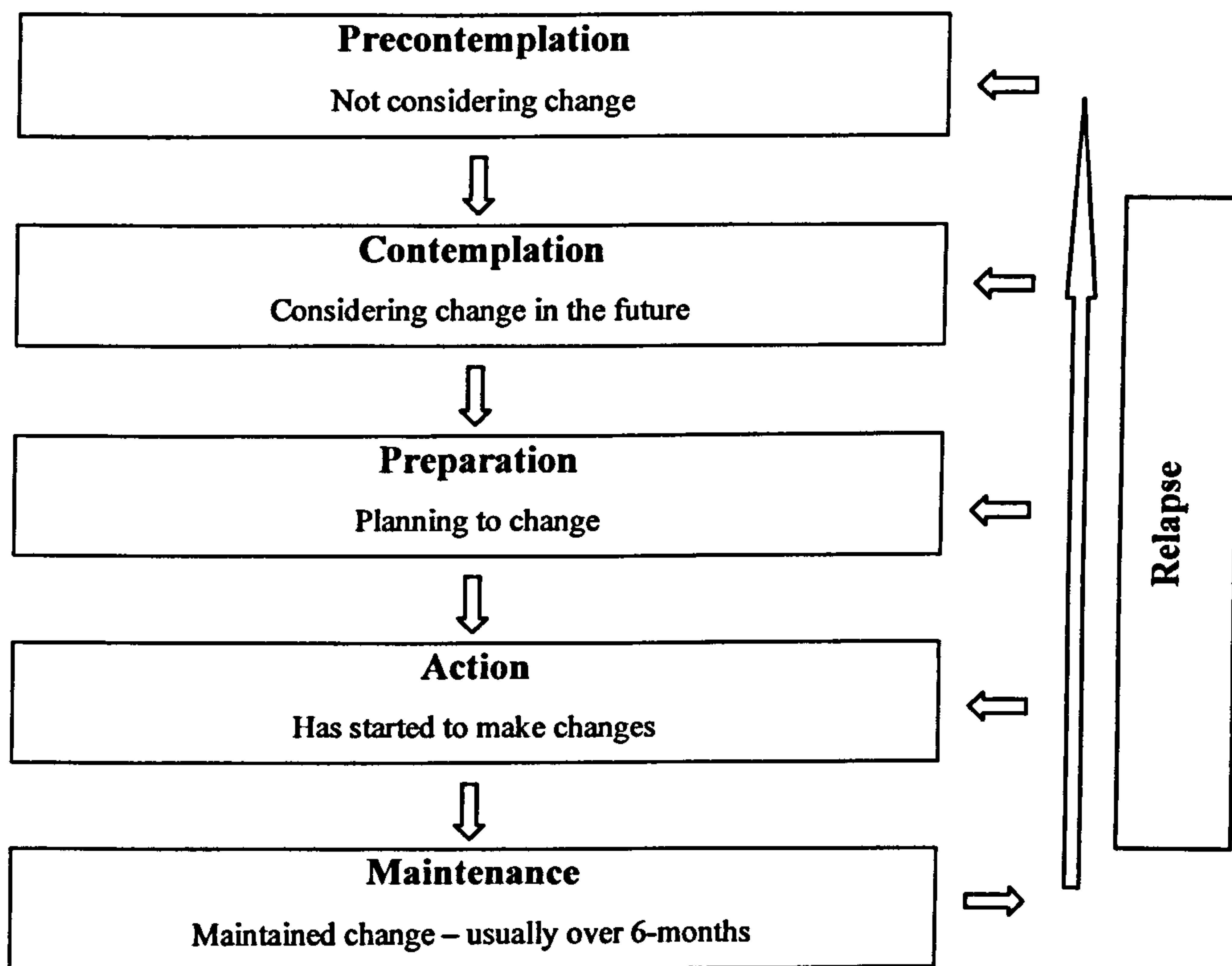
Velasquez et al (2000) assessed stage of change in a population of homeless people in an attempt to learn more about the drug treatment needs of these individuals. Basic analysis revealed that drug users<sup>7</sup> were again predominantly allocated to precontemplation and contemplation stage (30% and

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<sup>7</sup> The primary drug used was crack-cocaine (69%) followed by marijuana (64%), powder cocaine (18%) and heroin (7%) though results are amalgamated to include all drug types.

60%). This study reports that the use of this measure was helpful in highlighting the specific stage of change but was not longitudinal so effectiveness of the measure of stage recognition over time cannot be established.

**Figure 1.1: The Transtheoretical Model**



#### 1.4.1.2 Limitations within the TTM

Results from studies examining the stage and processes of change have yielded inconsistent findings, mixed results for the validity of the TTM constructs



and a wide variability in measurement of stage of change constructs<sup>8</sup> (Migneault, Adams & Read 2005). Hence, it has been questioned whether the model provides, in its current form, a valid description of the process of change and research based upon it has been criticised (Sutton 2001). West (2005) argues that there are such serious problems with the stage-based model that it should be disregarded and that a replacement is needed that more accurately reflect observations about behaviour change. The TTM model may possess good descriptive validity but it is currently lacking in predictive validity hence an alternative health behaviour model may be more effective in predicting behaviours. The Theory of Planned Behaviour (TPB Ajzen 1991) for example.

Armitage and Arden (2002) found that theory of planned behaviour, particularly behavioural intention, was predictive of TTM stage and report that the TTM is a 'pseudo-stage model'; thus the model adds little beyond what is presented in the TPB and purport that in enabling behaviour change it might be more effective to target an intervention at an individual's intention to change rather than allocate to descriptive stages of change. The theory of planned behaviour, developed from the theory of reasoned action (TRA; Fishbein & Ajzen 1975), has been utilised as a predictive framework for many health related behaviours (see Armitage & Conner (2001) for a full review).

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<sup>8</sup> Two main methods are used to measure stage of change; staging algorithms and multi-dimensional questionnaires. Belding, Iguchi & Lamb (1996) assessed the convergent validity of two measures in a population of methadone patients and report low concordance suggesting the two may well be measuring different aspects of readiness to change.

### **1.4.2 The Theory of Reasoned Action**

The theory of reasoned action (TRA) was designed by Fishbein and Ajzen in 1975, to predict behaviours under volitional control. The central component of the TRA is based around an individual's intention to perform a given behaviour. Behavioural intention is viewed as the motivation needed to engage in a particular behaviour and is an indication of how hard someone is willing to try in order to perform that behaviour (Fishbein & Ajzen 1975). Generally it is assumed the greater the intention to engage in the behaviour in question, for example to stop using drugs, the more likely you are to carry that behaviour out.

The TRA purports that intention is a function of two independent determinants, attitude (positive or negative evaluations of the behaviour) and subjective norms (perceived social pressure from others). In addition, each determinant is underpinned by salient beliefs about that behaviour; attitude is determined the beliefs about the likely outcomes and the evaluation of these beliefs (behavioural beliefs), subjective norm is determined by the normative expectations of others and the motivation to comply (normative beliefs).

Thus, the more positive your attitude towards a behaviour and the more perceived social pressure you feel from others to carry out that behaviour the stronger your intention will be to perform. However, the TRA fails to account for behaviours that are not fully under volitional control and hence those behaviours that may seem non-rational or not under complete control, drug use for example, may not adequately be explained by the TRA.

### **1.4.3 The Theory of Planned Behaviour**

The theory of planned behaviour (TPB) was developed to broaden the applicability of the TRA by incorporating perceptions of control. Perceived behavioural control (PBC) refers to the degree to which an individual feels that the performance of the behaviour is under their control as such constitutes a determinant of intention; thus the easier a behaviour the more likely you will intend to perform it.

As with attitude and subjective norm constructs, salient beliefs underpin perceived behavioural control. Control beliefs are related to factors that may facilitate or impede performance of the behaviour and the strength of those factors. Hence the more in control you feel about performing the behaviour the more likely your intention to carry it out.

PBC is also regarded as a determinant of behaviour based on the notion that, if intention is held constant, greater perceived control will increase the likelihood that the behaviour will be performed (Ajzen 1991). For example, two people may both have equally strong intentions to stop using drugs but if one has more confidence in their ability then they are more likely to achieve the desired behaviour. According to Ajzen (1991), if perceived behavioural control reflects actual control this too can directly influence behaviour.

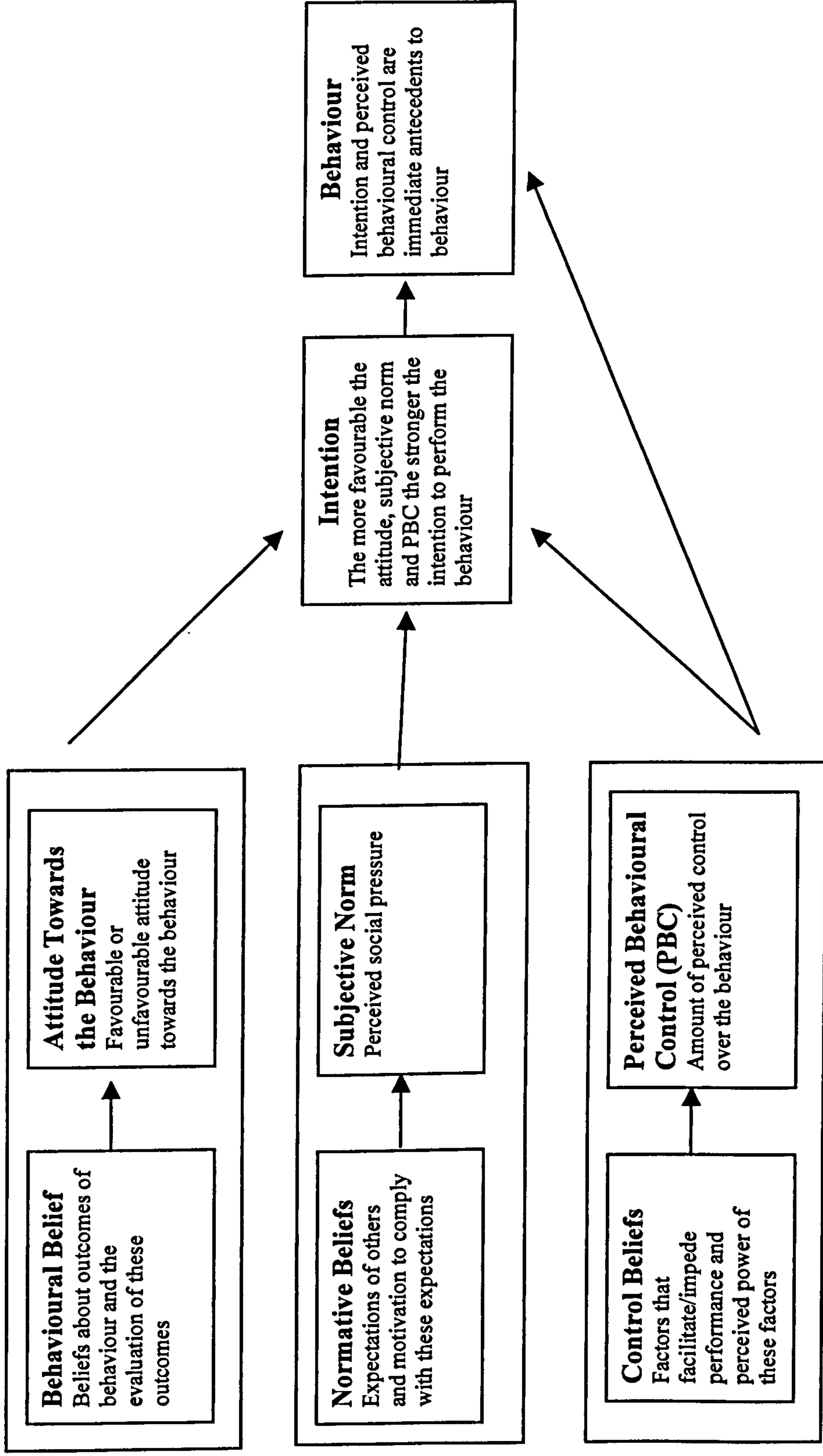
Salient beliefs play a central role in the theory of planned behaviour. They are believed to provide the cognitive and affective foundations for attitudes,

subjective norms and perceived behavioural control. Thus salient behavioural beliefs are assumed to determine attitude towards the behaviour, salient normative beliefs are assumed to determine subjective norms and salient control beliefs are held to determine perceived behavioural control.

The TPB stipulates that the salient beliefs of an individual are the psychological determinants of behaviour operating through TPB constructs (Ajzen & Fishbein 1980). Therefore if the identified beliefs can be successfully targeted attitude change and consequent behaviour change can occur.



**Figure 1.2: Theory of Planned Behaviour**



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### **1.4.3.1 Application of the TPB**

The TPB has been extensively applied to predict intentions and behaviour across a range of health and non-health domains for example; health screening (Michie et al 2004, Rutter 2000), exercise behaviour (Armitage 2005), parasuicide (O'Connor, Armitage & Gray 2006) driving behaviour (Elliot, Armitage & Baughan 2007), access to service provision (Christian & Armitage 2002), binge drinking (Norman & Conner 2006) and drug using behaviours (Armitage et al 1999, McMillan & Conner 2003), all of which support the application of the TPB in the prediction of intention and behaviour.

In a meta-analysis of the TPB by Armitage and Conner (2001), across 185 independent studies, attitude, subjective norms and perceived behavioural control accounted for 39% of the variance in intention whilst, across 63 studies, intentions and perceived behavioural control accounted for 27% of the variance in behaviour. This is encouraging and suggests that the TPB is a useful predictive model across a wide range of behaviours it; however, should be noted that only 34% of the studies reviewed within the meta-analysis reported the prediction of behaviour with the majority focusing on the prediction of intention only. Further limitations within the TPB will be addressed in the following section.

### **1.4.3.2. Limitations within the TPB**

#### **1.4.3.2.1 Self-Reported Behaviours**

As mentioned in the previous section only 34% (n=63) of studies included in the meta-analysis by Armitage and Conner (2001) included the prediction of behaviour. Further, of those 63 studies, only 19 studies used objective measures



of behaviour and results showed that there was a marked difference between studies employing self-report and objectively measured behaviours. Intentions and perceived behavioural control accounted for 20% variance on objective behaviour (across 19 studies), compared to 31% variance in self-reported behaviour (across 44 studies). Thus this brings into question the reliability of the TPB and undermines the power of the TPB to predict actual behaviour.

Although self-reported behaviour is recognised as valuable it can lead to biases of both under and over reporting as well as self-presentational biases (Paulhus 1984). Such biases may be particularly important for deviant or undesirable behaviours whereby giving information that might be seen as favourable to others. Elliott, Armitage and Baughan (2007) utilised both subjective and objective behaviour measures and whilst the TPB was better equipped to predict self-reported behaviour ( $R^2 = .62$ ), the variance in observed behaviours ranged from 31%-39% which are greater than the values found in Armitage and Conner (2001) suggesting that the TPB is able to predict, with large effect (Cohen 1988), objective behaviours. Thus, the addition of objective measures of behaviour should be, where possible, included in TPB applications to improve reliability.

#### **1.4.3.2.2 Follow-Up**

A further limitation of the TPB has been the lack of prospective designs; hence the predictive validity of the TPB over time has not been greatly examined. The TTM (Prochaska & DiClemente 1986) posits that for behaviour change to occur, and be maintained, a period of six-months is required (see Section 1.4.1).

Thus, anything less than this is not seen as sustained behaviour change. Armitage et al (1999), for example, applied the TPB to predict legal and illegal drug use with a follow-up of just one-week, the same follow-up period was also employed by Norman and Conner (2006) to predict future binge drinking behaviour. Thus the TPB is significantly limited in its predictive ability by the use of such short follow-ups.

Prospective designs of the TPB have been used though limitations are still apparent. O'Connor, Armitage and Gray (2006), examined the TPB over a three-month period in the prediction of parasuicide behaviour. Unfortunately study attrition resulted in only 26% of participants completing data collection at time two. Similar attrition rates were found when McMillan and Conner (2003) applied the TPB over six-months, to predict drug use, with only 29% of participants followed up at six months. The use of longitudinal studies of behaviour change is important to ensure the predictive validity of such models as the TPB. If longitudinal designs are to be employed, consideration of retention strategies or ways of dealing with missing data, for example imputing (Lang & Secic 2006), are required to ensure studies have sufficient power to show statistical significance.

#### **1.4.3.2.2 Study Populations**

Much research into the TPB has investigated university students with much less focus on general samples or clinical populations (Armitage & Christian 2003). The use of the TPB in drug and alcohol using behaviours, particularly, is done predominantly with college/university students as study participants

(Armitage et al 1991; McMillan & Conner 2003; Norman & Conner 2006); an easy-to-access population that requires none of the ethical considerations of clinical samples. The focus on these populations limits the ability of the TPB to generalise findings to general populations, as university students tend to represent a younger, healthier subsection of society.

It is acknowledged that within other domains, i.e., not drug or alcohol use, that the TPB has been applied to general and clinical populations; for example, Christian and Armitage (2002) examined homeless populations, O'Connor, Armitage and Gray (2006) parasuicide patients and Armitage (2005) gym attendees. If behaviour change interventions are to be designed as a result of TPB predictors of health behaviour then the samples need to be representative of those in which the interventions would ultimately be focused on.

#### **1.4.4 Summary of Findings**

Only two models were found that had been applied to drug using populations, the TTM and the TPB. Both have their limitations the TTM in that it has wide variability in its measurements of constructs and its lack of predictive validity. The TPB in its lack of objective measures of behaviour, short follow-up periods and the use of student populations to assess drug behaviour.

Although the TPB has its limitations it may be more useful as a predictor of heroin intention and behaviour than the TTM, as this is more a descriptive stage of change model than a predictive model. Thus the TPB could be applied as

a framework for predicting heroin use during drug treatment but consideration of the limitations within the TPBs applicability need to be addressed.

### **1.5 Broad Aims of the Thesis**

The reduction in use of heroin and the subsequent importance of access to drug treatment is a high priority. Identification of predictors of continued drug use has a central role to play in the identification of those at most risk of relapse or treatment drop out altogether. To date, no research has applied a psychological framework to the process of drug treatment to predict future heroin use and the TPB may be a suitable model.

The broad aim of the thesis is therefore to assess the efficacy of the TPB as a predictor of intentions and behaviour in a population of heroin users. The thesis can be broadly divided into three further sections: Firstly, given the TPB has not been applied in this area, a qualitative exploratory study will be undertaken to examine whether the TPB will be suitable for use in this population (Chapter 2), empirical applications of the TPB will then follow (Chapters 3 and 4), concluding with a summary and future directions (Chapter 5).

In an attempt to overcome the limitations of the TPB, this thesis will apply the TPB to a clinical population of heroin users to examine predictors of treatment attendance and heroin use intentions and behaviour during drug treatment; the studies will use both objective and subjective measures of behaviour and employ a longitudinal design, with a follow-up period of six-months, to assess the predictive validity of the TPB over time. In addition it will consider clinical

variables, as highlighted in Chapter One, which might contribute to the predictive ability of the model,

## **1.6 The Next Step**

The following chapter is a qualitative study intended to explore whether the TPB would be an appropriate framework for predicting behaviour in this population. The main objective is to investigate whether individuals with a heroin dependency can think about stopping heroin use in relation to TPB constructs and to identify whether any of the predictors already discussed within this Chapter, and in particular drug treatment, emerge as salient determinants associated with heroin behaviour.



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## **Chapter 2**

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## **Chapter 2 - Beliefs About Stopping Heroin Use in a Population of Dependant Heroin Users Attending for Drug Treatment.**

### **2.1 Introduction**

Whilst treatment is deemed an effective way of reducing illicit drug use many studies report the mediating effects of the treatment in question, for example methadone, rather than considering the psychological variables of the individual in the prediction of ongoing drug use during treatment. Chapter One discussed the predictors of continued heroin use, for example peer influence, heavy pre-treatment drug use, treatment history and the use of crack-cocaine, which have been highlighted from treatment outcomes studies. The limitations of the research discussed in Chapter One are that the studies have not been conducted from a psychological perspective nor have they utilized a theoretical framework to explain the findings. The subjective responses from heroin users on their reasons for continued heroin use during treatment is also not explored in many studies on treatment outcome.

The theory of planned behaviour (TPB; Ajzen 1991) is a motivational model that has been successfully applied to the prediction of various health behaviours, including illicit drug use. This Chapter will examine previous qualitative research to identify whether the subjective reasons given by heroin users for heroin use fit into the theoretical framework of the theory of planned behaviour. This will be followed by qualitative interviews with heroin users to

examine whether they think about their drug use in terms that would make the theory of planned behaviour applicable in this domain.

### **2.1.2 Construct Beliefs in the Theory of Planned Behaviour**

According to the theory of planned behaviour action is guided by three kinds of consideration: beliefs about the likely outcomes of the behaviour and the evaluation of these (behavioural beliefs), beliefs about the normative expectations of others and the motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behaviour and the perceived power of these factors (control beliefs) (Ajzen 1991). These beliefs are important as they provide valuable information concerning thoughts and feelings towards a particular behaviour. Thus to understand the psychosocial and cognitive determinants of stopping drug use it is important to understand which underlying beliefs most strongly determine attitude, subjective norm and perceived behavioural control. Previous research has examined heroin users' reasons for continued drug use during drug treatment.

### **2.1.3 Subjective Need for Treatment and Treatment Outcomes**

Powell et al (1993), as part of a larger study investigating relapse risk, interviewed heroin users attending for treatment and who continued to use heroin (n=28), to examine details of drug use to enable exploration of predictor variables. Narrative interviews were coded with seven themes emerging as risk indicators; negative mood state (n=19), indirect social pressure (presence of other drug users in absence of immediate drug availability, n=11), direct social pressure (drugs made explicitly available, n=6), interpersonal conflict (n=4), environmental

factors (presence in an area associated with drugs, n=4), physical discomfort (n=2), and the use of other substances (n=1).

A later study by Best et al (1999) interviewed 109 heroin users attending for methadone treatment to examine reasons for heroin use over the previous 90 days. 70% of participants had used heroin in the previous 90 days with 22% (n=24) reporting daily heroin use, on top of a current methadone prescription and 48% using occasionally<sup>9</sup>. Three main categories for ongoing heroin use were offered; to stop withdrawals, for pleasure and availability<sup>10</sup>. The most common reason given by daily users was to stop withdrawal (92%), followed by for pleasure (50%). Occasional users used for pleasure (68%) and to stop withdrawals (64%) and were more likely to use because it was available; 20% compared to 4% of daily heroin users.

Shen, McLellan and Merrill (2000) considered participants' perceived need for treatment and the impact that may have on treatment outcomes. They suggest that treatment is only important for those who feel ready or at least somewhat motivated to receive it. Subsequently 'treatment ready' was determined by recognition of higher numbers of reported problems associated with current drug use<sup>11</sup> and those who did not perceive any problems relating to their drug use were more likely to see treatment as unimportant. Thus they concluded that

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<sup>9</sup> Occasional use defined as those not using on a daily basis; between 1-60 days in the previous 90.

<sup>10</sup> Categories identified from a previous pilot study

<sup>11</sup> Measured by the use of the Addiction severity index used for the evaluation of patient functioning in seven areas: drug use, medical status, employment, psychiatric status, family/social relationships and legal status.



motivation, determined by recognition of recent problems, made a substantial difference in treatment outcome and a good predictor of change.

#### **2.1.4 Associations Between Subjective Beliefs and TPB Constructs**

The self-reported outcomes of these studies, that explore the reasons for continued drug use during treatment, are similar to the belief constructs found within the in the TPB; yet, again, studies have not used a theoretical framework to base their findings on.

##### **2.1.4.1 Behavioural Beliefs**

Numerous self-reported outcomes can be put into the context of a behavioural belief measure. For example, Powell et al (1993) reported 'negative mood state' as a barrier to stopping drug use; hence, the more negative mood state the more likely it is you'll use drugs especially if by using drugs the mood state improves thus positive reinforcement for ongoing drug use. Also, 'physical discomfort', the more physically uncomfortable you become the more likely it is you'll use drugs if you believe the physical problems will diminish as a result. Best et al (1999) also reports physical withdrawals and also 'pleasure'; thus the more pleasure you get from taking drugs the more positive an outcome you will perceive and the more likely you will be to use drugs again. Experiencing more drug related problems, as reported by Shen, McLellan and Merrill (2000), the more likely to you are to view treatment as important and subsequently want to stop using drugs. Conversely the less you perceive drug related problems the less likely you are to feel ready to stop and more likely to continue using.

#### **2.1.4.2 Normative Beliefs**

Examples of normative beliefs constructs derived from subjective reports of heroin users are also reported by Powell et al (1999). Experiencing direct social pressure, drugs being immediately available, indirect social pressure and association with drug users but in the absence of drugs, increases the chance that you are more likely to use drugs in those situations, thus complying with the expectation of doing what other people think that you should do.

#### **2.1.4.3 Control Beliefs**

Best et al (1999) and Powell et al (1993), cited environmental factors (presence in a known drug using area) and drug availability as risk factors that could facilitate further drug use, which fits with the construct of control, whereby the more drugs that are available the less perceived control you feel over using. Powell et al (1993) also included reported the use of other substances as a predictor of further drug use hence the more combinations of drugs that are used the less control you might feel that you have over future drug use.

The present study is interested in the utilization of the TPB in the prediction of heroin use in a population of heroin users attending for treatment. Previous research, although not based on specific theoretical frameworks, may provide some grounding from which to support the application of the TPB. The barriers to stopping drug use during treatment, discussed in the previous sections, do appear to relate to the concepts of control, normative and behavioural beliefs; for example, not feeling ready to stop, association with others drug users, access to drugs, withdrawal features and enjoyment, though are not described within that



context. This suggests that the TPB may be useful as predictor of heroin use behaviour if heroin users are firstly able to identify beliefs relating to stopping drug use within the contextual framework of the TPB.

As no previous TPB research has been applied to this population, and before any empirical application of the TPB to this population is carried out, a qualitative study will firstly be undertaken to investigate whether beliefs about heroin use can be identified that fit within the behavioural, normative and control belief constructs of the TPB.

### **2.1.3 Aims**

The aims of this Chapter are threefold; first to investigate whether dependant heroin users are able to discuss their thoughts and feelings in terms of stopping using drugs, second to examine whether they fit within the framework and constructs underlying the TPB and third to explore whether the barriers and facilitators of heroin use are associated with drug treatment or congruent with the predictors of heroin use discussed within Chapter One and Section 2.1.3.

## **2.2 Method**

### **2.2.1 Participants**

Participants were recruited from statutory specialist drug services in Sheffield and were attending for treatment of opiate dependency on a voluntary basis. An opportunistic sample was used based on those individuals that attended for an appointment on the day the researcher was able to attend the substance misuse service. Participants were excluded if they had concurrent alcohol

dependency, severe mental health problems, were entering treatment as part of a court order, pregnant, homeless or non-English speaking (no resource was made available for interpreters). The rationale for this being that they would then be representative of future participants as matched exclusion criteria applies. No incentives were given for participation in the study. This study was approved by the North Sheffield Research Ethics Committee.

Twenty-three treatment appointments were attended at the substance misuse service that day all of which, following screening by clinical staff, were deemed as being eligible for inclusion in the study. From the twenty three heroin users that attended their appointment seven (30%) agreed to participate in the study; two female and five males, the mean age being 27.4 (SD 3.5) and the mean number of previous times in treatment was 2.5 (SD 1.6). No information is available on the individuals that chose not to participate, as the details were not passed forward from clinical staff.

### **2.2.2 Procedure**

Participants were identified by attendance at the substance misuse service for their appointment with a clinical nurse specialist. Participation in the research was initially broached by the clinician and brief information given regarding the interviews and intended duration. If in agreement, the participant was introduced to the interviewer at that time and consent gained to take part.

Structured interviews were undertaken, consisting of open-ended questions, which took approximately 15-25 minutes. The questions in the interview schedule

are shown in Table 2.1 and were based on those recommended by Sutton et al (2003), for eliciting belief constructs within the TPB. Answers to the questions were followed by the prompt ‘anything else?’ until the participant had nothing else to add. The interviews were tape recorded and transcribed. Content analysis, a data reduction technique for compressing many words of text into an efficient number of categories that represent similar meanings (Weber 1990), was undertaken to develop the coding frames for each question.

### **2.3 Results**

The number of beliefs elicited ranged from three for the ‘disapprove’ question to 12 for the ‘advantages’ and ‘easy’ question. All participants gave at least one response (i.e., one belief) to each question and all ended each question with either ‘no nothing else’, ‘can’t think of anything else’ or ‘no’ to the additional prompt ‘anything else?’; hence this response been removed from the analysis. All participants gave appropriate answers without the need for re-phrasing of the questions, which suggests an understanding of what was being asked of them.

**Table 2.1: Open-Ended Questions Used in the Study**

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1. What would be the **advantages** of you stopping using heroin in the future?
2. What would be the **disadvantages** of you stopping using heroin in the future?

3. Are there any groups or people who would **approve** of you stopping using heroin in the future?
  4. Are there any groups or people who would **disapprove** of you stopping using heroin in the future?
  5. What do you think would make it **difficult** for you to stop using heroin in the future?
  6. What do you think would make it **easy** for you to stop using heroin in the future?
- 

### **2.3.1 Behavioural Beliefs**

Table 2.2 shows the 11 responses elicited for the behavioural beliefs, '*advantages*' question, with five beliefs being elicited by at least 50% of participants. All of the participants (n=7) reported an overall non-specific 'getting on with life' as the main advantage of stopping using drugs. This was in addition to other responses that focused on specific examples of life change like 'going back to work or college', five participants reported 'having more money' as being important and 'being able to stop the routine of using drugs everyday' was another positive behavioural belief reported by five participants. It is interesting that health improvements was only reported by 4 participants, as an advantage of stopping heroin use, when this is one of that main reasons the Department of Health are encouraging heroin users to enter treatment and stop using drugs, alongside reducing crime which was reported by 3 participants (Home Office 2002).



The ‘*disadvantages*’ question elicited nine behavioural beliefs, as shown in Table 2.3. Initially six participants reported ‘no disadvantages’ to stopping using drugs, until prompted, and even with prompting only a further one belief was elicited from the majority of participants (n=5); the belief being that previous psychological problems, including ‘stress’ and ‘anxiety’ would re-occur. Other negative salient behavioural beliefs included ‘social isolation’ elicited by two participants as they would have to disassociate from drug using peers and ‘difficult to find work’ as two participants reported having had no experience or skills.

**Table 2.2: Number of Reported Behavioural Beliefs – ‘Advantages’ Question**

Category	n=7
Getting on with life (non-specific)	7
Stop routine of using	5
Get back to college/work	5
Have more money	5
Health improvements	4
Feel accepted/reduce stigma	3
No further crime/illegal activity	3
Being able to get away/holidays	2
Not seeing other users	1
More contact with family/friends	1
No further contact with clinic	1



**Table 2.3: Number of Reported Behavioural Beliefs – ‘Disadvantages’**

**Question**

---

Category	n=7
No disadvantages	6
Re-occurrence of problems (psychological)	5
Change of lifestyle	2
Social isolation	2
Difficult to find work/no skills	2
Substitute other drugs	1
Get bored	1
Find it hard to cope (general)	1
Learning to deal with emotions	1

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**2.3.2 Normative Beliefs**

Table 2.4 reports the number of normative beliefs elicited from the ‘*approve*’ and ‘*disapprove*’ questions. All participants reported ‘family’ as the first elicited response to the ‘approve’ with a total of seven beliefs being elicited in total. ‘Friends’ was a salient category with participants also clarifying they were referring to ‘non drug using friends’ specifically. Other categories included ‘health professionals’ and ‘police’ or ‘probation staff’.

A substantial proportion of the participants did not respond with any salient normative beliefs to the ‘disapprove’ question by stating ‘nobody’. Of the participants who did respond drug associations, in particular ‘drug dealers’ and ‘other drug users’, were elicited as the two referents that would disapprove of them stopping using drugs.

Given the assumption that participants are likely to list referents with which they are motivated to comply, the normative beliefs elicited suggest that participants had more positive subjective norms when thinking about stopping using drugs.

**Table 2.4: Number of Reported Normative Beliefs – ‘Approve’ and ‘Disapprove’ Questions.**

Approve	n=7	Disapprove	n=7
Family	7	Drug dealer	4
Friends (non drug users)	6	Other drug users	3
Doctors/health professionals	3	Nobody	3
Probation/Police	3		
Everybody	3		
Work colleagues	2		
Society	1		

### 2.3.3 Control Beliefs

The '*difficult*' question resulted in ten categories of salient control beliefs (see Table 2.5) with three categories, 'low motivation', 'withdrawal symptoms' and 'craving' elicited by four of participants, two categories 'having money' and 'access to drugs' by three of participants, two stated that getting 'no help or support' would make stopping drugs difficult, with four further categories elicited from individual participants.

Table 2.6 shows the results of the '*easy*' question with 'medication/treatment' (n=6), 'support from family' (n=5) and 'support from professionals' (n=5) being the most common elicited control beliefs. A total of 10 salient beliefs were categorised including 'having no contact with other users' (n=3), 'having something to do (n=2) and having a 'positive attitude' (n=2).

Similar numbers of control beliefs were elicited from both questions with some beliefs simply being the obverse of each other, for example 'easy' = 'support/treatment' and 'difficult' = 'no support/no treatment', 'easy' = 'no withdrawal symptoms' = 'withdrawal symptoms', 'easy' = 'no contact with other drug users' and 'difficult' = 'contact with drug users'.

The control beliefs elicited from these interviews support earlier subjective predictors of continued heroin use gathered from previous qualitative interviews discussed in Section 2.2.3, i.e. low motivation, withdrawal symptoms and contact with other drug users. Drug treatment and professional support is also highly

reported as something that would help to facilitate stopping heroin use, which again supports the notion that drug treatment may be important.

**Table 2.5: Number of Reported Control Beliefs – ‘Difficult’ Question**

Category	n=7
Motivation (low)	4
Withdrawal symptoms	4
Craving/Habit	4
Having money in my pocket	3
Access to drugs/availability	3
Support/treatment	2
Stressful situations (non specific)	1
Anxiety	1
Association with other users	1
Enjoyment	1

## 2.4 Discussion

The aims of this Chapter were to investigate whether heroin users are able to discuss their thoughts and feelings in terms of stopping using heroin, to examine whether they fit within the TPB framework, and to explore whether the barriers and facilitators of heroin use are associated with drug treatment or the predictors of discussed within Chapter One and Section 2.2.2 of this Chapter.

**Table 2.6: Number of Reported Control Beliefs – ‘Easy’ Question**

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Category	n=7
Medication/treatment	6
Support – professional	5
Support –family	5
No contact with other drug users	3
Employment/education/something to do	2
Positive attitude	2
Drug awareness/education	1
No withdrawal symptoms	1
Prison	1
Receiving positive feedback	1

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#### **2.4.1 Summary**

Heroin users are able to discuss and identify their beliefs about stopping using drugs in the future during an interview designed to identify factors associated with behavioural, normative and control beliefs. Drug treatment and receiving support from professionals was elicited as a salient facilitating factor (control beliefs) in stopping drug use. Low motivation, withdrawal symptoms, and association with drug using peers, were also identified beliefs that support earlier research undertaken in this area. These results suggest that the TPB would be a useful framework in which to examine the prediction of heroin use intention and behaviour during drug treatment.



#### **2.4.2. Facilitating Factors Associated with Stopping Drug Use**

Control beliefs are held to be the barriers and facilitating factors, which underlie perceived behavioural control, a determinant of intention, but which can also have a direct impact on behaviour and influence behaviour change (Ajzen 1991)

Chapter One discussed the importance of drug treatment in enabling heroin users to stop using drugs (NTA 2006), by enabling the reduction of associated risks, for example, crime, and improving health and lifestyle outcomes (Home Office 2002a). The most commonly reported control belief was access to drug treatment and medication, thus this supports the suggestions discussed in Chapter One (Section 1.1.4) that drug treatment is an important factor for heroin users wanting to stop using drugs. Having professional support was the second most common facilitating factor in stopping drug use, which also correlates with positive normative influences of health professionals. Whilst national strategies are being delivered to engage drug users into treatment, it would appear that drug users also view this as a facilitating factor in stopping future drug use.

In terms of behavioural beliefs being able to 'get on with life' was the belief elicited by all participants, 'stopping the routine of using' is another advantage suggesting that heroin use becomes habitual and central to life during the time you are using. Heroin users have suggested many positive factors that are associated with stopping drug use; with a high percentage initially stating that there were no disadvantages to stopping. However the use of prompts during the interview enabled negative beliefs and barriers to be identified.

### **2.4.3 Barriers Associated with Stopping Drug Use**

A concern about reoccurrence of psychological problems was the most common negative belief elicited from the interviews. One of the side effects of heroin is the ability to suppress emotional states and allow a sense of 'escapism' (Department of Health 2001); hence heroin use becomes the primary coping mechanism. The effects of mood state on continued drug use was raised in the study by Powell et al (1993), though Brewer et al (1998) did not associate psychiatric morbidity with drug use outcomes. This area is perhaps one area that requires further exploration as heroin users are stating this as a problem yet treatment studies tend not to measure this; in the Brewer et al (1998) meta-analysis only 17% of studies reported the effects of mental health problems.

Having low motivation to stop using drugs, and coping with cravings or the habit formation of using heroin were also highly rated as barriers along with experiencing physical withdrawal symptoms, this supports the previous self-reported barriers to stopping drug use discussed in Section 2.2.3. The negative effects of heroin use, withdrawal symptoms, are identified as one of the most common control beliefs and as a predictor of continued heroin use during treatment (Powell et al 1993).

Having contact with other drug users and the potential unsupportive influence of drug users and drug dealers might also make it difficult to comply with treatment if this is also associated with drug availability (Best et al 1999). Chapter One reported peer influence as a strong influence on ongoing drug use behaviours (Schroeder et al 2001, Termorshuizen et al 2005). The need for non-

engagement with drug using peers seems important in stopping drug use, yet social isolation, as a result of moving away from a drug using peer group, was also identified by two participants as one of the disadvantages of stopping using drugs, which may bring with it another set of problems with which to cope.

Overall, the findings support previous research that has examined heroin users self-reported barriers to continued drug use. It has also highlighted the importance of drug treatment and the subsequent support from health professionals as a facilitating factor in stopping future drug use.

#### **2.4.4 Study Limitations**

The study had only a small sample size (n=7), and although the participants were all heroin users, as was the target population, this may not be totally representative of all heroin users. The heroin users in this study were all attending for treatment and thus may already be thinking about positive and negative associations of stopping, this may differ from heroin users that do not want treatment or want to stop using drugs. Nevertheless, heroin users entering treatment was the target population and by utilising interviews rather than questionnaires the data was rich with a high number of beliefs elicited and the information gained supported the predictors of continued heroin use, gathered from heroin users during treatment, detailed in Section 2.1.3.

A further limitation in this study was the use of only one researcher for transcription of interviews and analysis. Consequently, this could have the potential effect of introducing bias and poor internal consistency to the resulting



coding frames due to a lack of inter-rater reliability. This limitation should be recognised when before attempting to generalise the results to heroin user populations. Consistency could have been improved by introducing a second reviewer, however, this limitation was imposed on the study due to the restraints on available resources.

#### **2.4.5 Conclusion**

Findings indicate that heroin users can identify a variety of positive and negative beliefs about stopping using heroin based on a theory of planned behaviour framework. Drug treatment was identified as a facilitating factor in stopping heroin use and as such provides the basis in which to empirically apply the TPB to heroin use behaviour.

The structure of the interview, in enabling underlying beliefs about stopping using heroin to be identified, also has the potential to be used as a clinical intervention during drug treatment. Heroin users are able to specifically state which salient factors are important in the facilitation of behaviour change and thus intervention targeted at specific beliefs. Therefore, the present study shows that the TPB might be usefully applied as a framework for predicting heroin use in heroin users accessing drug treatment. Further, these underlying constructs may also provide a useful tool in clinical treatment settings.

#### **2.5 Summary**

The findings of the present chapter show that TPB might be usefully applied in this population and supports the discussion raised in Chapter One that

drug treatment and subsequent support from health professional is an important factor in stopping heroin use. Results also support the findings from previous self-reported barriers to ongoing drug use (see Section 2.1.3), including association with drug using peers, physical withdrawal states, drug availability and motivation. It has, however, not generally identified specific predictors of continued heroin use during treatment but has identified important beliefs that could be further examined during clinical appointments with treatment services.

### **2.5.1 Next Steps**

One of the key facilitating factors identified by heroin users for stopping heroin use was drug treatment and accessing help from professionals. For heroin users to get the most out of treatment they need to feel this has benefits for them and that they are motivated to attend (Shen, McLellan & Merrill 2000). We will therefore start the empirical Chapters by using the TPB to predict attendance for drug treatment before leading onto the application of the TPB in the prediction of heroin use during treatment.

The following chapter will assess the extent to which the TPB can predict intention to ‘attend appointments at clinic’ and actual attendance (behaviour), over a period of six-months, in a clinical population of heroin users attending a substance misuse service for drug treatment.



## **Chapter 3**

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## **Chapter 3 –Predicting Attendance for Drug Treatment: Application of The Theory of Planned Behaviour.**

### **3.1 Introduction**

The aim of this study is to examine the determinants associated with attendance at drug treatment services. The beliefs elicited, from heroin users, in Chapter 2 suggest that receiving professional support and subsequent medical treatment is important for heroin users wanting to stop drug use.

#### **3.1.1. Attendance in Drug Treatment**

Engaging drug users in treatments, such as methadone or buprenorphine, has been shown to offer positive outcomes in terms of reductions in drug use, injecting behaviours, and improved social and psychological functioning (Barnett, Rodgers and Bloch 2001, Mattick et al 2003). For drug treatment programmes to be effective drug users must attend and sustain regular contact with their clinic appointments. Treatment outcomes for patients receiving less than 90 days in treatment are not significantly different from those receiving no treatment, an indication that 90 days is the minimum time for treatment to be effective (Booth, Crowley & Zhang 1996). The National Treatment Agency (NTA) currently set substance misuse services targets to ensure individuals with drug problems are retained in treatment for a minimum of 12 weeks. Treatment data including retention rates and unplanned discharges (treatment drop out) is currently collected as part of ensuring the NTA treatments targets are being achieved. National data reported for 31/03/07 states that 66% of drug users were retained in

treatment over a 12-week period (NTA 2007a); thus 34% did not achieve the recommended minimum time for treatment effectiveness to be achieved.

### **3.1.2 Treatment Outcome Studies**

Predictors of poor treatment outcome have been highlighted in Chapter One; association with other drug users, previous treatment attempts, heavy pre-treatment heroin use, frequent crack use and drug users that inject, are consistent but weak predictors of treatment outcomes across studies (Brewer et al 1998). In general studies of treatment outcomes, for example methadone and buprenorphine treatment, the focus is on treatment effectiveness for improving pre-treatment variables rather than on the characteristics of those participants that have poor outcomes.

As an example, Gerra et al (2004) evaluated the patient/treatment variables influencing retention rates in methadone and buprenorphine treatment. They concluded by reporting both treatments to be as effective as each other in retaining patients over the total 12-week study period (62% vs 59%,  $p < .05$ ) but that methadone retained more patients in the initial four weeks of treatment than buprenorphine (78% vs 67%,  $p < .05$ ). Higher doses of treatment were influential in retaining methadone patients but dosing was not significant for buprenorphine patients and patients in methadone treatment were more likely to use illicit opiates than those in buprenorphine treatment (32% vs 25%,  $p < .05$ ). There was little discussion relating to patient variables, apart from reporting that patients who completed buprenorphine treatment were more likely to be depressed than those

that dropped out, thus suggesting patient variables are of secondary importance to treatment variables.

Treatment outcomes studies rarely report or suggest the pre-treatment variables that are associated with ongoing drug use during treatment. The exceptions are those that focus on particular risk factors rather than treatment outcomes per se, for example, Moos, Nichol and Moos (2002) examined risk factors during treatment, Termorshuizen et al (2005) predictors of relapse, Schroeder et al (2001) social predictors of illicit drug use and Williamson et al (2007) examined the use of cocaine on treatment outcomes. If treatment studies focus on positive outcomes associated with treatment and neglect reporting important information such as predictors of poor outcomes it makes it difficult to focus intervention at those most likely to continue using drugs during treatment or those who risk treatment drop out altogether.

### **3.1.3 Theory of Planned Behaviour**

The focus of interest in this study concerns which variables are likely to predict actual attendance for drug treatment, taking into account the variables discussed in Chapter One which may be predictive of treatment drop out, for example, ongoing drug use, drug using associates and previous treatment episodes. The theory of planned behaviour (Ajzen 1991) will be used as a theoretical framework for the study. The theory of planned behaviour (TPB) states that behaviour is predominantly guided by intentions and that behavioural intention, in this case, to attend drug treatment appointments can be determined by three underlying factors; attitude, subjective norm and perceived behavioural



control. Thus a drug user is more likely to intend to attend their appointments if they have a positive feeling about it, perceive a social pressure to attend and if they believe they will be successful in attending. (see Chapter One for full details on the TPB).

The TPB has been applied in numerous studies to predict various behaviours (see Conner & Armitage 1998, Armitage & Conner 2001). In general these reviews support the idea that intentions can be explained with high levels of variance accounted for by attitudes, subjective norms and perceived behavioural control. The prediction of actual behaviour is however more difficult with past behaviour often the best predictor of future behaviour over and above any of the TPB determinants (Drossaert, Boer & Seydal 2003, Ouellette & Wood 1998).

#### **3.1.4 Attendance Studies**

As previous studies of drug treatment attendance are unavailable it is perhaps reasonable to examine evidence from other studies that have used the TPB as a predictor of attendance, albeit in different populations, as a basis for the present study, for example, attending screening appointments for breast cancer (Rutter 2000, Drossaert, Boer & Seydel 2003) and Downs Syndrome (Michie et al 2004). Michie et al (2004) asked 1499 women about their intention to attend for Downs syndrome screening at a future appointment as either part of a routine hospital appointment or as a separate hospital appointment for the purposes of the test only. In the routine and separate appointment groups the TPB was able to predict intention to attend ( $R^2 = .74, p = <.01$  and  $R^2 = .69, p = <.01$  respectively) with attitude the strongest independent predictor. Subjective norm and perceived



control were also significantly predictive of intention, though subjective norm was only significant when that related to family and friends rather than the perceived pressure from health professionals. Intention was the single independent predictor of screening uptake in both groups (Michie et al 2004).

Drossaert, Boer and Seydal (2003) added past behaviour as a predictor of future behaviour when looking at attendance for breast cancer screening. Following an initial scheduled appointment, for breast cancer screening, women were invited to complete questionnaires regarding their attendance at future screening appointments. They found that intention to participate in two future rounds of screening was significantly predicted by the TPB variables ( $R^2 = .49, p < .01$ ), attitude being the strongest predictor. Attendance at baseline was predictive of attendance at the first follow up appointment, as was intention; and attendance for the first follow up appointment was the strongest predictor of attendance at the second follow up appointment ( $R^2 = 0.32, p < .01$ ). In this study 49% of the variance in intention to attend could be explained by the TPB variables whereas TPB variables could only explain 15% and 18% variance in actual behaviour at rounds two and three respectively with past behaviour being the strongest predictor. This supports the previous results found by Rutter (2000), in which attitude, subjective norm and perceived control were all independent significant predictors of intention to attend future screening appointments accounting for 29% of the variance. Past attendance was the only significant predictor of re-attendance some 3-years later ( $p < .01$ ).

Most closely related to the present population being studied, Christian and Armitage (2002) used the TPB to investigate homeless people's participation in outreach service programmes. One hundred and four homeless people were interviewed with the aim of assessing the utility of the TPB in predicting intention and future participation in future outreach programmes. In this study attitude emerged as the single significant predictor of behavioural intention explaining 46% of the variance with behavioural intention ( $\beta = 1.84, p < .01$ ) and subjective norm ( $\beta = 1.72, p < .01$ ) being significant predictors of participation in service provision with past behaviour not significant in predicting future participation.

Attendance studies support the theory of planned behaviour to predict intention though the ability of the TPB to predict actual behaviour in this context is not strong, with past behaviour being the strongest predictor of future attendance behaviour. In drug misuse research, as mentioned in Chapter One, previous treatment experiences may have an inverse effect on future behaviour with poor outcomes among treatment-experienced patients, and less compliance with treatment than those entering treatment for the first time (Brewer et al 1998, Hser et al 1999, Darke et al 2005). Previous TPB research has incorporated prior behaviour as a proximal determinant of intention and behaviour (Drossaert, Boer & Seydal 2003, Christian & Armitage 2002). Conner and Armitage (1998) report that the addition of past behaviour to the TPB variables explains, on average, an additional 7% of the variance in intention and 13% in behaviour. As Chapter One also suggests past behaviour (previous treatment) as a predictor of treatment outcomes this study will include previous treatment episodes as an indication of past behaviour.

### **3.1.5 Rationale for the Present Study**

The present study will use the TPB as a framework to examine predictors of behavioural intention and attendance. The participants will be a clinical population of heroin users that are attending substance misuse services for drug treatment.

A limitation of previous TPB studies has been the use of self-reported behaviour data, which are vulnerable to a number of biases, yet Elliott, Armitage and Baughan (2007) have reported that the TPB is able to predict and account for high levels of variance (31%-39%) in actual behaviour; hence, testing the predictive validity of the TPB with objective measures of behaviour is important. This study will use objective measures of actual attendance that will be collected from clinical records and information systems held at the drug treatment service.

A further limitation of previous TPB studies is the lack of follow-up, which has been discussed in detail in Chapter One, which may be limiting the ability of the TPB to predict intention and behaviour over time. This study will attempt to overcome this by collecting follow up data over a period of six-months, the time suggested within the TTM (Prochaska & DiClemente 1986) for the maintenance of behaviour change.

Additional variables have been included in the study that have been identified from Chapter One as being predictors of ongoing drug use and treatment drop out; pre-treatment drug use (heroin and crack), association with drug using peers (social relationships) and previous treatment (past behaviour).



Thus it is of interest to determine the relative importance of the social cognition variables when compared to clinical variables. The use of additional variables is encouraged by Ajzen (1991) “if it can be shown that they capture a significant proportion of the variance in intention and behaviour after the TPB variables have been taken into account” (p. 199). The addition of clinical predictors, and past behaviour, has been addressed by O’Connor, Armitage and Gray (2006) in their study of parasuicide behaviour. Clinical variables, depression, hopelessness and anxiety, were included in the final model with depression being significant in parasuicide intention, though were not significantly predictive of suicidality, beyond the effects of the TPB variables.

So that the TPB is able to predict continuous behaviours rather than single actions, i.e. repeat attendance for clinical appointments, survival analysis techniques will be employed to examine predictors of change. Survival analysis techniques are able to predict times to a particular event or end-point (Collett 2003), for example treatment dropout. Traditionally used in medical research to predict time to event, i.e. the onset of disease or death, psychology has also started to use these techniques to predict changes in behaviour. Elliot, Armitage and Baughan (2007) and Armitage (2005) have used these techniques to predict driving and exercise behaviour respectively, thus are able to predict which TPB variables are associated with behaviour change over time. The use of survival analysis techniques is discussed in further detail in Section 3.3.4.6.

### **3.1.6 Aims**

The aims of the present study are as follows: to explore whether attitudes, subjective norms and perceived behavioural control are predictors of heroin users intention to attend clinical appointments. To test the predictive validity of the TPB with regards to objective measures of behaviour and to investigate whether the TPB can predict time to treatment dropout.

It is predicted that the TPB variables would support the predictive validity of behavioural intention and that using an objective measure of behaviour would further support the validity of the TPB; that TPB variables would explain additional variance in behaviour beyond that accounted for by clinical variables and past behaviour; and that TPB variables would be predictive of treatment survival rates.

## **3.2 Method**

### **3.2.1 Participants**

Participants were recruited from statutory specialist drug services in Sheffield and were attending for drug treatment on a voluntary basis. Participants were not eligible for inclusion to the study if they were already in prescribed drug treatment, were receiving treatment on a coerced basis, for example as part of a court mandated treatment order, if they were pregnant, homeless, had severe mental health problems or they had concurrent alcohol dependence syndrome. No incentives were given for participation in the study and the study was approved by the North Sheffield Research Ethics Committee.



Following an assessment appointment 138 referrals were made to the study, 28 of which were excluded (see Figure 3.1); 18 refused to consent and a further 35<sup>12</sup> did not attend to start drug treatment (treatment appointment)<sup>13</sup>, leaving a sample of 57 participants that were recruited. The sample consisted of 15 women (Mean age=35.07 sd=9.55) and 42 men (mean age=31.43 sd 5.605) all of whom had been assessed by a clinical nurse specialist, diagnosed as having an opiate dependency and were attending the substance misuse service to start drug treatment.

### **3.2.2 Study Design**

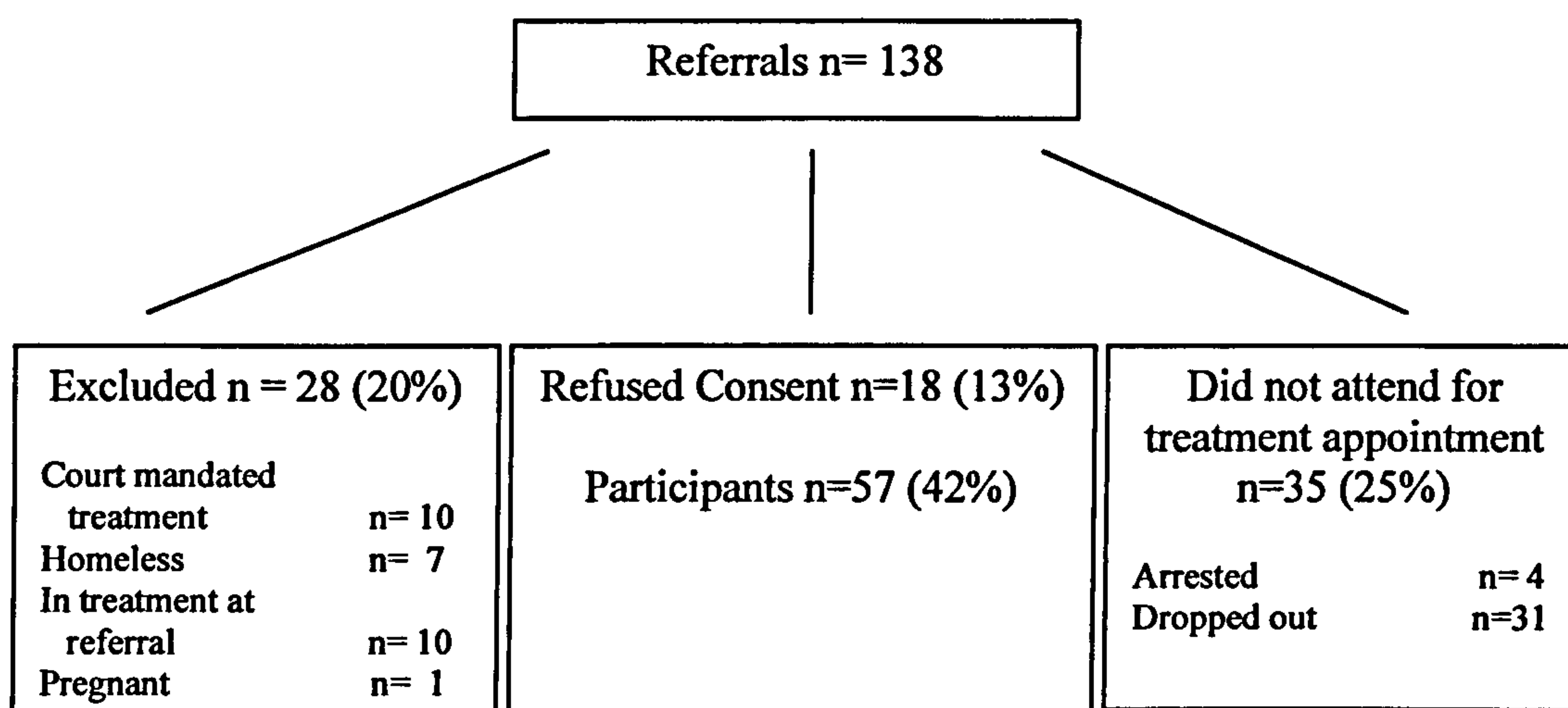
The study was longitudinal in design conducted over a six-month period. Initial data were collected at baseline, to coincide with start of drug treatment, with a follow-up period of six months. Attendance was monitored over the six-month period by accessing data from the substance misuse service on the number of appointments offered to each participant and confirming how many appointments were attended and how many were not attended.

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<sup>12</sup> As the 35 drop outs had not yet consented to the study only names and appointments times are available, thus we have little information on these individuals and therefore cannot make inferences about why they did not attend for treatment

<sup>13</sup> Following an assessment appointment with a nurse a follow-up appointment is booked with a doctor to initiate drug treatment

**Figure 3.1: Recruitment Process**



### 3.2.3 Procedure

Participants were identified by attendance at either of the two Sheffield substance misuse services for their initial assessment appointment with a clinical nurse specialist, social worker or doctor. Referral forms and inclusion criteria posters were left with recruitment sites, in the clinical rooms and reception areas. Participation in the research was initially broached by the clinician and brief information given regarding the study. Referral forms were completed giving information on the participant's name, contact details and date of their treatment appointment.

At the treatment appointment with the doctor, which would usually be the appointment given for start of prescribed drug treatment, the participant would be given information sheets, informed consent was obtained at this time and participants were invited to complete questionnaires to gather baseline data.

Interviews were conducted<sup>14</sup> comprising interviewer-led questionnaires (questions asked and recorded by interviewer) and self report questionnaires. The interviews took approximately 20 minutes to complete depending on the literacy of the individuals participating.

Participants would continue their treatment programme as agreed with their treatment service and involvement within the study would have no bearing on the treatment they would receive. Follow-up attendance data would be collected at six-months.

If the participant did not attend for the treatment appointment they were either contacted directly, if it was felt to be appropriate by the clinician, or information was given for subsequent treatment appointments. If no further contact had been made or appointments attended within 4 weeks it was assumed the individual no longer required drug treatment and were discharged from the treatment service<sup>15</sup>.

The recruitment process relied solely on referral from the recruitment sites and hence co-operation of the clinicians working within those services. The treatment services did not hold specific assessment clinics with nurses seeing patients throughout the week depending on individual diaries, therefore the engagement with the clinicians in this process was paramount to recruitment. In

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<sup>14</sup> Although the data collected was quantitative, interviews were undertaken due to the nature of some of the measures being used, namely the Opiate Treatment Index (see Section 3.3.4.1), it gives the participants and researcher chance to ask for clarification and reduces the potential for missing data.

<sup>15</sup> The 4-week limit was the time allocated by the treatment service; thus, if no contact was made by the individuals within this time frame they would be discharged.



an attempt to improve the recruitment rates, treatment services were visited regularly, especially at times of low referral numbers, weekly phone calls were made to the treatment services to check clinicians' diaries for assessment times and to remind clinicians' of the study and referral criterion and reminders were sent through the post.

The introduction of court ordered treatment initiatives from the Department of Health during the recruitment period significantly reduced the numbers of heroin users available for recruitment purposes, as voluntary assessment slots were re-allocated for this purpose.

### **3.2.4 Measures**

#### **3.2.4.1 Demographic data**

Demographic data included: gender, date of birth, marital and employment status, ethnicity, whether they had children living with them, the amount of times they had previously been in drug treatment and the number of other drug users they currently had regular contact with (reported as social relationships). Data were categorical with the exception of age and previous treatment, which remained continuous (see Table 3.1 in results Section for categorisation of demographic data).

#### **3.2.4.2 Drug Use**

Drug use behaviour was gathered using the Opiate Treatment Index (OTI) (Darke et al 1991, Darke et al. 1992) a validated, structured, interviewer-led questionnaire designed to monitor drug treatment outcomes. The OTI consists of

six sections; Drug use, HIV risk taking behaviour, social functioning, criminality, health and psychological adjustment. Initial questionnaire construction was tested on 290 opiate users; see Darke et al (1992; 1991) for full details of the analysis undertaken and results. Test-retest and inter-rater reliability methods, with all except the drug use section, showed good internal reliability scores. As the drug use section covers 11 different drugs it was not considered appropriate to combine the drug use data into a single scale instead the provision of drug use data for each category was seen as a reliable means of presenting this section. Validity was gained by correlations with a previously validated outcome measure, the Addiction Severity Index (McLellan et al 1980), and by obtaining collateral information from interviews with participants' partners, medical assessments, urine screens and criminal records<sup>16</sup>. The OTI, originally designed in Australia, has been replicated for use within the UK by Adelekan et al (1996) with comparable results and has more recently been used by Keen et al (2003) to examine outcomes of methadone treatment in a UK population. The findings suggest that the OTI scales are capable of obtaining accurate self-report information.

The OTI drug scale has eleven drug categories; heroin, other opiates, alcohol, cannabis, amphetamines, cocaine, tranquillizers, barbiturates, hallucinogens, inhalants and tobacco. Because of the rise in, and harms related to, the use of crack-cocaine (crack) within the UK, (Home Office 2002b) crack was added as an additional variable to the drug use section, making 12 drug categories in total from which to collect drug use data. In this study recent drug behaviour is

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<sup>16</sup> All correlations with the Addiction Severity Index were significant to  $p < .05$ .



examined by collecting self-reported information on heroin and crack use only, as these are the drugs of interest.

For each drug class the participant is asked when their three most recent days of use occurred and how many times they used, within the last month. The interval between days of use is taken as an estimate of frequency of use and the number of times they used each day taken as the quantity consumed. The day of interview is not recorded, as that does not represent a full day's use. The data obtained is then used to get an estimate of recent use by using the following formula (Darke et al 1991)

$$Q = \frac{q1 + q2}{t1 + t2}$$

Q = average use per day

q1 = amount used on the last occasion

q2 = amount used on the second last occasion

t1 = interval between last and next to last day of drug use

t2 = interval between second and third days of drug use

Heroin use, crack use, and social relationships were extremely highly correlated; heroin and crack ( $r = .99, p < 0.01$ ), heroin and social relationships ( $r = .99, p < 0.01$ ), and crack and social relationships ( $r = .98, p < 0.01$ ). Therefore a combined 'Drug Use' scale was used for the purposes of regression analysis. The

drug use scale showed good internal reliability with Cronbach's  $\alpha = .792$ . This reflects previous assumptions made in Chapter One that association with drug using peers is predictive of drug use.

### **3.2.4.3 Drug Treatment**

Ongoing drug treatment and the length of time in drug treatment, for those who dropped out, were collected from computer records at the substance misuse services. The drug treatments were categorised into either; ongoing treatment or dropped out of treatment and length of time in treatment was calculated on weekly increments, with the start of treatment taken from the data of baseline data collection through to week 26 signifying the end of the study period.

### **3.2.4.4 Attendance at Clinic Appointments**

Attendances at subsequent clinical appointments at the substance misuse service were collected for the following 6 months by way of computer and medical records. Attendance was calculated by dividing the proportion of appointments attended by the number of appointments actually offered. As each participant had an individual treatment plan, including frequency of attendance, proportion was thought to be the best way of measuring attendance to reflect the percentage of actual attendance for each participant.

$$\frac{\text{Appointments attended}}{\text{Appointments offered}} \times 100 = \text{proportion of attendance}$$

### **3.2.4.5 Theory of Planned Behaviour Variables**

The theory of planned behaviour predictor variables, relating to attendance at clinic appointments, were measured using standard items (Ajzen 1991) on 7-point scales.

The present study uses direct construct measures, to predict intention and behaviour, rather than belief based measures and the rationale for this is fourfold. Firstly, Armitage & Conner (2001) have provided evidence for the use of the TPB in predicting intention and behaviour as a result of direct measures, secondly, no previous application of the TPB has been made to heroin users so it may be appropriate to start with the direct measures recommended by Ajzen (1991), thirdly, to include belief based measures, for example those already identified in Chapter Two, would require a much larger sample size which would be beyond the resources available for this study and finally using only direct measure will reduce the burden to participants literacy.

#### **3.2.4.5.1 Behavioural Intention**

Behavioural intention was measured on four bipolar (-3 to +3) scales using the items: 'I intend to attend all my appointments at clinic *definitely do not-definitely do*', 'I plan to attend all my future appointments at clinic *strongly disagree-strongly agree*', 'I would like to attend all my future appointments at clinic *definitely do not –definitely do*' and 'How likely is it that you will attend all your future appointments at clinic *very unlikely-very likely*'. The internal reliability of this scale was good (Cronbach's  $\alpha = .807$ ).

#### **3.2.4.5.2 Attitude**

The attitude measure was assessed with two items asking participants to rate on a bi-polar scale (-3 to +3) whether 'Attending all my future appointments at clinic would be' *good-bad, and wise-foolish*. The attitude scale had good internal reliability (Cronbach's  $\alpha = .829$ )

#### **3.2.4.5.3 Subjective Norm**

Subjective norm was described using two unipolar (1-7) rating scales: 'Most people that are important to me think *I should not attend all my future appointments at clinic – I should attend all my future appointments at clinic*', 'The people that I value think I should attend all my future appointments at clinic *strongly agree- strongly disagree*'. The subjective norm scale possessed acceptable internal reliability (Cronbach's  $\alpha = .673$ ).

#### **3.2.4.5.4 Perceived Behavioural Control**

Perceived behavioural control was measured by scoring the following three items on a 7-point unipolar (1 to 7) scale 'For me to attend all my future appointments at clinic would be *difficult – easy*', 'How confident are you that you can attend all your future appointments at clinic *not very confident-very confident*' and 'How much do you feel that attending all your future appointments at clinic is beyond your control *not in control – control*'. Cronbach's  $\alpha$  showed that the scale possessed good internal reliability ( $\alpha = .722$ ).



### **3.2.4.6 Analysis**

The focus of the analysis was to test the power of the theory of planned behaviour to predict intention to attend clinic appointments for drug treatment and to examine which variables may be predictive of attendance. Pearson's correlation coefficient was initially used to explore the strength of association between the theory of planned behaviour and the drug using variables, using a one-tailed test as is usual in the theory of planned behaviour analysis as there is a specific direction to the hypothesis being tested; the higher the behavioural intention the greater attendance at clinic appointments.

Correlations are able to tell us about the association between variables but tell us little about the predictive power of variables. Regression analysis fits a predictive model to the data and uses that model to predict values in the outcome (dependent) variable from a single predictor (independent) variable; multiple regression allows several predictors to be included. In this study hierarchical multiple regression will be used, as this will enable predictors to be added to the model to examine the predictive power of the theory of planned behaviour variables and drug using variables in predicting behavioural intention and actual behaviour (attendance at clinic appointments) also to explore which predictors produced significant improvements in model fit.

Survival analysis will be conducted to plot time to treatment drop out. Survival analysis is concerned with studying time-to-outcome data, for example, the time between study entry until the occurrence of a subsequent event or outcome, in this case dropping out of treatment. For drug treatment to be



effective it is suggested that a minimum retention rate of 90 days is required (Booth Crowley & Zhang 1996).

Data looking at survival times or times to a specific event are generally not symmetrically distributed and is therefore not amenable to standard statistical procedures (Collett 2003). The main feature of survival analysis is that survival times are classed as *censored*. Censored data occur when the end point of interest has not been observed for that individual, for example, individuals lost to follow-up where the outcome for that person is unknown. In this study where treatment drop out is the event of interest those participants still in treatment at the end of the study would be deemed censored as drop out would not have occurred by the final round of data collection.

As an example of survival analysis techniques, Dobkin et al (2002) examined treatment drop out with a sample of drug users starting a 6-month treatment programme, to examine treatment drop out between two groups of patients assessed as having low and high social support. Survival functions for both groups were compared results showing higher attrition rate for the low support group with mean survival times of 100 days compared to 180 days for the group with high social support. For the purposes of this study survival analysis will be used in its simplest terms to estimate time to treatment drop out.

Finally a Cox regression analysis will assess the association between the predictor variables and survival rate. A hazard ratio or risk ratio ( $\text{Exp}(\beta)$ ) calculates the degree of risk associated with each variable on the effect of an event

happening, for example, the risk each variable has on treatment drop out. Hazard ratios less than one indicate reduced risk and those above one indicate increased risk of the event occurring (Lang & Secic 2006).

### **3.3 Results**

#### **3.3.1 Participants**

A total of 57 participants were recruited to the study (see Table 3.1) of those 74% were male, 26% female, the mean age being 32 years. 51% of participants were single, the majority being white (93%), unemployed (67%), and having no children (79%). Heroin was the most frequently used opiate at baseline (83%) with 37% also using crack-cocaine. Injecting accounted for 28% of the route of administration with smoking being the most popular way of using opiates (54%). Half of participants reported having no regular associations with other drug users (53%) and the mean number of times in treatment was 2.09 (SD 2.33).

Comparative data was received from the Sheffield Drug and Alcohol Action Team<sup>17</sup> to examine whether the present sample was representative of the numbers of individuals entering drug treatment within Sheffield. Unfortunately only proportionate data was available as raw data is not within the public domain hence tests of significance were unable to be conducted. From the information available Table 3.1 does show that the study sample is well matched to the Sheffield drug using population on age, gender, ethnicity and drug use. The only difference being the Sheffield population does have a slightly higher percentage

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<sup>17</sup> Acknowledgment is to be given to Bradley Spencer, Data and Information Assistant, of Sheffield Drug and Alcohol Action Team for his support in supplying the Sheffield data. Statistics originate from the National Treatment Agency, National Drug Treatment Monitoring System (NDTMS) May 2007.

of injecting drug users than the study sample. Nevertheless, the present sample is broadly representative of people entering drug treatment in Sheffield.

**Table 3.1: Participant Characteristics**

	Participants <i>n</i> = 57	Sheffield (%)
Mean Age in Years (SD)	32 (6.9)	--
<b>Age</b>		
< 19	0 (0%)	(0%)
20-24	6 (11%)	(12%)
25-39	16 (28%)	(24%)
30-34	13 (23%)	(27%)
35-39	14 (25%)	(19%)
40-44	6 (10%)	(10%)
45+	2 (3%)	(8%)
<b>Gender</b>		
Male	42 (74%)	(73%)
Female	15 (26%)	(27%)
<b>Marital Status</b>		
Single	29 (51%)	--
Married/Cohabiting	17 (29%)	--
Divorced	1 (2%)	--
Widowed	1 (2%)	--
With partner	9 (16%)	--
<b>Ethnicity</b>		
White	53 (93%)	(89%)
Mixed Race	--	(2%)
Black (African/Caribbean)	1 (2%)	(5%)
Asian	3 (5%)	(3%)
Other	--	(1%)
<b>Employment status</b>		
Unemployed	38 (67%)	--
Disabled	7 (12%)	--
Full-time	8 (14%)	--
Part-time	3 (5%)	--
Self-employed	1 (2%)	--
<b>Children at Home</b>		

Yes	12 (21%)	--
No	45 (79%)	--
<b>Opiate Use at Intake<sup>a</sup></b>		
Heroin	47 (83%)	(80%)
Methadone	6 (10%)	(5%)
Other opiate	4 (7%)	(3%)
Crack Use at Intake	21 (37%)	--
<b>Route of Administration</b>		
Intravenous	16 (28%)	(34%)
Smoked	31 (54%)	--
Oral	10 (18%)	--
<b>Social Relationships</b>		
0	30 (53%)	--
1-2	12 (21%)	--
3-4	9 (16%)	--
5+	6 (10%)	--
No. Times in Previous Treatment (sd)	2.09 (2.33)	--

<sup>a</sup> Primary opiate use reported for Sheffield (Sheffield drug treatment services also accept referrals from non-opiate drug users)

### 3.3.2 Predictive Validity of the Theory of Planned Behaviour

Table 3.2 shows the means, standard deviations and intercorrelations among the variables. It can be seen that behavioural intention was correlated with perceived behavioural control ( $r = .41, p < .01$ ), attitude ( $r = .24, p < .05$ ) and negatively correlated with the number of previous treatment episodes ( $r = -.35, p < .01$ ) suggesting that the more previous times a person has been in treatment the less likely their intention to attend future appointments. Attendance, in turn, was correlated with perceived behavioural control ( $r = .25, p < .05$ ) and subjective norms ( $r = .31, p < .05$ ), hence the more control you feel you have and the more you feel it important to do what others would want you to do the more likely you are to go to appointments. Attendance was also correlated drug using variables;



the number of other drug users they socialise with ( $r = .26, p < .05$ ), and heroin use ( $r = .24, p < .05$ ) appears to be a relevant factor in attendance. Perceived behavioural control had significant negative associations with the drug variables, heroin use ( $r = -.51, p < .01$ ), crack use ( $r = -.53, p < .01$ ), and social relationships ( $r = -.52, p < .01$ ), which would suggest that the more drug using behaviour and drug relationships you are involved in the less perceived control you have over attending future clinic appointments.



**Table 3.2: Correlations Between Measured Variables**

	1	2	3	4	5	6	7	8	9	M	SD
1. Behavioural Intention	--									2.80	0.49
2. Attitude	.24*	--								2.91	0.29
3. Subjective Norm	.10	.08	--							6.87	0.34
4. Perceived Behavioural Control	.41**	.06	.19	--						5.82	1.28
5. Attendance	-.06	-.20	-.31*	.25*	--					79.64 <sup>a</sup>	12.91
6. Heroin use	.07	.05	.04	-.51**	-.25*	--				3.05	11.58
7. Crack use	.05	.04	.03	-.53**	-.21	.99**	--			1.81	11.64
8. Social relationships	.05	.04	.03	-.52**	-.27*	.98**	.99**	--		2.89	11.63
9. Previous treatment	-.35**	-.15	-.20	-.21	.14	-.12	-.12	-.16	--	2.09	2.33

\*  $p < .05$

\*\*  $p < .01$

<sup>a</sup> mean scores denotes the proportion of attendance (%)



**PAGE**

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### **3.3.3 Determinants of Behavioural Intention**

Hierarchical regression analysis was used to examine the predictors of behavioural intention (see Table 3.3). The first step was to examine the theory of planned behaviour variables in predicting attendance for drug treatment; step two added the 'drug use' items, a combined heroin use, crack use and social relationships scale which were predictors of drug use highlighted in Chapter One, and finally step 3 added previous treatment (past behaviour) to examine whether this is able to predict future behaviour over and above TPB variables (Conner & Armitage 1998).

Step 1 demonstrates that the theory of planned behaviour variables were significant predictors of intention explaining 21% of the variance with perceived behavioural control having a significant influence on intentions ( $\beta = .39$   $p < .01$ ). Thus those participants who perceived more control over attending their clinic appointments had higher attendance rates.

Adding the drug using variables in step 2 significantly increases the amount of variance explained in intentions from 21% to 31%. Both perceived behavioural control ( $\beta = .60$ ) and drug use ( $\beta = .38$ ) had significant beta weights showing higher levels of drug using behaviour were associated with a higher intention to attend appointments.

In step 3 of the regression analysis previous drug treatment was added, significantly predicted intention ( $R^2 = .34$ ,  $F = 4.97$ ,  $df = 1, 48$ ,  $p < .01$ ), with



perceived behavioural control ( $\beta = .54, p < .01$ ) and the drug items ( $\beta = .32, p < .05$ ) as the main significant influences on intention.

**Table 3.3: Hierarchical Regression Analysis - Predicting Behavioural Intention**

Variables	$R^2$	$\Delta R^2$	$F$	$\beta$
Step 1	.21	.21	4.53**	
Attitude				.22
Subjective Norm				.01
Perceived behavioural control				.39**
Step 2	.31	.10	5.60**	
Attitude				.19
Subjective Norm				-.05
Perceived behavioural control				.60**
Drug use				.38**
Step 3	.34	.03	4.97**	
Attitude				.17
Subjective Norm				-.07
Perceived behavioural control				.54**
Drug use				.32*
Previous Treatment				-.08

\*  $p < .05$

\*\*  $p < .01$

### 3.3.4 Determinants of Clinic Attendance

A second regression analysis was conducted with attendance as the dependent variable to examine which variables are predictive of actual behaviour

(see Table 3.4). The variables were added in the same order as the previous regression analysis, for consistency. The theory of planned behaviour variables, behavioural intention, attitude, subjective norm and perceived behavioural control, were first included and explained 19% of the variance in attendance. Subjective norm was the only variable to be predictive of actual attendance at appointments ( $\beta = .29, p < .05$ ). Thus the more you want to do what others think you should do, in this case those that are important to you, the more likely you are to attend appointments.

Step 2 adds drug use, which increases the variance associated with attendance ( $R^2 = .23$ ) though is not itself a significant predictor of actual behaviour. The final step in this analysis adds previous treatment. The addition of previous treatment as an independent predictor significantly increases predictive power of the regression model by improving the variance to 26% ( $R^2 = .26, F = 2.68, df = 1, 47, p < .05$ ) but previous treatment does not itself predict actual behaviour and attendance. Subjective norm is the strongest independent predictor of attendance at treatment appointments ( $\beta = .35, p < .05$ ). This finding is interesting and contrary to prediction as, within the TPB, the effects of subjective norm on behaviour should be mediated through intention thus conflicts with current theoretical understanding of the determinants of actual behaviour.

**Table 3.4: Hierarchical Regression Analysis – Predicting Clinic Attendance**

Variables	$R^2$	$\Delta R^2$	$F$	$\beta$
Step 1	.19	.19	2.90*	
Behavioural intention				.01
Attitude				-.24
Subjective norm				.29*
Perceived Control				.21
Step 2	.23	.04	2.83*	
Behavioural intention				.09
Attitude				-.24
Subjective norm				.33*
Perceived Control				.04
Drug Use				-.25
Step 3	.26	.03	2.68*	
Behavioural intention				.13
Attitude				-.23
Subjective norm				.35*
Perceived Control				.07
Drug Use				-.21
Previous Treatment				.18

\*  $p < .05$

\*\*  $p < .01$

### **3.3.5 Treatment Drop Out**

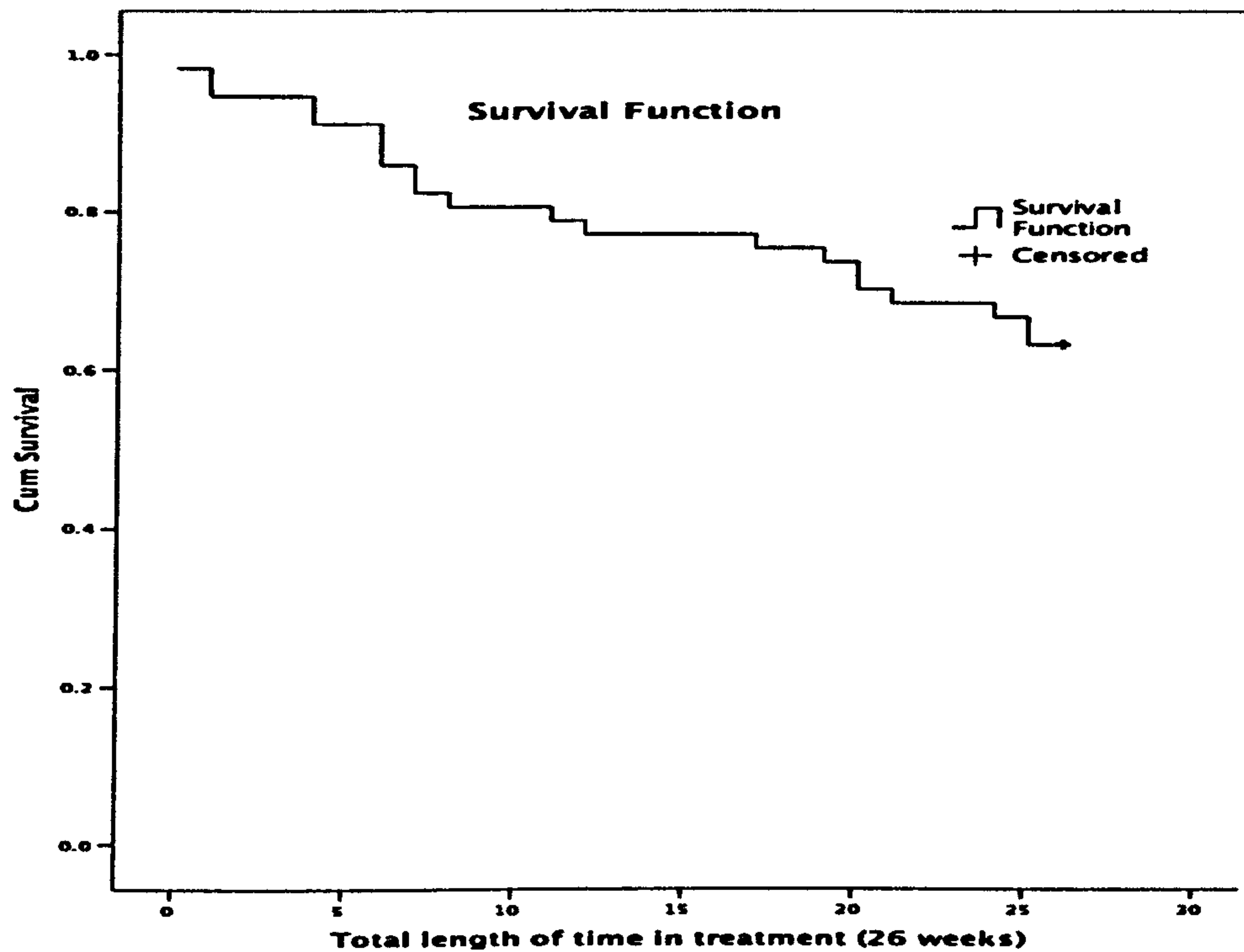
The following section will change focus and examine the time to treatment drop out and survival rates.

#### **3.3.5.1 Survival Times to Treatment Drop Out**

Standard survival analysis was used to explore the time taken to drop out of drug treatment; operationalised as the time when drug treatment had stopped and the participant was not longer attending clinic appointments. The study period was over 26 weeks and right-censored data is included within the analysis. A Kaplan- Meier curve was computed, which is a step function with jumps at observed failure times; the horizontal lines represent the passing of time and the vertical lines the proportion of participants that dropped out of treatment (see Figure 2). By the end of the study 37/57 (65%) of participants remained in drug treatment. The Kaplan-Meier curve shows that there are no significant time periods when drop out occurred, with 21 events during the 26-week period and the overall mean survival time was 20 weeks.



**Figure 3.2: Time to Treatment Drop Out**



To assess the association between the predictor variables and survival rate (treatment drop-out) a Cox regression analysis was calculated. Table 3.5 highlights that drug use has the greatest effect on treatment drop out with those still using drugs 1.8 ( $\text{Exp}(\beta) = 1.81, p < .001$ ) times more likely to drop out of treatment than those who do not use drugs. Those with a high level of intention to attend are more likely to stay in treatment ( $\text{Exp}(\beta) = .19, p < .001$ ).

**Table 3.5 Cox's Regression Analysis Showing the Effect of Predictor Variables on the Risk of Treatment Drop Out**

Predictor Variables	$\beta$	SE	Wald $\chi^2$	<i>p</i> -value	Exp ( $\beta$ )	95% CI
Behavioural Intention	-1.67	.50	11.24	.001	.19	.07 to .50
Attitude	-.08	.65	.02	.903	.92	.26 to 3.32
Subjective norm	-.66	.66	1.02	.313	.52	.14 to 1.87
Perceived Control	.06	.25	.07	.798	1.01	.65 to 1.74
Drug Use	.60	.18	11.40	.001	1.81	1.30 to 2.55
Previous treatment	-.18	.13	2.10	.835	.84	.65 to 1.10

### 3.4 Discussion

#### 3.4.1 Summary of Findings

The present study provides support for the use of the TPB as a predictor of drug treatment attendance intention and actual behaviour over a six-month period. Most notably the subjective norm component, which is not generally associated with the prediction of behaviour, was the only significant predictor of actual behaviour in this context. Drug use (combined clinical variables) was a significant predictor of attendance intention along with perceived behavioural control. Ongoing drug use had the greatest impact on treatment drop out and those with higher levels of intention to attend are more likely to stay in treatment.

### **3.4.2 Efficacy of TPB**

#### **3.4.2.1 Prediction of Intention**

The TPB variables were able to account for a significant amount of variance in attendance intention ( $R^2 = .21$ ) with perceived behavioural control being the single independent predictor. This is in contrast to previous attendance studies (Drossaert, Boer & Seydal 2003, Mitchie et al 2004, Rutter 2000), which report attitude, subjective norm and perceived behavioural control all to be significant independent predictors of attendance intention for health related-screening.

The inclusion of the 'drug use' measure<sup>18</sup> significantly increased the amount of variance explained in intentions by 10%. This supports the inference made by Shen, McLellan and Merrill (2000) in Chapter Two which suggests that the more perceived problems associated with drug use the more motivated you might be to access drug treatment and be 'treatment ready', whereas those who did not perceive any problems were more likely to see treatment as unimportant. Thus they concluded that motivation determined by problem recognition was a good predictor of change. This is in contrast to the prediction that TPB variables can increase the variance in intention over and above clinical variables, thus suggesting drug use variables are of important predictors of attendance intention.

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<sup>18</sup> 'drug use' was a combined measure of heroin use, crack use and social relationships

### **3.4.2.2 Prediction of Behaviour**

Unexpectedly, neither intention nor perceived behavioural control were significant predictors of behaviour. One consideration for lack of effect of perceived behavioural control on behaviour could be due the relatively large standard deviation (see Table 3.2) and the significant negative associations between perceived behavioural control, heroin use, crack use and social relationships. Findings from Rutter (2000) and Drossaert, Boer and Seydel (2003) also report intentions, as not being significantly predictive of future attendance behaviour, thus intentions and perceived behavioural control it seems are not important determinants of attendance behaviour in this population. And whilst drug use, a composite measure consisting of pre-treatment drug use and association with other drug users, was significant at predicting intention to attend for treatment it was not significant in predicting actual attendance. However, Cox's regression analysis revealed continuous drug using behaviours during treatment increases the risk of treatment drop out and higher levels of intention reduces the risk of treatment drop out, which supports studies by Gossop, Duncan and Marsden (2003) and Booth, Crawley and Zhang (1996) that suggest drug use behaviours, during treatment, are predictive of treatment drop-out (see Section 1.2.3.).

#### **3.4.2.2.1 Subjective Norm in the Prediction of Behaviour**

It was possible to explain 26% of the variance in actual behaviour; subjective norm was the single independent predictor of attendance for drug treatment. The normative component of the TPB has been reviewed by Armitage



and Conner (2001). Whilst subjective norm is argued to be the weakest predictor of intention it is suggested this could be due to the number of items used to measure this component and if multiple measures of subjective norm are used this may provide strong relationship with intention, though the relationship with behaviour is typically not reported. It is also worthy of note that very few studies even test a direct link between subjective norm and behaviour as this is not a relationship defined within the TPB.

Interestingly, the prediction of behaviour from subjective norm does support the results found by Christian and Armitage (2002) where subjective norm was significantly predictive of uptake of outreach service for homeless individuals. It could be suggested that it is the target populations, in both cases vulnerable and hard to access populations, which might put value on perceived social pressure and weight their motivation to comply highly. Chapter Two identified family, non drug users and health professionals as strong normative influences perhaps suggesting that that the impact on behaviour is through a strong influence on wanting to do what is expected by a non-drug using society and that their actions are driven primarily by subjective norms.

Attempting to engage drug users with treatment health interventions that also incorporates family members or significant others may strengthen the likelihood of the behaviour being successful. Kidorf et al (2005) report utilising a behavioural intervention<sup>19</sup>, to designed encourage opioid-dependent individuals to

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<sup>19</sup> The programme comprised a mixture of weekly individual counselling sessions, group counselling and a community monitoring support group (that includes the significant other). The level of intensity and participation in counselling sessions increases as progress is being made (monitored by urine samples).

involved a drug-free family member or friend in their care whilst receiving drug treatment, to facilitate the development of a supportive non drug using social network. Approximately 78% of participants that participated in the social support intervention achieved at least four consecutive weeks of abstinence.

### **3.4.3 Past Behaviour**

Past behaviour (previous treatment) had a non-significant relationship with both intention and behaviour. This contradicts the hypothesis that past behaviour would be predictive of future behaviour that was based on previous findings in drug treatment outcome studies, discussed in Chapter One, and the attendance studies discussed in Section 3.1.4. Previous attendance for drug treatment was identified in Chapter One as a predictor of poor outcomes for future treatment (Brewer et al 1998, Darke et al 2005, Hser et al 1999) and when actual behaviour was an added predictor in previous attendance studies (Drossaert, Boer & Seydal 2003, Rutter 2000) it was the strongest significant predictor of behaviour. However, the results from this study do not support past behaviour as being significantly predictive of future behaviour. The lack of significance in past behaviour predicting future treatment attendance suggests that attendance behaviour in this population is under the influence of other conditions, in this case subjective norms. Thus previous treatment experiences, successful or unsuccessful should not determine future treatment attendance.

There is a strong clinical significance to this finding; the implication being that heroin users may still view treatment as important even if they have accessed

this numerous times previously; thus, professionals in drug treatment services should view each episode of treatment as significant.

#### **3.4.4 Conclusion**

This study shows some success for the use of TPB in the prediction of attendance intention and its ability to predict actual attendance for drug treatment over a six-month period. Interestingly this study provides evidence to suggest that subjective norm is significant in the prediction of attendance behaviour. There is some argument over the usefulness of subjective norm in the prediction of behaviour, yet two studies looking at vulnerable populations have made significant findings to suggest that subjective norm can predict behaviour in these populations.

Of the additional variables included in the model neither past behaviour (previous drug treatment) nor drug use (clinical variables; heroin use, crack use, social relationships) were significant in predicting attendance behaviour though drug use was a significant predictor of intention. Subsequently Cox's regression analysis showed that individuals that continued to use drugs during treatment were more likely to drop out than those that did not use.

#### **3.5 Summary**

The predictive validity of the TPB warrants further examination for use in this population. Intention to attend for drug treatment was, as predicted, determined by perceived behavioural control and drug use. Drug use and previous drug treatment were included as predictor variables from those

highlighted as risk factors in Chapter One; in contrast to what was originally hypothesized, neither were significantly predictive of treatment attendance in this study.

The most interesting, and unexpected, finding from this study was that attendance behaviour was determined by subjective norm, which is in direct contrast to usual theoretical assumptions made by the TPB. One other attendance study (Christian & Armitage 2002) supported this outcome, with a population of homeless individuals accessing support services, suggesting that vulnerable populations may put value on the expectations of others. Clearly this component requires further empirical attention.

### **3.5.1 Next steps**

To follow on from the prediction of treatment attendance, the subsequent Chapter will apply the TPB to a population of heroin users attending for drug treatment but this time will assess the ability of the TPB to predict heroin use intention and behaviour whilst engaging in a drug treatment programme.

The study will again be conducted over a six-month period, but in addition will incorporate four separate data collection points; baseline, 1-month, 3-months and 6-months, to assess predictive power of the TPB at different time points during drug treatment. Participants will be interviewed at all four time points to collect both subjective and objective data for measurement of ongoing drug use and participation in drug treatment.



## **Chapter 4**

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## **Chapter 4 – Application of the Theory of Planned Behaviour to Predict Heroin Use During Drug Treatment.**

### **4.1 Introduction**

Chapter Three provided some support for the TPB as a predictor of drug treatment attendance and suggested that continued drug use during treatment was indicative of treatment drop out. The continued use of drugs during treatment continues to present challenges to drug treatment services thus the identification of drug use predictors are important for behaviour change modification. This study aims to apply the TPB to investigate predictors of ongoing drug use during drug treatment.

#### **4.1.1 Drug Treatment**

The National Drug Treatment Monitoring System (NTA 2007a) for England reported 179,628 drugs users were accessing drug treatment by the end of March 2006, which is a 43% rise on 2003/4 Figures (126,000). This suggests that heroin use is rising and/or more heroin users are accessing treatment.

Drug users present to treatment with complex mixtures of substance use and other related problems, as discussed in Chapter One. Drug treatment is seen as an effective way of reducing heroin use (Gossop et al 2003, Prendergast et al 2002) and mortality (Gibson et al 2008), though reports of continued drug use during drug treatment still range from between 20%-70% (Best & Ridge 2003, Belding et al 1998). This suggests that drug treatment alone cannot be responsible

for behaviour change in this population<sup>20</sup>. Treatment outcomes studies report that continued drug use during treatment is a strong predictor of poor treatment compliance (Gossop, Duncan & Marsden 2003) and that this could also lead to treatment drop out (Booth, Crowley & Zhang 1996). Chapter 3 also supports this assumption in that those who continue to use drugs during drug treatment are 1.8 times more likely to disengage with treatment (see Section 3.3.5.1) than those who do not use drugs.

Chapter Two highlighted, from self-reports of heroin users, that drug treatment is seen as an important facilitating factor in becoming drug free and that having support from health professionals would make stopping drug use easier. However, continued drug use during treatment does still occur and for treatment to be effective the variables that predict ongoing drug use need to be identified thus enabling behaviour change interventions to be developed.

#### **4.1.2 TPB Applied to Drug Use**

Reviews generally suggest that the theory of planned behaviour (TPB) is a useful predictive framework across a wide range of health behaviours (Armitage & Conner 2001) and studies have also examined the TPB in relation to recreational drug use<sup>21</sup>; for example, cannabis use (Armitage et al 1999, Conner & McMillan 1999), ecstasy use (Umeh & Patel 2004), LSD, amphetamine, ecstasy

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<sup>20</sup> Fountain et al (2000) report high rates of drug diversion from individuals selling their prescribed treatment, which may be suggestive that those individuals have little intention of wanting to stop using drugs even though they are accessing drug treatment.

<sup>21</sup> Recreational drug use differs from dependant drug use in that dependant drug use is identified through symptoms of tolerance (diminished effect with continued use), withdrawal states, social and occupational activities are reduced because of time spent in activities necessary to obtain or use the substance, lack of feeling of control over the drug and often use in an isolated way. Recreational users use less often, use for enjoyment with peers, have control over the drugs they are taking, do not experience withdrawal features and are still able to maintain their usual lifestyle.



and cannabis (McMillan & Conner 2003) and abstinence intentions for alcohol, drugs and eating disorder during recovery treatment (Morojele & Stevenson 1994). The following section will review previous examples of studies in which the TPB has been applied to the prediction of drug use.

#### **4.1.2.1. Predicting Drug Intention from TPB Variables**

McMillan and Conner (2003) applied the TPB to predict LSD, amphetamine, cannabis and ecstasy use in a sample of students using a prospective design with a three-month follow up period. 47% of the sample were followed up at 3-months and results suggest that across all drug use behaviours attitude and perceived behavioural control were significant independent predictors of drug use intentions. Attitude was also a significant independent predictor of intention in a study of ecstasy intention conducted by Umeh and Patel (2004) and perceived behavioural control was also significant but only through a positive interaction with attitude. In contrast Morojele and Stevenson (1994) found subjective norm to be the only significant predictor of abstinence intention in their study of individuals attending a rehabilitation programme for drug, alcohol and eating disorders.

#### **4.1.2.2 Predicting Drug Behaviour from TPB Variables**

McMillan and Conner (2003), found intentions to be significant in predicting LSD, amphetamine, cannabis and ecstasy behaviours explaining between 26-49% of the variance in drug use. Conner and McMillan (1999) also report intention as the strongest predictor of cannabis use. Both of these studies also found perceived behavioural control was only able to increase the variance in



behaviour through an interaction with intention; thus was itself not independently predictive of drug use behaviours.

Subjective norm was not included in analysis of behaviour in either of the studies by McMillan and Conner (2003) and Conner and McMillan (1999). This reflects the assertion made in the meta analysis by Armitage and Conner (2001) that subjective norm is seen as the weakest predictor and as such studies have chosen to remove it from behaviour analysis. However, two studies have found empirical support to suggest a direct subjective norm-behaviour relationship. Chapter Three found subjective norm to be the single independent predictor of attendance behaviour which builds on earlier findings from Christian and Armitage (2002) who found that subjective norm was predictive of attendance at homeless services. Results from these two studies suggest that the subjective norm component could be important in some populations thus in removing this variable from analysis significant developments in the TPB might be getting missed.

#### **4.1.2.3 Limitations in Drug Use TPB Studies**

Armitage et al (1999), Conner and McMillan (1999), McMillan and Conner (2003), and Umeh and Patel (2004) and all used student populations to predict drug use intentions within their studies. Self reported drug use behaviours were reported by Armitage et al (1999), Conner and McMillan (1999), McMillan and Conner (2003), Morojele and Stevenson (1994) and Umeh and Patel (2004). Morojele and Stevenson (1994) and Umeh and Patel (2004) also only reported drug use intentions. The length of follow-up periods varied from between one-

week (Armitage et al 1999) to six-months (McMillan & Conner 2003) with only 29% retention achieved by McMillan and Conner (2003) over their six-month study period. The limitations found in these studies reflect the overall limitations of TPB applications discussed within Chapter One (Section 1.4.3.2)

#### **4.1.3 Summary**

Consistent with the general studies of the TPB, attitude is a strong predictor of drug intention, as is perceived behavioural control. Subjective norm has been argued to be the weakest predictor of intention (Armitage & Conner 2001) though this does not appear to be consistent with findings related to drug intentions (Morojele & Stevenson 1994) and has not been included in behaviour analysis in some drug use studies (Conner & McMillan, 1999, McMillan & Conner 2003). Interestingly, perceived behavioural control is not a significant determinant of actual drug behaviours apart from through an interaction with intention. Morojele and Stevenson (1994) have suggested that although the TPB was developed to predict behaviours not under volitional control it actually does no better than the TRA in the prediction of drug use behaviours. The TPB may be useful as a framework for predicting heroin use behaviours though consideration of the limitations of the TPB, in general and, in drug populations need addressing.

#### **4.1.4 Rationale for the Present Study**

The focus of this study is to use the TPB to explore predictors that are associated with intention to stop using drugs and drug behaviour in a population of heroin users attending a Substance Misuse Service to start drug treatment. It

will also attempt to overcome some of the limitations of TPB studies by including prospective measures of actual behaviour in a clinical population.

As with Chapter Three, this study will incorporate clinical and psychosocial predictors of drug use, TPB variables and those highlighted from Chapter One; heroin use, crack use, and social relationships (numbers of drug using associates). In addition, as the drug treatment strategy is focused on the reduction of drug related harms (Department of Health 2001, Home Office 2002), injecting behaviour will be included as a measure of risk behaviour and health risk.

To test the validity of the TPB in predicting actual behaviour, drug use will be measured by both self-report and objective data. Urine samples taken at baseline and follow-up periods will give confirmation of drug using behaviours by utilising clinical biological markers of actual drug use. This will reduce the potential biases related to self-report and further investigate the effectiveness of the TPB in predicting objective behaviours.

For the TPB to be regarded as a predictive model it is important to show that it is able to predict continuous behaviours, heroin use for example, as well as single actions, for example attendance at health screening (Rutter 2000, Michie et al 2004). Single actions may also have long time periods between behaviours hence do not permit investigation into how behaviour might change in between follow-up and which variables are associated with change. As a result potentially



valuable information about how behaviour changes over a study period can be lost.

The use of multiple outcome measures will enable the assessment of TPB in predicting continued drug use during different stages of drug treatment. Multiple measures of behaviour have been used by Elliott, Armitage and Baughan (2007) and Armitage (2005) to investigate those TPB variables associated with behaviour change over time using survival analysis techniques. However, the studies did not investigate changes in predictors within time periods, a limitation reported by Armitage (2005). This study will use traditional hierarchical regression analysis to investigate predictors of drug use at different time periods within the study thus building a picture of predictors over time. Therefore to assess the predictive ability of the TPB over time, drug use outcomes will be measured at four distinct time points within a six month period; baseline, one-month, three-months and six-months.

Only one other study was found<sup>22</sup> that used repeated measures of the TPB in this way. Cote, Gogin and Gagne (2004) measured TPB variables four-times over a 26-month period to assess the factors protecting smoking abstinence in school children. Subjective norm and perceived behavioural control effects on abstinence behaviour did not change over time though the interaction of intention over time was significant. Smoking abstinence intention was significant at baseline and 26 months only, yet in at the latter time point the correlation was

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<sup>22</sup> Based on web of Knowledge searches which included keywords 'theory of planned behaviour' AND 'repeat\* measure\*' 'repeat\* event\*' 'multiple measure\*' 'multiple event\*' 'multiple outcome\*'



negative suggesting student's intention to remain abstinent was higher at the start of the study period than at the end. The authors conclude that the TPB, as well as being a predictive model, could also be a valuable tool for identifying and targeting school educational interventions at times that are best placed to reinforce abstinence intentions. Thus the findings from the present study may go on to highlight important outcomes on which to base clinical interventions, at different times, during drug treatment.

#### **4.1.4.1 Aims**

The aim of this study is to use a longitudinal repeated measures design to test the TPBs ability to predict future illicit drug use (heroin) in a clinical sample of heroin users, accessing a drug treatment programme using objective biological data to confirm drug use outcomes.

It is hypothesized that: (a) the TPB variables will be able to predict intention and behaviour over multiple time periods; (b) that subjective norm and the additional clinical variables will account for additional variance in behaviour and (c) the predictive validity of the TPB would be further supported in the domain of heroin use by using an objective measure of behaviour.

## **4.2 Method**

### **4.2.1 Participants**

The participants in this study are those as described in Chapter Three (see Table 3.1). The same population was used for both empirical studies as it enabled

attendance and drug use intention and behaviour to be assessed simultaneously during a treatment programme.

#### **4.2.2 Study design**

The study was longitudinal in design conducted over a six-month period. Initial data were collected at baseline, to coincide with start of drug assessment and treatment, with a follow-up periods at one-month (t2), three-months (t3) and finally at six-months (t4).

#### **4.2.3 Recruitment Procedure**

Recruitment procedure is described in Chapter Three (see Figure 3.1). Structured interviews were undertaken which took approximately 20 minutes to complete depending on the literacy of the individuals participating<sup>23</sup>. Participants would continue their treatment programme as agreed with their treatment service and involvement within the study would have no bearing on the treatment they would receive.

##### **4.2.3.1 Follow-up Procedure**

Participants were required to provide telephone and mail contact information and the name of one other contact person. Consent was also given to contact treatment services for details of future treatment appointments so that contact could also be made through this route. Multiple contact strategies were collected to maximise follow-up communication and subsequent study retention.

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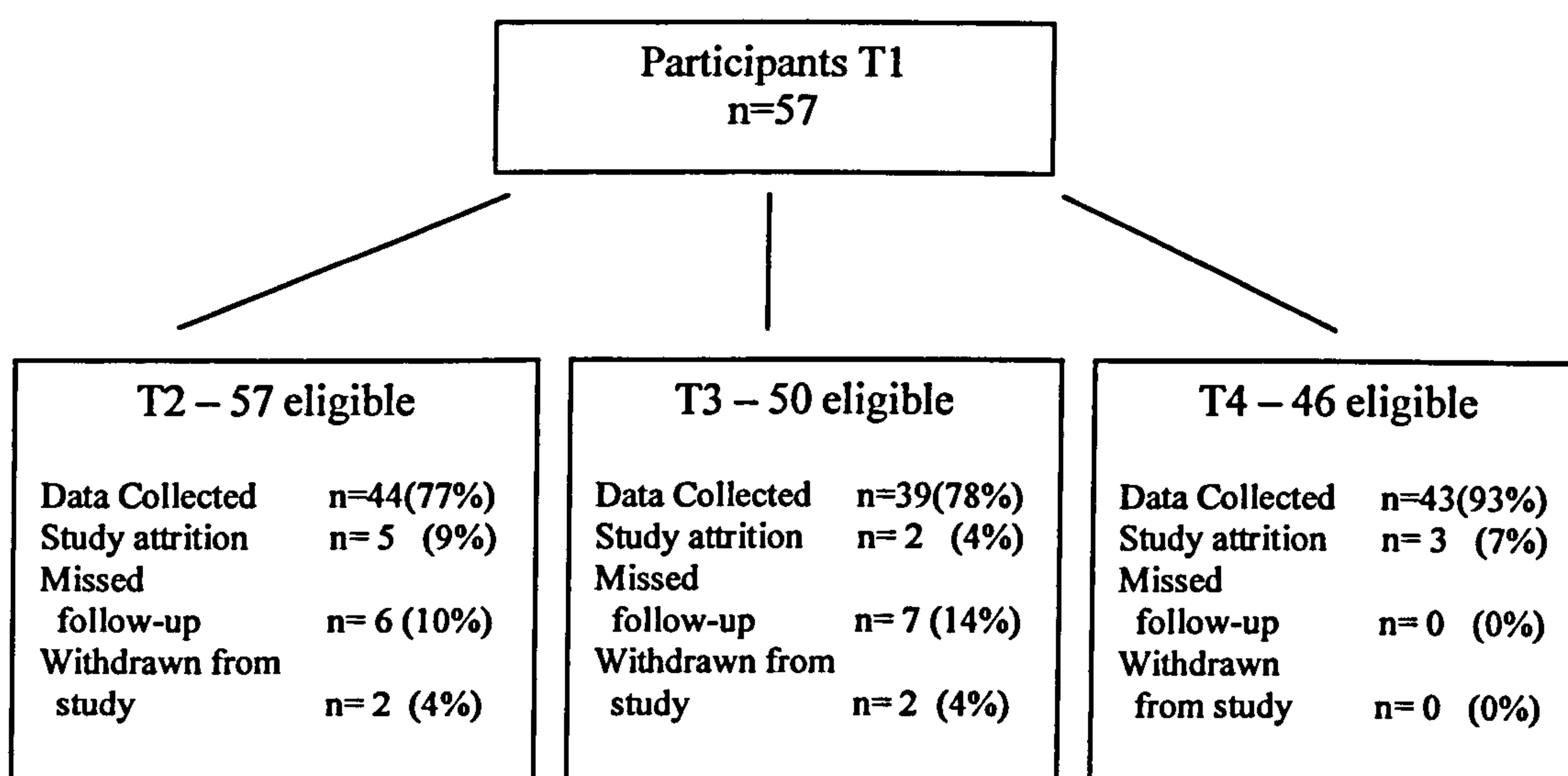
<sup>23</sup> Rationale for the use of interviews is discussed in Chapter 3 Section 3.3.3.

Participants were contacted either personally or via the clinician involved and seen for further data collection at their convenience either coinciding with a clinic appointment or as a home visit if preferred. If participants did not attend or were unable to be contacted within two weeks of the data collection period then that time period was entered as missing data (see Section 4.3.4.6 regarding the handling of missing data). Collecting data any later than 2-weeks could potentially have biased results as participants would have been in treatment for a longer time period and hence more probability of in-treatment variables having increased mediating effects on outcomes. A mean of five (range 1-9) contact attempts were made per participant per follow-up period.

#### 4.2.4 Measures

All measures, with the exception of the demographic information, were collected at all four time periods throughout the study.

**Figure 4.1: Follow Up and Study Attrition**





#### **4.2.4.1 Demographics**

Information was collected on demographic outcomes; gender, age, marital status, employment and the number of other drug users participants currently had contact with (reported as social relationships). Data was collected in the same format as that in Chapter Three (see Section 3.3.4.1)

#### **4.2.4.2 Self-Reported Drug Use**

The measures for self-reported drug use, has been fully described in the measures section of Chapter 3 (see Sections 3.3.4.1 and 3.3.4.2). The Opiate Treatment Index (Darke et al 1991) will be used to assess drug use outcomes.

#### **4.2.4.3 Objective Drug Use**

In addition to self-reported data on drug use participants also gave urine samples to validate self-reported information. It is worth noting that self-reported data was given from the past month and objective urine data would only have given a positive result, confirming recent drug use, if the drug had been used within the time taken for each of the drugs to be metabolised and eliminated from the body. In urine samples the detection rates for heroin is 48 hours with a 2-3 day detection rate for crack cocaine (NTA 2007). As a result discrepancies may occur as a result of the data being collected over different time periods, for example, if a participant had used heroin 7-days prior to interview it would be reported as a positive self-reported score but as a negative urine score.

Analysis showed that self reported, opiate treatment index scores, and objective data, urine results, for the heroin and crack drug categories were highly



correlated. For heroin scores; self-reported (SR) at t1 and objective scores (OS) at t1,  $r = .77, p < .001$ ; SR and OS at t2,  $r = .75, p < .001$ ; SR and OR at t3,  $r = .70, p < .001$ ; SR and OR at t4,  $r = .75, p < .001$ . For crack scores; SR and OR at t1,  $r = .70, p < .001$ ; SR and OR at t2,  $r = .70, p < .001$ ; SR and OR at t3,  $r = .74, p < .001$ ; SR and OR at t4,  $r = .84, p < .001$ . High internal reliability scores, cronbach's  $\alpha = .841$  and  $\alpha = .888$ , were seen for heroin and crack respectively.

Chermack et al (2000) report combining data obtained from both objective and self-reports is a much more accurate measure of drug use than either method alone. This will allow an objective measure of the frequency of heroin and crack use rather than a binary negative or positive score, which is of more interest as it reflects the amounts of drugs being used. As the self-reported and objective measures of heroin and crack use have high internal reliability, a composite heroin score and a composite crack score, at each data collection point, will be used for analysis.

#### **4.2.4.4 Injecting Behaviour**

Injecting behaviour was added as a variable in this study to assess whether health risk and high risk behaviour is a predictor of heroin use as highlighted by Booth, Crowley and Zhang (1996) and Darke et al (2005) in Chapter One. To measure injecting behaviour, the injecting Section, part of the HIV risk taking behaviour section of the Opiate Treatment Index was used (Darke et al. 1991)<sup>24</sup>, This section asks “how many times have you injected drugs in the past month?”. The more frequent the injecting behaviour the higher a score is given; hasn't

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<sup>24</sup> See Section 3.3.4.2 for reliability and validity for the use of the Opiate Treatment Index.

injected=0, once a week or less=1, more than once a week (but less than once per day) =2, once a day=3, 2-3 times a day=4, more than 3 times a day=5. The higher the score in this section relates to the greater the frequency drugs are injected and the greater the risks that are associated with this route of administration.

#### **4.2.4.5 Drug Treatment**

Drug treatment and was collected via a verbal '*treatment tracking*' form, used from time 2 onwards, in which participants were asked what type of treatment they were receiving, whether there had been any changes to that treatment and the dosage of any prescribed medication. This information was validated by use of computer records at their drug treatment service.

#### **4.2.4.6 Theory of Planned Behaviour Variables**

The theory of planned behaviour predictor variables, relating to stopping using drugs were measured, at four times points over a six month period, using standard items<sup>25</sup> (Ajzen 1991) on 7-point scales.

##### **4.2.4.6.1 Behavioural Intention**

Behavioural intention was measured on three bipolar (-3 to +3) scales using the items: 'I intend to stop using drugs in the future *definitely do not-definitely do*', 'I plan to stop using drugs in the future *definitely do not-definitely do*', 'I would like to stop using drugs in the future *definitely do not-definitely do*'.

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<sup>25</sup> The use of standard items rather than belief based measures has been previously discussed in Chapter 3 Section 3.3.4.5.

The internal reliability of the scales was good with Cronbach's  $\alpha = .929$ ,  $\alpha = .935$ ,  $\alpha = .928$ ,  $\alpha = .933$  over the four time periods.

#### **4.2.4.6.2 Attitude**

The attitude measure was assessed with four items asking participants to rate on a bi-polar scale (-3 to +3) whether 'my stopping using drugs in the future is/would be *'unpleasant-pleasant, nasty-nice, not enjoyable-enjoyable and unsatisfying-satisfying'*. The attitude scale had good internal reliability over the study period Cronbach's  $\alpha = .918$ ,  $\alpha = .914$ ,  $\alpha = .863$ ,  $\alpha = .915$  respectively.

#### **4.2.4.6.3 Subjective Norm**

Subjective norm was assessed using the direct measure (*n*); 'The people who are important to me think I *should not stop using drugs in the future- should stop using drugs in the future'* followed by a motivation to comply measure (*m*); 'With regard to stopping using drug in the future, how much do you want to do you what those important to you think you should *not at all – very much so'*. Both scales were scored on a 7-point unipolar scale and multiplied together to produce a subjective norm score.

#### **4.2.4.6.4 Perceived Behavioural Control**

Perceived behavioural control was measured by scoring three items on a 7-point unipolar (1 to 7) scale 'If I wanted to I could easily stop using drugs in the future strongly disagree-strongly agree' *and* 'How confident are you that you will be able to stop using drugs in the future *not very confident-very confident'* 'My stopping using drugs in the future would be *difficult-easy'*. Cronbach's alpha



showed that the scale possessed good internal reliability for time one, two and three  $\alpha = .604$ ,  $\alpha = .642$  and  $\alpha = .661$ , however the final measure had a poorer internal reliability of  $\alpha = .461$  but was still included in the analysis. This could possibly be related to changes in perceived behavioural control during the process of treatment, especially if illicit drug use continues, the level of control over future drug use may not be as strong as perceived when treatment was first accessed.

#### **4.2.5 Analysis**

The focus of the analysis was to test the theory of planned behaviour and its power to predict intention to stop using drugs in the future and to explore which predictor variables would be significant in the predicating future behaviour. A correlation matrix of predictor variables was computed and multiple regression used for data analysis.

Missing data caused by study attrition or withdrawal from the study (see Figure 4.1 for flow of missing data and study attrition) was imputed by way of 'last-observation-carried-forward', which will serve to reduce the potential bias in analysis. This method has been used in substance misuse research (Hutchinson et al 2000, Wasserman et al 1998) and is seen as a valid way of dealing with missing follow up data (Lang & Secic 2006).



## **4.3 Results**

### **4.3.1 Participants**

See Chapter 3 (Table 3.1) for baseline demographic data on participants. Fifty seven participants consented to take part in the study of those 43 (75%) were successfully followed up over the six-month study period. Figure 4.1 shows the flow of study attrition and missing data at each time point.

Of the 43 who remained in the study; 37 continued to have contact with the Substance Misuse Service for drug treatment and six had been discharged (Three had planned discharges following successful completion of a detoxification programme; unfortunately two of the three had relapsed by the end of the study period. One participant never actually started any prescribed drug treatment and the remaining two were discharged from the service due to non-attendance and ongoing illicit drug use).

Four participants withdrew from the study and 10 were lost to follow-up; three were in prison, two had moved away from the Sheffield area and the remaining five were unable to be contacted.

### **4.3.2 Drug Treatment**

Of the 37 participants that remained in drug treatment at six months, 27 (73%) had used heroin in the past month with 13 (35%) of those continuing to use heroin on a daily basis. Multiple regression analysis confirmed that being in treatment at t2, t3, and t4 was not significantly predictive of stopping heroin at six months, with drug treatment only accounting for 9% of the variance ( $F = 1.52, p >$

.10). Drug treatment as a predictor of future heroin use was therefore removed from the remainder of the analysis in order to reduce the number of variables being assessed.

### **4.3.3 Correlations Between Measured Variables at Time 1**

Table 4.1 shows the intercorrelations, means and standard deviations among the variables. It can be seen that behavioural intention is, as expected, correlated with perceived behavioural control ( $r = .41, p < .01$ ), attitude ( $r = .43, p < .05$ ) but was negatively correlated with crack use ( $r = -.39, p < .01$ ) and social relationships ( $r = -.24, p < .05$ ) suggesting that the higher the use of crack and the increased number of drug associates you have the less likely your intention is in stopping using drugs in the future.

Heroin use was not correlated with any of the theory of planned behaviour variables but was associated with both crack use ( $r = .25, p < .05$ ) and social relationships ( $r = .30, p < .05$ ). Crack use in turn was correlated with behavioural control ( $r = -.40, p < .01$ ) suggesting the more crack that is used the less control you have in being able to stop using drugs in the future, as heroin, crack is also associated with drug using relationships ( $r = .32, p < .01$ ).



**Table 4.1: Correlations Between Measured Variables**

	1	2	3	4	5	6	7	8	M	SD
1. Behavioural Intention	--								2.76	.55
2. Attitude	.43**	--							2.10	1.45
3. Subjective Norm	.02	-.05	--						41.58	12.67
4. Perceived Behavioural Control	.40**	.49**	.14	--					5.42	1.30
5. Heroin use	-.17	-.04	.13	.03	--				1.10	.65
6. Crack use	-.39**	-.20	.02	-.40**	.25*	--			.39	.47
7. Injecting behaviour	-.16	-.28*	-.07	-.10	.04	.09	--		1.28	3.35
8. Social relationships	-.24*	-.08	-.14	-.08	.30*	.32**	.22	--	1.42	1.95

\*  $p < .05$

\*\*  $p < .01$



#### **4.3.4 Predicting Behavioural Intention**

The predictive validity of the theory of planned behaviour was tested using hierarchical regression (see Table 4.2). The first step included the TPB variables; attitude, subjective norm and perceived behavioural control, which accounted for 23% of the variance in behavioural intention with attitude being the only significant independent predictor ( $\beta = .30, p < .05$ ). The second step added predictors from previous treatment outcome studies discussed in Chapter One, heroin use, crack use, injecting behaviour and social relationships. The additional predictors improved the variance to 31% but added nothing to the final model with only attitude ( $\beta = .29, p < .05$ ) emerging as a significant predictor of behavioural intention.

#### **4.3.5 Predicting Future Drug Use**

To test the predictive ability of the theory of planned behaviour to predict drug use an initial multiple regression analysis was conducted regressing heroin use at t4 with behavioural intention, attitude, subjective norm and perceived behavioural control. Results showed the TPB variables accounted for 25% of the variance in predicting drug use with subjective norm being the only significant predictor ( $\beta = -.30, p < .05$ ). As you would not normally expect subjective norm to be predictive of behaviour further exploratory regression analysis was conducted. Stepwise regression rather than the traditional hierarchical regression analysis will be used to further explore predictors of behaviour. Hierarchical regression builds a model based upon what past research might tell you; hence you include variables in the order of their importance to build a model. As there is no current research that has examined the predictive ability of the theory of



planned behaviour in relation to stopping using heroin and as subjective norm was unexpectedly shown to be a significant predictor of attendance behaviour, in Chapter Two, stepwise methods are helpful as they help build exploratory models where there is no previous research base (Field 2002).

**Table 4.2: Predicting Behavioural Intention**

Variables	$R^2$	$\Delta R^2$	$F$	$\beta$
Step 1	.23	.23	4.99**	
Attitude				.30*
Subjective Norm				.00
Perceived behavioural control				.24
Step 2	.31	.08	3.01**	
Attitude				.29*
Subjective Norm				.01
Perceived behavioural control				.16
Heroin use				-.07
Crack use				-.21
Injecting behaviour				-.01
Social relationships				-.12

\*  $p < .05$

\*\*  $p < .01$

Stepwise methods make decisions about which predictor variables are entered into the model based on mathematical criterion, for that reason this method is often viewed as having limitations as it is the computer rather than the researcher that searches for the predictor that best predicts the outcome variable.

Forward methods add only those variables that best predict the outcome variable and backward methods add all variables into the model removing variables at different steps that contribute the least until a final model fit is calculated (Field 2002). Backwards regression will be used in this study to assess the contribution of each variable on the final model. The rationale for this being that it will enable the least important variables to be removed thus might give a sense of which of the variables may be the least significant when attempting to understand heroin use behaviour change in clinical settings.

Analysis will be undertaken to investigate predictive variables associated with heroin use at t2, t3 and t4 to examine different predictors at different time points. The backward multiple logistic regression models includes all the baseline measures for each of the variables; behavioural intention, subjective norm, perceived behavioural control, heroin and crack use, injecting behaviour and social relationships, at step one.

#### **4.3.6 Predicting Drug Use at Time 2 (one month)**

Regression analysis using a backward stepwise method was used to explore which variables were predictive of stopping drug use at one month; four steps were taken to get to the final model.

Step 1 of the regression model with all the predictors included (see Table 4.3) accounts for 49% of the variance with heroin use ( $\beta = .48, p < .01$ ) and subjective norm ( $\beta = -.31, p < .01$ ) significantly associated with heroin use at one

month. Heroin use at baseline is associated with heroin at one month and the lower the perceived social pressure to stop using drugs at baseline the less likely you are to stop using at one month. Step 2 removes injecting behaviour, which has no impact on the variance, and adds perceived behavioural control ( $\beta = -.27, p < .05$ ) along with subjective norm and heroin use as significant independent predictors.

Crack use and intention were removed at steps three and four respectively, the significant predictors remaining the same over the final two steps. The final  $F = 11.58, (df = 1, 49, p < .01)$  with four predictors accounting for 48% of the variance. The strongest independent predictor of heroin use at one month is heroin use at baseline ( $\beta = .43, p < .01$ ), the next being subjective norm ( $\beta = -.31, p < .01$ ) and perceived behavioural control ( $\beta = -.30, p < .01$ ). Thus ongoing heroin use at one month was predicted by heroin use at baseline. Those with lower levels of perceived control and social pressure to stop using heroin were more likely to still be using heroin at one month.

**Table 4.3: Predicting Drug Use at Time 2**

Predictors at t1	$R^2$	$\Delta R^2$	$F$	$\beta$
Step 1	.49	.49	6.51**	
Behavioural intention				-.12
Subjective Norm				-.31**
Perceived behavioural control				-.27*
Heroin use				.48**





Steps one and two results in heroin use being the only significant predictor of heroin use at three months accounting for 38% of the variance after perceived control was removed. At step three crack use is removed due to insignificance and as a result the variance remains the same. Behavioural intention ( $\beta = -.25, p < .05$ ) become a significant predictor alongside heroin use ( $\beta = .37, p < .01$ ), once crack use was removed from the model. Step four of the regression removes injecting behaviour, which leaves, at step five, three independent significant predictors, after removal of social relationships, accounting for 34% of the variance in stopping heroin use at three months ( $R^2 = .34 F = 8.83, df = 1, 50, p < .01$ ).

As at one month both heroin use ( $\beta = .43, p < .01$ ) and subjective norm ( $\beta = -.26, p < .05$ ) are significant predictors of heroin use at three months yet perceived behavioural control, a significant predictor of heroin use at one-month, was removed from the model at step one as non significant. Behavioural intention ( $\beta = -.28, p < .05$ ) was also a strong predictor of heroin use at three months hence those that had lower levels of intention to stop were associated with on going heroin use at three months.

**Table 4.4: Predicting Drug Use at Time 3**

Predictors at t1	$R^2$	$\Delta R^2$	$F$	$\beta$
Step 1	.38	.38	4.18**	
Behavioural intention				-.23
Subjective Norm				-.23
Perceived behavioural control				-.02
Heroin use				.36**
Crack use				.05
Injecting behaviour				-.08
Social relationships				.21
Step 2	.38	.00	4.98**	
Behavioural intention				-.23
Subjective Norm				-.23
Heroin use				.36**
Crack use				.06
Injecting behaviour				-.08
Social relationships				.21
Step 3	.38	.00	6.04**	
Behavioural intention				-.25*
Subjective Norm				-.23
Heroin use				.37**
Injecting behaviour				-.08
Social relationships				.22
Step 4	.38	.00	7.50**	
Behavioural intention				-.24*
Subjective Norm				-.22
Heroin use				.37**

Social relationships				.20
Step 5	.34	-.04	8.83**	
Behavioural intention				-.28*
Subjective Norm				-.26*
Heroin use				.43**

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\*  $p < .05$

\*\*  $p < .01$

#### 4.3.8 Predicting Drug Use at Time 4 (six months)

Steps one through four of the regression results in only heroin use being a significant predictor of heroin use at six-months accounting for 32% of the variance ( $\beta = .39, p < .01$ ) the removed variables being, injecting behaviour, social relationships and perceived behavioural control in that order (Table 4.5).

At step five behavioural intention was removed as was subjective norm at step six leaving heroin ( $\beta = .37, p < .01$ ) and crack use ( $\beta = .26, p < .05$ ) to account for 26% of the variance in the final model ( $R^2 = .26, F = 9.02, df = 1, 51, p < .01$ ) with none of the theory of planned behaviour variables being significant predictors of heroin use over a six-month period. It is therefore the drug variables, heroin and crack, that are independently predictive of drug use over the longer term.

**Table 4.5: Predicting Drug Use at Time 4**

Predictors at t1	$R^2$	$\Delta R^2$	$F$	$\beta$
Step 1	.33	.33	3.32**	
Behavioural intention				-.17
Subjective Norm				-.19
Perceived behavioural control				-.08
Heroin use				.41**
Crack use				.18
Injecting behaviour				-.01
Social relationships				-.06
Step 2	.33	.00	3.96**	
Behavioural intention				-.16
Subjective Norm				-.19
Perceived behavioural control				-.08
Heroin use				.41**
Crack use				.18
Social relationships				-.06
Step 3	.33	.00	4.79**	
Behavioural intention				-.16
Subjective Norm				-.18
Perceived behavioural control				-.08
Heroin use				.40**
Crack use				.17
Step 4	.32	-.01	5.97**	
Behavioural intention				-.18
Subjective Norm				-.19
Heroin use				.39**



Crack use				.19
Step 5	.30	-.01	7.16**	
Subjective Norm				-.20
Heroin use				.40**
Crack use				.26*
Step 6	.26	-.04	9.02**	
Heroin use				.37**
Crack use				.26*

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\*  $p < .05$   
\*\*  $p < .01$

#### 4.4 Discussion

##### 4.4.1 Summary of Findings

Heroin use continued throughout the six-month study with 35% of participants still using drugs on a daily basis thus drug treatment was not predictive of stopping heroin use over a six-month period.

The TPB was able to predict objective drug use behaviour over the short term (3-months), PBC and intention predicting behaviour at one-month and three-months respectively. As in Chapter Three, subjective norm was significant in predicting behaviour at both one month and three months. Heroin and crack use were independent predictors of heroin use at six months. Attitude was the single significant predictor of drug use intention. The use of multiple time points highlights the changes in predictors over time that would not have been made apparent by using baseline to end-point data analysis.

#### **4.4.2 Prediction of Intention**

None of the clinical items were significant in predicting intention to stop using drugs. Attitude was significantly predictive of drug use intentions, which is congruent with previous studies on drug use (see Section 4.2.2.1). This also supports the findings in Chapter Two (see Section 2.4.1) that heroin users reported a high number of positive behavioural beliefs about stopping using drugs. However, in contrast, this study does not support the findings of McMillan and Conner (2003), Armitage et al (1999), Conner and McMillan (1999) and Umeh and Patel (2004), as perceived behavioural control was a non-significant predictor of drug use intention.

#### **4.4.3 Prediction of Behaviour from TPB Variables over Six-Months**

The present study found some evidence to support the predictive validity for the TPB in the short-term, 3-months, but not over a six-month period once clinical variables were included in the model. Perceived behavioural control and subjective norm contributed to the final model, which contributed to 48% of the variance in drug use at one month into drug treatment and intention and subjective norm were significant predictors of drug use behaviour at three-months. None of the TPB variables were able to predict drug use behaviour over a longer 6-month period. Therefore intervention based upon psychological variables may only be effective in the short to medium term with other variables predictive of continued drug use after that time. With regards to clinical variables, heroin was predictive of future heroin use at all time periods and crack use was predictive of heroin use

a time four (six-months), which supports the hypothesis that the additional clinical variables will explain additional variance in drug use behaviours.

This finding suggests that psychological interventions might be best targeted at the very start of drug treatment; as interventions done further into treatment, especially if drug use continues, could prove less effective. Hence, this might give some support to the proposal that individuals should be retained in treatment for at least three-months; however, if change has not occurred during this time and drug use continues future outcomes for those individuals might be poor.

#### **4.4.4 Prediction of Drug Use Behaviour from Subjective Norm**

In contrast to the theory of planned behaviour assumptions subjective norm was able to predict objective behaviour over a three -month period. This supports the findings from Chapter 3 that, within the current study population, subjective norm has a strong influence on behaviour, at least in the short-term.

The acceptance by some that subjective norm is the weakest predictor of intention, and the assumption that it has no bearing on behaviour, appears to have resulted in subjective norm being excluded from analysis (see Armitage & Conner (2001) for full review). Interestingly, of the drug studies reviewed only Armitage et al (1999) included subjective norm as a determinant of drug use, though it was not a significant predictor of cannabis behaviour. This supports the need for further empirical investigation of the subjective norm-behaviour relationship.

#### **4.4.5 Prediction of Drug Use Intention and Behaviour from Perceived Behavioural Control**

This study supports Morojele and Stevenson (1994) in that PBC is not a significant predictor of behavioural intention and has contrasting findings to that of Conner and McMillan (1999), Armitage et al (1999) and McMillan and Conner (2003) in that it was able to predict drug use behaviour at one-months.

One consideration may be that in the studies by Conner and McMillan (1999), Armitage et al (1999) and McMillan and Conner (2003) the target population were recreational drug users<sup>26</sup> as opposed to the current study where the population were using heroin in a dependant daily pattern. Ajzen (1991) proposes that people are likely to form strong intentions to perform behaviours when they believe they have the necessary resources and opportunities to perform them. In terms of the PBC – behaviour relationship this study found PBC to be predictive of behaviour only in the short term and not consistently over time. Conner and McMillan (1999), Armitage et al (1999) and McMillan and Conner (2003) report PBC as a non-significant predictor of drug use. The control beliefs that determine subsequent perceived control and behaviour may also differ in dependant drug users with the identification of such variables as withdrawal symptoms and association with others as strong barriers to behavioural achievement this could impact on their perceived ability to have control over future drug use.

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<sup>26</sup> College/University students



Nonetheless, this does call into question the validity of the TPB over and above the TRA. Application of the TPB to non-volitional behaviours (Ajzen 1991), in this case drug use, does not report PBC as a significant predictor of behaviour.

#### **4.4.6 Drug Use-Behaviour Relationship**

Heroin use at baseline was the strongest significant predictor of future drug use at one-month, three-months and six-months which is congruent with previous findings by Gossop, Duncan and Marsden (2003) and Gossop, Stewart and Marsden (2006). Crack use at baseline was predictive of continued heroin use at six-months which supports Williamson et al (2007) and findings from Chapter One (Section 1.2.3) that cocaine<sup>27</sup> use at the start of treatment is a significant predictor of poor long-term outcomes. Findings from Chapter Three also support this assumption in that ongoing drug use during treatment was found to increase the risk of non-attendance for treatment and treatment dropout (see Section 3.3.5.1). In this current study there was a significant correlation between crack use at t1 and t4 ( $r = .61, p < .01$ ), heroin use at t1 and crack use at t4 ( $r = .37, p < .05$ ), heroin and crack use at t4 ( $r = .43, p < .01$ ).

Interventions based around reducing ongoing crack use during treatment are recommended if outcomes for drug treatment are to be improved. It is clear that the use of crack by heroin users in treatment has negative outcomes for treatment and the individual.

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<sup>27</sup> This is an Australian study and the use of injected cocaine powder significantly dominates where as in the UK users tend to use crack-cocaine. The associated risks from each cocaine derivative are viewed similarly.

#### **4.4.7 Conclusion**

This study provided mixed results for the application of the TPB in relation to stopping heroin use during treatment suggesting that the TPB might be effective in the short-term though is not predictive of continued drug use over six-months.

Attitude is the single significant independent predictor of intention to stop drug use. Subjective norm was the most stable TPB predictor of drug use behaviour over three-months whilst the strongest predictor of heroin use at six months was heroin and crack use at baseline. The TPB enabled moderate short-term prediction of behaviour; and this may have implications, as it implies that psychological predictors of behaviour might be best targeted at early stage drug interventions, application any later could result in poor prognosis in the long term. Focusing on normative beliefs especially may have the biggest impact in drug use behaviour.

Drug substitution treatment may be effective in reducing drug use; 27% of the participants were not using heroin at six-months, though in contrast to inferences made by Booth, Crowley and Zhang (1996), in Chapter Two, retention in treatment is not significantly predictive of stopping drug use altogether.

#### **4.5. Next Steps**

The final Chapter of this thesis, Chapter Five, will consider the overall aims of the thesis and examine whether those aims have been met. It will draw

together the main findings from the studies; follow with a discussion of the limitations of the study and future research considerations that might be apparent as a result.

## **Chapter 5**

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## **Chapter 5 – Key Findings and Developments, Study Critique and Future Research Considerations.**

### **5.1 Aims**

The aims of the thesis were to examine whether the TPB would be suitable for use with a population of heroin users and to assess the use of the TPB as a predictor of drug treatment attendance and ongoing drug use. Moreover the thesis sought to consider the inclusion of clinical variables, the use of self-reported versus objective measures of behaviour and to assess the predictive capability of the TPB over time and changes over time by using multiple time measures. The following discussion will assess the extent to which the aims of the thesis have been met.

### **5.2 Key Findings and Developments**

#### **5.2.1 Application of the TPB to Heroin Users**

The findings presented in Chapter One (Section 1.4.3.1) indicate that no previous studies had applied the TPB to a population of heroin users. One of the aims of the present thesis was to determine the extent to which the TPB could be applied to this domain by firstly undertaking interviews with heroin users. Results from Chapter Two suggest that heroin users are able to communicate beliefs about stopping drug use within the framework and constructs underlying the TPB. Moreover, the barriers to stopping drug use were congruent with some, though not all, predictors highlighted in Chapter One (Section 1.2) in particular the association with drug using peers. Importantly, drug treatment and receiving

professional support were highlighted as facilitating factors for heroin use behaviour change and thus provided a sound rationale for exploring the applicability of the TPB in predicting behaviour change in heroin users accessing drug treatment. Further, the structure of the interviews has the potential to be used as a clinical intervention during drug treatment. Heroin users were able to specify salient factors associated with behaviour change thus these beliefs could be targeted during clinical appointments with substance misuse health professionals. The use of the TPB in behaviour change intervention will be addressed later in this chapter.

### **5.2.2 Predictive Utility of the TPB**

To summarize, Chapters Three and Four examined the utility of the TPB for predicting intention to attend drug services and the subsequent stopping of drug use during treatment. Intention to attend drug treatment was predicted by perceived behavioural control and attitudes were predictive of stopping future drug use. Taking into account Cohen's (1988, 1992) qualitative indices for interpreting effect sizes this finding is considered to have a large effect size thus supporting the hypotheses that the TPB is a good predictor of attendance and drug use intentions.

The TPB was able to predict attendance behaviour over six-months, with subjective norm emerging as a significant independent predictor. The TPB also predicted heroin use behaviour over three-months with intention, perceived behavioural control and subjective norm emerging as significant predictors. Thus,

this thesis has further extended the application of the TPB to a clinical population of hard-to-reach, vulnerable and under-researched group; namely, heroin users.

### **5.2.3 Subjective Norm – Behaviour Relationship**

An interesting finding to emerge from this thesis is the importance of subjective norm in the prediction of behaviour. In the TPB the subjective norm component has been argued to be the weakest predictor of intention and has no role to play the prediction of behaviour unless mediated by intentions. However, the normative component had a direct effect on behaviour in this thesis. Chapters Three and Four have both showed subjective norm to be a significant independent predictor of treatment attendance and predictive of drug use behaviour at one month and three months

The impact of subjective norm on behaviour has also been observed in previous TPB research. For example, Christian and Armitage (2002) and more recently Christian, Armitage and Abrams (2007), have shown subjective norm to predict homeless peoples' behaviour and suggest that in this population situational and social processes, as distinct from personal evaluations, might strongly affect behaviour (Christian, Armitage & Abrams 2007). There appears to be a pattern emerging within potential vulnerable populations; that subjective norm is a strong predictor of behaviour in these two domains is interesting.

Societal norms may cast drug use as an unacceptable behaviour, which can lead to feelings of stigma and alienation. Stigma can be defined as a characteristic



of persons that is contrary to a norm of a shared unit, where norm is defined as a shared belief that a person should behave in a certain way (Ahern, Stuber & Galea 2007). Thus being a drug user in a social context where drug use is frowned upon may lead to conformity with other drug users. Ahern, Stuber and Galea (2007) found that marginalized drug users experience high levels of stigma and discrimination and that this is also associated with poor mental and physical health. The concept of stigma and social isolation is also discussed by Christian, Armitage and Abrams (2007), in that the sense of isolation from society may lead to a greater connection or social identity with peers and that this common identity may provide the basis on which to succumb to the norms of the group.

Social identity theory focuses on both the psychological and sociological aspects of group behaviour and is concerned with when and why individuals identify with, and behave as part of social groups (Tajfel & Turner 1986). Heroin users might see themselves as outside of, or rejected by, societal norms, i.e., due to criminal activity, which may actually discourage initial attendance at health or social services due to fear of reprisal. However, once engaged, they might be influenced by the normative influences of health professionals (Ahern, Stuber & Galea 2007). Chapter Two identified having support from health professionals as being a facilitating factor in stopping drug use. Previous research has considered the impact of social influence in the context of the TPB, within other behaviours, and has found that identification with a group is a significant predictor of intention. For example, Terry, Hogg and White (1999) applied social identity and group norms to household recycling, Conner and McMillan (1999) applied



descriptive norms to cannabis use, Terry and Hogg (1996) applied group norms and group identification to health-related behaviours, Fekadu and Kraft (2002) applied descriptive norms and group norm to condom use and Fielding et al (2008) group norms and group identification to agricultural practices. These studies provide evidence that that 'group norms' have an impact on intention for those individuals that that identify with the group in question. Though social influence has been shown to exert a strong relationship on intention the same cannot be said for behaviour with most of the aforementioned studies not extending analysis to the prediction of behaviour, the exceptions being Conner and McMillan (1999) and Fielding et al (2008) both of whom reported non-significant results. This is disappointing as this is an area of particular interest given the findings of this thesis. Nonetheless, it seems likely that when behaviours have significant social implications, particularly in the context of heroin use and the high-risk behaviours associated with it, that normative and social identity considerations might be particularly relevant. Thus further empirical research might want to focus on the degree to which heroin users see themselves as being stigmatized by others or occupying a social identity and the subsequent influence this may have on heroin use intention and behaviours.

One important consideration for this section, and a consideration for further work on the subjective norm component would be to differentiate between the relevant referents in empirical applications. Chapter Two identified salient normative influences on stopping drug use for example, family, health professionals and non-drug users, as well as other drug users and drug dealers.

However, in this thesis, as with the two Christian studies (Christian, Armitage & Abrams 2007, Christian & Armitage 2002) direct measures of subjective norm were utilised rather than belief based measures; thus it would be difficult to distinguish which referent each participant was considering 'important' at the time. If we are to think about the impact of subjective norm on behaviour further, exploration of these concepts, perhaps extending the TPB with the addition of social identity variables, could be considered.

#### **5.2.4 Past Behaviour and the use of Clinical Variables**

This thesis further extended the use of the TPB by including both measures of past behaviour and clinical variables with the expectation that this would build a more representative picture of drug use behaviour by incorporating variables taken from previous treatment outcome studies alongside TPB constructs. The rationale for this being if we could identify patterns of clinical and psychosocial variables that predict drug use behaviour interventions could then be developed to help modify behaviour change. The additional variables were able to explain additional variance in heroin use behaviour though not in attendance behaviour.

Past behaviour has been shown to be a strong predictor of intention and behaviour explaining variance over and above that accounted for by the TPB variables (Ajzen 1991, Conner & Armitage 1998), explaining on average a further 13% of the variance in behaviour (Conner & Armitage 1998). This study supports that assumption for heroin use behaviour only. Performance of



behaviour may bring subsequent behaviour under habitual processes and thus make subsequent behaviour more likely. However, the results might suggest that the number of previous treatment episodes had little impact on future attendance. In contrast, daily use of heroin may become under habitual control and thus has consequences for future heroin use.

Previous attendance behaviour is therefore not important for drug users considering future treatment, which again supports self-reports from heroin users discussed in Chapter Two, that drug treatment is viewed as an important facilitating factor. These findings have important implications for clinical practice.

Previous drug treatment outcomes studies, for example those discussed in Chapter One (Brewer et al 1998, Hser et al 1999, Darke et al 2005), suggest that previous treatment is a significant predictor of poor treatment outcomes and treatment dropout. This study contradicts those findings and actually opens up avenues for clinical development whereby previous treatment episodes are not important for future treatment and therefore strategies to improve treatment access may still be helpful. Once in treatment the issue of continued drug use poses a significant challenge. Heroin, and the use of crack-cocaine, had significant implications for treatment outcomes. This study supports previous research (Booth, Crowley & Zhang 1996, Brewer et al 1998, Darke et al 2005, Gossop, Duncan & Marsden 2003), and findings from Chapter Three, suggesting that heroin and crack use is related to ongoing drug use and has implications for poor

treatment compliance and treatment dropout altogether. The combination of heroin and crack use in particular is strongly suggestive of poor outcomes at six-months. Interventions are required that focus on those individuals that attend for treatment with concurrent poly-drug use.

### **5.2.5 Objective Measures of Behaviour**

In order to overcome one of the limitations of the TPB, as discussed in Chapter One, objective measures of behaviour were included in both empirical Chapters in an attempt to improve the predictive validity of the TPB. Self reported behaviour data are vulnerable to a number of biases and so testing the predictive validity of the TPB with objective measures of behaviour is important. Armitage and Conner (2001) found that out of 154 applications of the TPB only 19 studies utilised objective measure of behaviour, which calls into question the usefulness of the TPB in predicting actual behaviour. The variance in actual behaviour over those 19 studies was 20%, as opposed to 31% variance across self-reported behaviours (44 studies). The TPB accounted for between 26% and 48% of the variance in behaviour using objective measures thus, the  $R^2$  values are between 6 and 28 points greater than those found by Armitage and Conner (2001) and higher values than found with self-reported behaviours. This also supports earlier research conducted by Elliott, Armitage and Baughan (2007) in which they found objective behaviour measures to account for 31%-39% of variance in driving behaviours.



An explanation for the high variance scores, in this thesis, could be due to the reliable behavioural measures. Participants were aware that urine screens were being collected, alongside self-reported drug use; hence the need to under or over report may have been reduced as a result. Attendance at appointments are recorded by clinical staff, thus you would expect this to be a reliable confirmation of treatment attendance. A second explanation could be the use of interviews rather than questionnaires, participants were reminded that information collected was confidential and would not impact on the treatment they were receiving. In addition prompts and clarification could be obtained for all information received from self-reports. However, it should be recognised that the use of interviews is more time consuming than the traditional use of questionnaires in TPB research.

Chermack et al (2000) suggests that combining data obtained from both objective and self-reports is a much more accurate measure of drug use than either method alone and this suggestion was adopted in Chapter Four for drug use behaviours. The correlations between self-reported and objective heroin and crack use behaviour were high and hence the combined measure of drug use had high internal reliability scores. The combined score also objectively reflected the frequency and intensity of heroin and crack use as opposed to a, positive and negative, binary score outcome which is more significant in clinical terms when assessing the level of risk behaviour and subsequently when considering predictors of drug use outcomes. The objective behaviour relationship in this thesis exceeds what would be considered a large size effect, thus these findings

further support the use of objective measures; consequently the TPB's ability to predict actual behaviour in this context is highly significant.

### **5.2.6 Use of Repeated Behaviours and Multiple Time Measures**

This thesis used a longitudinal design over six-months, the rationale for this, as per the TTM (Prochaska & DiClemente 1986) is that for behaviour to change and be maintained a period of no less than six-months is required. This also addresses one of the previous limitations of the TPB by investigating the models ability to predict intention and behaviour over time. The addition of multiple measures of behaviour, implemented within this thesis, supports, and builds on, previous work by Armitage (2005) and Elliott, Armitage and Baughan (2007) particularly for repeatable behaviours and predicting time to event, for example, attendance for exercise and exceeding the speed limit, respectively. The use of survival analysis techniques is a relatively new development within this field and findings from Chapter Three showed that intention was able to predict attendance behaviour, with increased intention associated with a decrease in hazard function (treatment dropout), and that increased drug use was associated with an increase in hazard function. These findings indicate that clinical interventions aimed at increasing intention or reducing drug use could improve treatment contact.

As well as examining the applicability of the TPB over six-months, Chapter Four also included multiple outcome measures. The rationale for this

was that it allows investigation into behaviour change over long and short-term periods to examine changes in predictors of heroin behaviour over time.

The findings from Chapter Four has significant clinical implications and implications for the application of the TPB in general. In terms of the TPB, if only a single observation had been utilised at time four (six-months) it would have shown the TPB to be a non-significant predictor of heroin use behaviours when, in fact, the TPB was a significant predictor of behaviour at one and three months. In terms of clinical implications a single observation would have missed some significant observations at time two and three highlighting that cognitive variables are important, at least in the short-term. It also found that different predictors became salient at different times during drug treatment; subjective norm and perceived behavioural control at time two (one-month) and subjective norm and intentions at time three (three-months). Cote, Gogin and Gagne (2004) found similar results when they used multiple measures over 26-months in that changes in smoking abstinence intention were apparent over time. Hence, as well as being a predictive model, the TPB could also be a valuable tool for identifying and thus targeting interventions to variables or times that are best placed to reinforce behaviour change.

### **5.2.7 Application of the TPB in Behaviour Change Interventions**

According to the TPB efforts to change behaviour need to be targeted at behavioural, normative and control beliefs; thus belief changes should reflect more positive attitudes, subjective norm and perceived behavioural control which



in turn enhance intentions and increase the likelihood that the behaviour will be performed (Ajzen 1991). A systematic review of the TPB and behaviour change interventions has been conducted by Hardeman et al (2002) which identified 30 papers describing 24 distinct interventions, 21 of which were health-related. Most interventions were targeted at university/college students; the interventions were often based on selected TPB components only and included such techniques as giving information, persuasion, increasing skills, goal setting, modelling, rehearsal of skills, planning and social encouragement/support. Study designs were mainly randomised control trials; follow-up was variable with periods of less than one-week to more than six-months<sup>28</sup>. Thirteen studies reported interventions on change in behavioural intervention with half of those finding change in the right direction and 13 reported on behaviour with two-thirds finding positive behaviour change.

The studies included within the meta-analysis were reported to be of poor quality; incomplete reporting of dropout limiting the feasibility and acceptance of the intervention and generalisability of the findings; reliability of the studies were called into question due to poor measurement of the TPB components, commonly one item, and one-third of studies did not report reliability measures; 14 out of 18 studies measured behaviour by self-report and most studies failed to test all TPB components. The authors conclude by stating that whilst the TPB may have potential for developing behaviour change intervention effect sizes were generally small. As the TPB fails to state which strategies are used to change predictors

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<sup>28</sup> The exact length of follow-up was not specifically reported.



findings from this study are difficult to generalise due to the heterogeneity of the interventions included.

Fife-Shaw, Sheeran and Norman (2007), more recently, used statistical simulations to assess how much change in intention and behaviour is engendered by changes in evaluations of the behaviour, perceptions of social control and control over the performance. The study enlisted university students to self-report on 30 behaviours over a two-week period using questionnaires. Statistical simulations maximised the values of attitudes, subjective norms and perceived behavioural control to assess whether increases in constructs were reflected in improved intention and behaviour outcomes compared to original values. Findings indicated that maximising each of the predictors produced significantly stronger intention scores than those originally observed and that maximising perceived behavioural control scores increased behaviour after maximising intention scores but that maximising subjective norm did not increase performance. The mean proportion of participants who performed the behaviours increased from 46% to 74% under maximization which suggests that the TPB could provide a useful basis for behaviour change intervention. However, this does not provide evidence to suggest which behaviour change strategies are most likely to stimulate change; rather it just gives an example of what could happen if effective strategies are able to increase construct values. Further limitations to this study, also fit into those previously discussed within Chapter One, the use of student samples, a short-follow-up period and self-reported behaviour measures.

The clinical and theoretical implications of the findings of this thesis suggest that different beliefs may become salient at different time points, or under different conditions. Longitudinal studies utilising multiple TPB measures could assess more regular changes in beliefs over time which, if identified, could become the basis of clinical intervention targeted towards behaviour change. The meta-analysis by Hardeman et al (2002) and study by Fife-Shaw, Sheeran and Norman (2007) suggest that the TPB could be used as a basis for intervention, although further studies are required to address strategies that might provoke behaviour change<sup>29</sup>.

### **5.3 Critique of Present Thesis**

There are a number of possible limitations that should be addressed; firstly, sample size and study retention, secondly, the non-inclusion of drug treatment in the analysis (Chapter Four), thirdly, the representativeness of the study sample and finally the use of direct rather than belief based measures, each of which will be addressed in the following section.

#### **5.3.1 Sample Size and Retention**

One limitation could be the numbers of participants included in the study. Overall recruitment was reduced by the introduction of court mandated drug treatments, which was an exclusion criteria throughout the thesis. Recruitment

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<sup>29</sup> The Medical Research Council (2000) have produced a framework for the development of interventions in randomised controlled trials, which is worth consideration if looking to development an intervention for further evaluation. The framework sets out objectives to be met and methodological issues to consider at each stage of development. Based on five phases; pre-clinical/theoretical basis, modelling, exploratory trial, main trial and long term implementation, the framework offers researchers guidance in recognising challenges and suggests strategies for addressing such issues in their own trials.

also relied upon clinical staff; consequently referrals may have been improved if additional resources had been available to attend the substance misuse service on a more regular basis thus enabling a constant reminder of the study to clinicians.

Bearing in mind that the population in question is hard-to-reach and tracking participants in longitudinal studies is a tremendous challenge, the level of retention in the study tries to go some way to counterbalance this problem. Retention rates in substance misuse treatment studies are reported to be between 50% and 90% (Hansten et al 2000). To gain follow-up rates of 90% is a considerably resource intensive task and Hansten et al (2000) argues that studies obtaining rates of follow-up between 60-80% can produce credible findings. Digusto et al (2006), also report that a 70% follow-up is an acceptable rate to estimate overall outcomes. Thus, a retention rate of 75% over six-months, which included four data collection points, is certainly an acceptable follow-up rate. Had more participants entered the study there would have been a dichotomy regarding numbers of participants versus levels of follow-up achievable given the limited resources available.

However, to ensure adequate power as a result of the small study sample a reduced number of variables were used in the analysis based on the predictors of poor treatment outcomes discussed in the literature review in Chapter One. Chapters Three and Four both reported large size effects with significant findings from a sample size of n=57. Based on Cohen's (1992) paper "A Power Primer", sample size based on a power of .80 and a significance level of 0.05, with a large



effect size would require a sample of  $n=42$ , for five independent variables as in Chapter Three and  $n=47$  for seven independent variables as in Chapter Four (see Cohen 1992, pg 158) suggesting that, although the sample is small, the study is adequately powered.

### **5.3.2 Drug Treatment**

This thesis focused on heroin users accessing drug treatment as a way of reducing their future heroin use. Though Chapter Four found treatment *per se* to be a non-significant predictor of future heroin use, an omission in the analysis was the effect of treatment type on heroin outcome. For example, the type of medication used (methadone or buprenorphine), whether the participants were in maintenance treatment or undergoing detoxification and medication dosages, could have had an effect on outcome (Gerra et al 2003, Gossop et al 2001, Horspool et al 2008, West, O'Neal & Graham 2000). Consideration was given to this but due to the sample size, further reduction of group size by stratification would not have provided adequate power for this level of analysis.

### **5.3.3 Study Sample**

The exclusion criteria used throughout the thesis included heroin users with severe mental health problems, alcohol dependency, homelessness and pregnancy thus reducing the overall representativeness heroin users accessing drug treatment. Caution should be taken when interpreting the results gained from Chapters two to four as they are based on those presenting to treatment with non-complex presentations and as such are a sub section of heroin users attending



treatment services. Including heroin users with multifaceted problems may have yielded different salient beliefs about the difficulties relating to stopping drug use and different predictor variables relating to treatment attendance and ongoing heroin use. Future studies that include a more representative sample of heroin users would be desirable in order to generalise the results to a broader population.

#### **5.3.4 Belief Based Measures**

The thesis used global measures rather than belief based measures for a number of reasons including; evidence supporting direct measures (Armitage & Conner 2001), sample size and burden to participants literacy (Section 3.3.4.5 discusses this in more detail). However, beliefs are important to develop a meaningful understanding about the determinants of intention and behaviour (Ajzen 1991). Ajzen (1991), at a most basic level, explains that the behaviour is a function of salient information or beliefs relevant to the behaviour hence salient beliefs play a central role in the theory of planned behaviour. Ajzen (1991) notes that responding to belief items may require more careful deliberation and thus global measures evoke a relatively automatic response as opposed to belief items that may evoke a relatively reasoned response (Ajzen 1991).

Chapter Two identifies, through qualitative interviews, that these beliefs are easily accessible from this population. Each participant involved in the qualitative study was able to give at least two salient behavioural, normative and control beliefs. Thus using belief based measures, in this population, could further improve our understanding of the facilitators and barriers to intentions and

behaviours and improve the predictive ability of the TPB by accurately reflecting the belief systems of the participants.

## **5.4 Extending the Thesis: Future Considerations**

### **5.4.1 Additional Variables;**

Subjective norm emerged as a strong predictor of behaviour in this population and thus the extent to which social pressure predicts behaviour is significant. A further avenue of interest would be the extent to which heroin users connection with heroin users, and other groups, underpins the impact of subjective norms on intention and behaviour. In particular it would be important/useful to assess the extent to which they see themselves as having a 'social identity' and the subsequent influence on behaviour. Individuals are more likely to engage in a particular behaviour if it is accord with the norms of a behaviourally relevant group; however, if group membership is not salient then behaviour should be congruent with individual characteristics (Terry, Hogg & White 1999). Thus, the elicitation of salient normative referents is again significant in this context.

More recent developments within social cognition research suggest that the TPB could be better conceptualized as a dual factor model (Conner and Sparks 2005). Although the TPB is traditionally measured by single concepts; attitude, perceived behavioural control and subjective norm, Ajzen (2006) suggests that that each TPB component comprises two specific sub components. Thus, attitudes are conceptualized into having instrumental (e.g. beneficial/harmful) and affective (e.g. enjoyable/unenjoyable) components, perceived behavioural control

divided into perceived controllability (e.g. extent to which you perceive you have control over the behaviour) and self-efficacy (e.g. ease or difficulty of performing the behaviour) and social norms into injunctive (e.g. whether one believes their social network wants them to perform the behaviour) and descriptive norms (e.g. where social approval is driven by perceptions of what others do ). This is would seem especially salient within the social norm component where the relationship with intention and behaviour has generally been found to be is quite weak (Armitage & Conner 2001). Hence, it would be interesting to apply the dual factor conceptualisation of TPB components, alongside social identity theory, to a heroin using population in an attempt to further our understanding of heroin use behaviours.

#### **5.4.2 Interventions Designed to Elicit Change**

To gain a better understanding of how to influence heroin behaviour through changes in attitude, subjective norm and perceived behavioural control further research is needed. The identification of the salient beliefs that predict those variables could then underpin intervention designed to change those beliefs and subsequent behaviour. Research examining the use of TPB interventions designed to facilitate behaviour change would be of specific clinical interest within this context. Given that specific strategies related to the development of TPB intervention are sparse, the limitations highlighted in Hardeman et al (2002) would need to be considered and addressed.



### **5.4.3 Alternative Behaviours and Treatment Settings**

The application of the TPB in heroin use populations requires further empirical support. To the best of my knowledge this thesis is the only known application to this population; hence research exploring the psychosocial predictors of ongoing drug use is sparse. The population used in the thesis consisted of heroin users attending treatment services to start a medical treatment intervention. Hence, caution must be adopted before generalizing the findings to other populations of heroin or other drug users, for example those that are accessing services for non-medical support to stop their drug use, for example psychological or complementary therapies, or inpatient and residential services. The application of the TPB in other drug use settings would be of significance to improve the generalisability of the findings. Considering one of the limitations of this thesis, it would also be of interest to explore the effect of different treatment regimes, or medications, on heroin use intention and behaviour. However, the present study could form the basis of future research in this area by being replicated using a broader sample in a range of drug treatment services.

## **5.5 Conclusion**

This thesis has extended the applicability of the TPB by demonstrating that it is an acceptable model for use in a hard-to-reach, stigmatized population (heroin users). The TPB in this context accounted for moderate proportions of variance in intentions and behaviour and, contrary to TPB assumptions, subjective norm emerged as an important independent predictor of actual behaviour over and above intention and perceived behavioural control.



The thesis has overcome the TPB limitations addressed in the introduction by (a) utilising a longitudinal design with multiple measures over time; the TPB was able to predict attendance behaviour and drug use behaviours over six and three-months respectively and (b) using objective measures of behaviour which, in this domain, thus it was possible to account for between 26% and 48% of the variance in behaviour thus validating the predictive ability of the TPB.

The use of combined clinical and psychosocial predictors further extends the applicability of the TPB by adding additional variance to the final model. The present thesis was limited due to sample size, nonetheless, it is the first study to examine the TPB within the context of heroin use and thus can provide a foundation on which future research can be developed.

## References

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## References

- Adelekan, M., Green, A., Dasgupta, N., Tallack, F., Stimson, G., & Wells, B. (1996). Reliability and validity of the Opiate Treatment Index among a sample of opioid users in the United Kingdom. *Drug and Alcohol Review, 15*, 261-270.
- Ahern, J., Stuber, J., & Galea, S. (2007). Stigma, discrimination and the health of illicit drug users. *Drug and Alcohol Dependence, 88*, 188-196.
- Ajzen, I. (2006). Constructing a TPB questionnaire: Conceptual and methodological considerations.  
<http://people.umass.edu/aizen/pdf/tpb.measurement.pdf>. Retrieved 24.07.08.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall.
- Alemi, F., Stephens, R. C., Llorens, S., & Orris, B. (1995). A review of factors affecting treatment outcomes: Expected treatment outcome scale. *American Journal of Drug and Alcohol Abuse, 21*, 483-509.

Anglin, M. D., Booth, M. W., Kao, C., & Harloe, L.L. (1987). Similarity of behaviour within addict couples: Addiction related variables. *International Journal of Addiction, 22*, 583-607.

Armitage, C. J. (2005). Can the theory of planned behaviour predict the maintenance of physical activity? *Health Psychology, 24*, 235-245.

Armitage, C. J., & Christian, J. (2003). From attitudes to behaviour: Basic and applied research on the theory of planned behaviour. *Current Psychology, 22*, 187-195.

Armitage, C. J., & Arden, M. (2002). Exploring discontinuity patterns in the transtheoretical model: An application of the theory of planned behaviour. *British Journal of Health Psychology, 7*, 98-103.

Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*, 471-499.

Armitage, C. J., Conner, M., Loach, J., & Willetts. (1999). Different perceptions of control: Applying an extended theory of planned behaviour to legal and illegal drug use. *Basic and Applied Social Psychology, 21*, 301-316.



- Barnett, P. G., Rodgers, J. H., & Bloch (2001). A meta-analysis comparing buprenorphine to methadone for the treatment of opiate dependence. *Addiction*, 96, 683-690.
- Beardsley, K., Wish, E. D., Fitzelle, D. B., O'Grady, K., & Arria, A. M. (2003). Distance travelled to outpatient drug treatment and client retention. *Journal of Substance Abuse Treatment*, 25, 279-285.
- Belding, M. A., Iguchi, M. Y., & Lamb, R. J. (1996). Stages of Change in Methadone Maintenance: Assessing the Convergent Validity of Two Measures. *Psychology of Addictive Behaviours*, 10, 157-166.
- Belding, M.A., McClellan, A.T., Zanus, D.A., & Incmikoski, R. (1998). Characterising 'non-responsive' methadone patients. *Journal of Substance Abuse Treatment*, 15, 1-8.
- Best, D., Gossop, M., Stewart, D., S., Marsden, J., Lehmann, P., & Strang, J. (1999). Continued heroin use during methadone treatment: relationships between frequency of use and reasons reported for heroin use. *Drug and Alcohol Dependence*, 53, 191-195.
- Best, D., & Ridge, G. (2003) 'Using on top' and the problems it brings: additional drug use by methadone patients. In Tober, G., & Strang, J. (eds) *Methadone*

*Matters: Evolving Community Methadone Treatment of Opiate Addiction*, (pp141-154). London, UK: Martin Dunitz.

Booth, R. E., Crowley, T. J., & Zhang, Y. (1996). Substance abuse treatment entry, retention and effectiveness: out-of-treatment opiate injection drug users. *Drug and Alcohol Dependence*, 42, 11-20.

Brewer, D. D., Catalano, R. F., Haggerty, K., Gainey, R. R., & Fleming, C. B. (1998). A meta-analysis of predictors of continued drug use during and after treatment for opiate addiction. *Addiction*, 93, 73-92.

Chermack, S. T., Roll, J., Reilly, M., Davis, L., Kilaru, U., & Grabowski, J. (2000). Comparison of self-reports and urinalysis results obtained under naturalistic methadone treatment conditions. *Drug and Alcohol Dependence*, 59, 43-49.

Christian, J., & Armitage, C. J. (2002). Attitudes and intentions of homeless people towards service provision in South Wales. *British Journal of Social Psychology*, 41, 219-231.

Christian, J., Armitage, C. J., & Abrams, D. (2007). Evidence that theory of planned behaviour variables mediate the effects of socio-demographic variables on homeless people's participation in service programmes. *Journal of Health Psychology*, 12, 805-817.

- Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. Hillsdale, NJ: Erlbaum.
- Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, 112, 155-159.
- Collett, D. (2003). *Modelling Survival Data in Medical Research*. 2<sup>nd</sup> Edition. London, UK: Chapman & Hall.
- Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behaviour: A review and avenues for further research. *Journal of Applied Social Psychology*, 28, 1429-1464.
- Conner, M., & McMillan, B. (1999). Interaction effects in the theory of planned behaviour: Studying cannabis use. *British journal of Social Psychology*, 38, 195-222.
- Conner, M., & Sparks, P. (2005). The theory of planned behaviour and health behaviours. In Conner, M., & Norman, P. (eds), *Predicting health behaviour: Research and practice with social cognition models* (2<sup>nd</sup> ed., pp 170-222). Maidenhead: Open University Press.
- Cote, F., Godin, G., & Gagne, C. (2004). Identification of factors promoting abstinence from smoking in a cohort of elementary schoolchildren. *Preventive Medicine*, 39, 695-703.

Darke, S., Ross, J., Teesson, M., Ali, R., Cooke, R., Ritter, A., & Lynskey, M. (2005). Factors associated with 12 months continuous heroin abstinence: findings from the Australian Treatment Outcome Study (ATOS). *Journal of Substance Abuse Treatment, 28*, 255-263.

Darke, S., Hall, W., Wodak, A., Heather, N., & Ward, J. (1992). Development and validation of a multi-dimensional instrument for assessing outcome of treatment among opiate users: The Opiate Treatment Index. *British Journal of Addiction, 87*, 733-742.

Darke, S., Hall, W., Wodak, A., Heather, N., & Ward, J. (1991). *The Opiate Treatment Index Manual*, Technical Report Number 11. National Drug and Alcohol Research Centre, The University of New South Wales. ISBN 0 947 229 23 X

Davies, J., B. (1992). *The Myth of Addiction*. UK: Harewood Academic Publishers.

Department of Health (2001). *Dangerousness of Drugs*. London: National Addiction Centre.



- Digusto, E., Panjari, M., Gibson, A., & Rea, F. (2006). Follow-up difficulty: Correlates and relationship with outcome in heroin dependence treatment in the NEPOD study. *Addictive Behaviours, 31*, 1201-1210.
- Dobkin, P. L., DeCivita, M., Parherakis, A., & Gill, K. (2002). The role of functional social support in treatment retention and outcome among outpatient substance abusers. *Addiction, 97*, 347-356.
- Drossaert, C. H. C., Boer, H., & Seydel, E. R. (2003). Prospective Study on the determinants of repeat attendance and attendance patterns in breast cancer screening using the theory of planned behaviour. *Psychology and Health, 18*, 551-565.
- Elliott, M. A., Armitage, C. J., & Baughan, C. J. (2007). Using the theory of planned behaviour to predict observed driving behaviour. *British Journal of Social Psychology, 46*, 69-90.
- Farre, M., Mas, A., & Torrens, M. (2002). Retention rate and illicit opioid use during methadone maintenance interventions: a meta-analysis. *Drug and Alcohol Dependence, 65*, 283-290.
- Fekadu, Z., & Kraft, P. (2002). Expanding the theory of planned behaviour: The role of social norms and group identification. *Journal of Health Psychology, 7*, 33-43.

- Field, A. (2002). *Discovering Statistics using SPSS for Windows*. London, UK: Sage Publications.
- Fielding, K. S., Terry, D. J., Masser, B. M., & Hogg, M. A. (2008). Integrating social identity theory and the theory of planned behaviour to explain decisions to engage in sustainable agricultural practices. *British Journal of Social Psychology*, 47, 23-48.
- Fife-Shaw, C., Sheeran, P., & Norman, P. (2007). Simulating behaviour change interventions based on the theory of planned behaviour: Impacts on intention and action. *British Journal of Social Psychology*, 46, 43-68.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fountain, J., Howes, S., Marsden, J., Taylor, C., & Strang, J. (2003). Drug and alcohol use and the link with homelessness: Results from a survey of homeless people in London. *Addiction Research and Theory*, 11, 245-256.
- Gerra, G., Borella, F., Zaimovic, A., Moi, G., Bussandri, M., Bubici, C., & Bertacca, S. (2004). Buprenorphine versus methadone for opioid dependence: predictor variables for treatment outcome. *Drug and Alcohol Dependence*, 75, 37-45.

Gerra, G., Ferri, M., Polidori, E., Santoro, G., Zaimovic, A., & Sternieri, E. (2003). Long-term methadone maintenance effectiveness: psychosocial and pharmacological variables. *Journal of Substance Abuse Treatment, 25*, 1-8.

Gibson, A., Degenhardt, L., Mattick, R. P., Ali, R., White, J., & O'Brien, S. (2008). Exposure to opioid maintenance treatment reduces long-term mortality. *Addiction, 103*, 462-468.

Gossop, M., Marsden, J., Stewart, D., Edwards, C., Lehmann, P., Wilson, A., & Segar, G. (1997). The National Treatment Outcome Research Study in the United Kingdom: six month follow-up outcomes. *Psychology of Addictive Behaviours, 11*, 324-337.

Gossop, M., Marsden, J., Stewart, D., & Kidd, T. (2003). The National Treatment Outcome Research Study (NTORS): 4-5 year follow-up results. *Addiction, 98*, 291-303.

Gossop, M., Duncan, S., & Marsden, J. (2003). Treatment Process components and heroin use outcome among methadone patients. *Drug and Alcohol Dependence, 71*, p93-102.

Gossop, M., Marsden, J., Stewart, D., & Treacy, S. (2001). Outcomes after methadone maintenance and methadone reduction treatments: two-year follow-up

results from the National Treatment Outcome Research Study. *Drug and Alcohol Dependence*, 62, 255-264.

Gossop, M., Stewart, D., & Marsden, J. (2006). Readiness for change and drug use outcomes after treatment. *Addiction*, 102, 301-308.

Gowing, L. R., Ali, R. L., & White, J. M. (2000). The management of opiate withdrawal. *Drug and Alcohol Review*, 19, 309-318.

Hansten, M. L., Downey, L., Rosengren, D. B., & Donovan, D. D. (2000). Relationship between follow-up rates and treatment outcomes in substance abuse research: more is better but when is "enough" enough? *Addiction*, 95, 1403-1416.

Hardeman, W., Johnston, M., Johnston, D. W., Bonetti, D., Warehan, N. J., & Kinmouth, A. N. (2002). Application of the theory of planned behaviour in behaviour change interventions: A Systematic Review. *Psychology and Health*, 17, 123-158.

Heider, F. (1985). *The Psychology of Interpersonal Relations*. New York: Wiley.

Home Office (2002a). *Updated Drugs Strategy*. London: HMSO.

Home Office. (2002b). *Tackling Crack – A National Plan*. London: HMSO.



Horspool, M. J., Seivewright, N., Armitage, C., J., & Mathers, N. (in press) Post-treatment outcomes of buprenorphine detoxification in community Settings: A systematic review. *European Addiction Research*, 14, 179-185.

Hutchinson, S., Taylor, A., Gruer, L., Barr, C., Mills, C., & Elliott, L. (2000). One-year follow-up of opiate injectors treated with oral methadone in GP-centred programme. *Addiction*, 95, 1055-1068.

Hser, Y.-L., Grella, C. E., Hsieh, S.-C., Anglin, M. D., & Brown, B. S. (1999). Prior treatment experience related to process and outcomes in DATOS. *Drug and Alcohol Dependence*, 57, 137-150.

Keen, J., Oliver, P., Rowse, G., & Mathers, N. (2003) Does methadone maintenance treatment based on the new national guidelines work in a primary care setting? *British Journal of General Practice*, 491, 461-467.

Kidorf, M., King, V. L., Neufeld, K., Stoller, K. B., Peirce, J., & Brooner, R. K. (2005). Involving significant others in the care of opioid-dependent patients receiving methadone. *Journal of Substance Abuse Treatment*, 29, 19-27.

Lang, T., A., & Secic, M. (2006). *How to Report Statistics in Medicine* (2<sup>nd</sup> Edition). Philadelphia, USA: American College of Physicians.

- Marsden, J., Gossop, M., & Stewart, D. Assessment and outcome monitoring in  
Tober, G., & Strang, J. (eds) (2003) *Methadone Matters: Evolving community  
methadone treatment of opiate addiction*. London: Martin Dunitz.
- Mattick, R.P., Ali, R., White, J. M., O'Brien, S., Wolk, S., Danz, C. (2003)  
Buprenorphine versus methadone maintenance therapy: a randomised double  
blind trial with 405 opioid dependent patients. *Addiction*, 98, 441-452.
- McLellan, A. T., Alterman, A. I., Metzger, D. S., Grissom, G. R., Woody, G. E.,  
Luborsky, L., & O'Brien, C. P. (1994). Similarity of outcome predictors across  
opiate, cocaine and alcohol treatment: role of treatment services. *Journal of  
Consulting and Clinical Psychology*. 62, 1141-1158.
- McLellan, A. T., Luborsky, L., Woody, G. E., & O'Brien, C. P. (1980). An  
improved evaluation instrument for substance abuse patients. *Journal of Nervous  
and Mental Diseases*, 168, 26 – 33.
- McMillan, B., & Conner, M. (2003). Applying an extended version of the theory  
of planned behaviour to illicit drug use among students. *Journal of applied Social  
Psychology*, 33, 1662-1683.
- Medical Research Council (2000). *A framework for development and evaluation  
of RCTs for complex interventions to improve health*.

<http://www.mrc.ac.uk/Utilities/Documentrecord/index.htm?d=MRC003372>.

Retrieved 04.07.08.

Michie, S., Dormandy, E., French, D. P., & Marteau, T. M. (2004). Using the theory of planned behaviour to predict screening uptake in two contexts. *Psychology and Health, 19*, 705-718.

Migneault, F. P., Adams, T. B., & Read, J. P. (2005). Application of the Transtheoretical Model to substance abuse: historical development and future directions. *Drug and Alcohol Review, 24*, 437-448.

Moos, R. H., Nichol, A. C., & Moos, B. S. (2002). Risk factors for symptom exacerbation among treated patients with substance use disorders. *Addiction, 97*, 75-85.

Morojele, N. K., & Stephenson, G. M. (1994). Addictive behaviours: Predictors of abstinence intentions and expectations in the Theory of Planned Behaviour. In Rutter, D. R., & Quine, L. (eds) *Social Psychology and Health: European Perspectives* (pp47-70). Aldershot, UK; Avebury Press.

National Treatment Agency for Drug Misuse. *Drug Misuse and Dependence-Guidelines on Clinical Management* (2007). London: NTA.



National Treatment Agency for Substance Misuse. (2007a)

[www.nta.nhs.uk/media/media\\_releases/media\\_releases/2007](http://www.nta.nhs.uk/media/media_releases/media_releases/2007)

[media\\_releases/statistics\\_for\\_drug\\_treatment\\_activity\\_in\\_england\\_2006\\_07\\_statistical\\_release\\_181007.aspx](http://www.nta.nhs.uk/media/media_releases/media_releases/2007/media_releases/statistics_for_drug_treatment_activity_in_england_2006_07_statistical_release_181007.aspx)

National Treatment Agency for Substance Misuse. (2006) *Towards Treatment Effectiveness: Business Plan 2006/07*. London: NTA.

Norman, P., & Conner, M. (2006). The theory of planned behaviour and binge drinking: Assessing the moderating role of past behaviour within the theory of planned behaviour. *British Journal of Health Psychology, 11*, 55-70.

O'Connor, R. C., Armitage, C. J., & Gray, L. (2006). The role of clinical and social cognitive variables in parasuicide. *British Journal of Clinical Psychology, 45*, 465-481.

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behaviour predict future behaviour. *Psychological Bulletin, 124*, 54-74.

Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology, 46*, 598-609.



- Petijean, S., Stohler, R., Deglon, J. J., Livoti, S., Waldvogel, D., Uehlinger, C., & Ladewig, D. (2001). Double-blind randomized trial of buprenorphine and Methadone in opiate dependence. *Drug and Alcohol Dependence*, 62, 97-104.
- Powell, J., Dawe, S., Richards, D., Gossop, M., Marks. I., Strang. J., & Gray, J. (1993). Can opiate addicts tell us about their relapse risk? Subjective predictors of clinical prognosis. *Addictive Behaviours*, 18, 473-490.
- Prendergast, M. L., Podus, D. Chang, E., & Urade, D. (2002). The effectiveness of drug abuse treatment: A meta-analysis of comparison group studies. *Drug and Alcohol Dependence*, 67, 53-72.
- Prochaska, J. O., & DiClemente, C. C. (1986). Towards a comprehensive model of change, in: Miller, W. R., & Heather, N. (eds) *Treating Addictive Behaviours: processes of change*, p. 3-27, New York: Plenum.
- Prochaska, J. O., & Velicer, W.F. (1997). The transtheoretical model of health behaviour change. *American Journal of Health Promotion*, 12, 38-48.
- Rutter, D. R. (2002). Attendance and re-attendance for breast cancer screening: A prospective 3-year test of the theory of planned behaviour. *British Journal of Health Psychology*, 5, 1-13.



Schroeder, J. R., Latkin, C. A., Hoover, D. R., Curry, A. D., Knowlton, A. R., & Celentano, D.D. (2001). Illicit drug use in one's social network and in one's neighbourhood predicts individuals heroin and cocaine use. *Annals of Epidemiology, 11*, 389-394.

Seivewright, N. (2000). *Community treatment of drug misuse: more than methadone*. Cambridge: Cambridge University Press.

Shen, Q., McLellan, T., & Merrill, J. C. (2000). Client's perceived need for treatment and its impact on outcome. *Substance Abuse, 21*, 179-192.

Sutton, S., French, D. P., Hennings, S. J., Mitchell, J. Wareham, N. J., Griffin, S., Hardeman, W., & Kinmonth, A. L. (2003). Eliciting salient beliefs in research on the theory of planned behaviour: The effect of question wording. *Current Psychology, 22*, 234-251.

Sutton, S. (2001). Back to the drawing board? A review of applications of the transtheoretical model to substance use. *Addiction, 96*, 175-186.

Sutton, S. (1998). Explaining and predicting intentions and behavior: How well are we doing? *Journal of Applied Social Psychology, 28*, 1318-1339.

- Symonds Downs, D., & Hausenblas, H. A. (2005). Elicitation Studies and the theory of planned behavior: a systematic review of exercise beliefs. *Psychology of Sport & Exercise, 6*, 1-31.
- Tajfel, H., & Turner, J. C. (1986). The social identity of intergroup relations. In Worchel, S., & Austin, W. G. (eds). *Psychology of Intergroup Relations*. p7-24. Chicago: Nelson-Hall.
- Termorshshuizen, F., Krol, A., Prins, M., Geskus, R., van den Brink, W., & van Ameijden, E. J. C. (2005). Prediction of relapse to frequent heroin use and the role of methadone prescription: An analysis of the Amsterdam Cohort Study among drug users. *Drug and Alcohol Dependence, 79*, 231-240.
- Terry, D. J., & Hogg, M. A. (1996). Group norms and the attitude behaviour relationship: A role for group identification. *Personality and Psychology Bulletin, 22*, 776-793.
- Terry, D. J., Hogg, M. A., & White, K. M. (1999). The theory of planned behaviour: Self –identity, social identity and group norms. *British Journal of Social Psychology, 38*, 225-244.
- Tuten, M., & Jones, H. E. (2003). A partner's drug using status impacts women's drug treatment outcome. *Drug and Alcohol Dependence, 70*, 327-330.

- Umeh, K., & Patel, R. (2004). Theory of planned behaviour and ecstasy use: An analysis of moderator-interactions. *British Journal of Health Psychology, 9*, 25-38.
- Velasquez, M. M., Crouch, C., von Sternberg, K., & Grosdanis, I. (2000). Motivation for change in homeless substance abusers. *Journal of Substance Abuse Treatment, 19*, 395-401.
- Wasserman, D. A., Weinstein, M. G., Havassy, B. E., & Hall, S. M. (1998). Factors associated with lapses to heroin use during methadone maintenance. *Drug and Alcohol Dependence, 52*, 183-192.
- Weber, R. P. (1990). *Basic Content Analysis*, 2nd ed. Newbury Park, CA: Sage Publications.
- Williamson, A., Darke, S., Ross, J., & Teesson, M. (2007). The effect of baseline cocaine use on treatment outcomes for heroin dependence over 24 months: Findings from the Australian Treatment Outcome Study. *Journal of Substance Abuse Treatment, 33*, 287-293.
- West, R. (2005). Time for a change: putting the transtheoretical (Stages of Change) Model to rest. *Addiction, 100*, 1036-1039.



West, S. L., O'Neal, K. K., & Graham, C. W. (2000). A meta-analysis comparing the effectiveness of buprenorphine and methadone. *Journal of Substance Abuse*, *12*, 405-414.