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# **The Versatility of Counselling Psychology in the Field of Substance Misuse**

Portfolio for a Structured Doctor of Philosophy in Counselling  
Psychology

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October 2014

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### City University Declaration

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## Part A: Introduction to the Portfolio

### ***I. Preface***

This preface will introduce the various components of this Structured Doctor in Philosophy. The portfolio focuses on three different areas related to counselling psychology. The novel piece of research assesses the utility of voucher based incentives in reducing crack cocaine misuse in clients in opiate maintenance treatment. To the author's knowledge, this is the first study that systematically employed and documented this type of programme in the UK. This, is followed by a client study using relapse prevention therapy in a flexible way, adapting the theoretical framework and relational values in line with the clients' presentation and own style of being in the world. This piece of work is intended to demonstrate my professional practice and competence in the field of drug misuse. Finally, a critical review of the literature pertaining to the *self* of the therapist in counselling psychology is provided, drawing on one of the unique features in counselling psychology, which is its dialogue with other fields, such as philosophy and psychotherapy. The literature review attempts to bridge the gap between theory and practice, and conceptualises human activity and meaning relationally. A crucial aspect of this is the place of consciousness, subjectivity and lived experience in our therapeutic practice. As a counselling psychologist<sup>1</sup>, I recognise that the therapeutic relationship is a significant component of therapy (Woolfe, 1996), and that people have a need to relate. People suffer not just from their thoughts and feelings but also from the limits of their relationships. People are understood and restored in relationships.

The preface will now detail each of these three areas in turn, and conclude with an exploration of the thematic strands binding the sections together.

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<sup>1</sup> *The terms 'counselling psychologist', 'therapist', 'counselor' and 'clinician' will be used interchangeably throughout this portfolio.*

### ***1.1. The Empirical Paper***

The use of financial incentives for changing health related behaviour dates back to the 1960s and the advent of behaviour modification and behaviour therapy. The approach is commonly referred to as contingency management (CM), especially in the addictions field, where the largest body of health related incentives research has been conducted (Lussier, Heil, Mongeon, Badger & Higgins, 2006). This portfolio contains an original piece of research that evaluates whether voucher based contingency management reduces crack cocaine misuse among opiate maintenance clients in a community based drug service. A group of 21 clients agreed to participate in the 12 week CM intervention. The central tenets of the CM intervention were to (a) urine test clients on fixed intervals according to a standardised incentive protocol in a 12 week intervention period, (b) provide monetary based incentives when cocaine abstinence was demonstrated, (c) withhold the incentive when cocaine use was detected. The results were compared to a sample of 21 clients that received standard treatment of opiate maintenance. Between-group analysis was used to compare the frequency of self-reported crack cocaine use between the two groups at baseline, 1 week after the CM programme concluded and at 6 months follow up. At 6 months follow up, compared to their counterparts receiving standard treatment, the group participating in CM intervention had significantly decreased their crack cocaine use over time. A within-group analysis using the clinical significant change method to assess meaningful change on an individual basis revealed that 24% of participants demonstrated statistical and clinical improvement. Additionally, a survival analysis revealed that the estimated median time to study dropout was 14 days. Overall, these results seem to indicate that the onset of crack cocaine abstinence is likely to occur early in treatment or not at all.

The results of the study provide a tentative overview of the acceptability and generalisability of a voucher based contingency management programme reducing crack cocaine use among clients in opiate maintenance treatment in the UK. Finally, a critical appraisal, which is provided after the discussion section, highlights the rationale and the ethical issues of the use of incentives in healthcare and how these issues impact on clinicians' views, and therefore on clinical practice. This

information will be useful in expanding this evidence-based approach into community settings.

### ***1.2. Professional Practice: Case Study***

This case study is a reflexive account of my work with a client using relapse prevention therapy (RPT), a cognitive-behavioural intervention with empirical support as a treatment for substance misuse behaviours. Given that the client's physical dependence on opiates was not severe, it was possible to offer supervised gradual detoxification. With regards to structured psychosocial support, I implemented relapse prevention therapy including motivationally focused techniques in a creative way, adapting theoretical and relational values in line with my clients' presentation. My 'cognitively-oriented' client seemed to embrace the RPT model. She seemed to relish 'doing' therapy in a supportive working alliance, not wishing to get 'bogged down' in emotional aspects of her being, but taking great pride in increasing her self-efficacy in relation to her substance use and engaging in recovery related activities. She also took great comfort in her deepening cognitive self-understanding and experimenting with different pleasurable drug-free activities. In short, she slowly developed a new way of life. Also, given that my understanding of RPT is far less technical, I value and incorporate the relational aspects of therapy, as typified in the Rogerian core principles (Rogers, 1951, 1957).

After 12 weeks of therapy and detoxification from methadone, my client was drug free for the first time since she was 14 years old. She also experienced improvements in her life, such as strengthening meaningful relationships, finding paid work and taking up hobbies. As indicated by empirical research, the relapse prevention approach proved to be an efficacious therapy to assist my client in initiating her journey of recovery. I learnt that my ability to respond openly and flexible to her needs and requirements was essential in supporting her behaviour change. Further, my training and experiences allowed me to integrate my professional and personal 'selves' in a way that allowed me to fully engage in the therapeutic process and relationship.

### ***1.3. Critical Literature Review***

This critical review aims to provide a historical and philosophical overview of the Western concept of *self* in the context of counselling psychology. The use of *self* is a concept employed to describe the therapist's self in the therapeutic relationship. This is particularly relevant to counselling psychology because the actual contact between the therapist and the person who is seeking help lies at the heart of what counselling is about. Although a therapist may be able to use theory to make sense of the client's difficulties, and may have a range of techniques at her or his disposal for revealing and overcoming these difficulties, the fact remains that theory and technique are delivered through the presence and being of the therapist as a person: the basic tool of counselling is the person of the therapist. An interest in the nature of the therapeutic relationship represents a common concern of all therapy practitioners and theorists. Even if different approaches to counselling make sense of the client therapist relationship in different ways, they all agree that effective counselling depends on how this kind of relationship operates (McLeod, 2010).

This review outlines philosophical roots of the self with an emphasis on existential thinkers such as Søren Kierkegaard and Martin Buber, and epistemologies that focus on the multifaceted nature of the self. Exemplified by Buber's relational notion of being, some implications on counselling psychology are then discussed in light of this perspective. Buber conceives of I-Thou, the ultimate state of relation through which *being* and *self* can be actualised. Most pertinent to the therapeutic encounter, Buber states that the highest expression of I-Thou manifests in the mutual confirmation with another. In this sense, rather than a pre-occupation with methodology or techniques, Buber places an importance on the therapist being open and accepting. As such, the flexible nature of work is emphasised. Therapy is not dogmatic or rigid in technique but about establishing a bond of mutual confirmation through being open and genuinely authentic. In this review, I aim to emphasise that the self of the therapist is a crucial element of the deeply personal therapeutic relationship. I conclude that, ultimately, what therapists offer is not theory or technique, but who we are.

## ***II. Thematic Connections for the Structured Phd. Portfolio and Personal Reflections***

This portfolio reflects the culmination of my professional and personal experience over the course of my training and beyond. Each section is relevant, in content, to the practice of counselling psychologists working in the field of substance misuse and counselling psychology in general. Given that the world in which we live consists of a multiplicity of people, of experiences, attitudes, beliefs and claims to the truth, counselling psychology, as a part of this world, adopts a pluralistic standpoint which recognises the variety within it (McAteer, 2010). Counselling psychology in the UK promotes openness to virtually any theoretical approach to psychotherapy, for those tied to experimental psychology, such as behavioural therapies and to those influenced by Eastern philosophies. Such openness fosters variety, vitality, creativity, adaptability to context and demonstrates the overall strength of the discipline. It also presents us with the challenge to accommodate unlimited theoretical diversity and yet to avoid confusion and contradiction.

While owing an epistemological and philosophical debt to humanism, we (as counselling psychologists) have to navigate different models. Addiction is a profoundly complex phenomenon and counselling psychology recognises that psychological distress has many causes and maintaining factors, and that it is impossible for any single model to capture all of these. In order to understand and practice in this challenging field, I have adopted a pluralistic stance. A stance of pluralism acknowledges that no theoretical, methodological or epistemological approach is any 'truer' or more appropriate than another and that different people are likely to find different meanings or practices useful at different times (Cooper & McLeod, 2007). Whilst models overlap to some degree, each is unique and makes a specific contribution which can place it in marked disagreement with others. These differences are not always insignificant and, at times, we must engage with a range of competing theoretical frameworks.

The inclusion of the empirical paper and the case study will inherently make sense to the reader. Relapse prevention therapy has its origin in behaviour therapy and theory, and CM is a behavioural therapy. Both treatments are derived from the principles of

social learning theory with its key concepts of classical and operant conditioning. As a result, CM and RPT are compatible and the integration of these interventions could prove to be beneficial for some clients. Cognitive-behavioural approaches like RPT, for example, bring to counselling psychology an extremely useful set of conceptualisations, theoretical understandings and practical tools and techniques that are readily accessible in the service of therapeutic work and ultimately to clients.

The presentation of the literature review, however, may have surprised the reader. Commonsense dictates that the therapist and the client must inevitably affect each other as human beings. This involvement of the therapist's *self* or *person* occurs regardless of, and in addition to, the treatment philosophy or the approach. Techniques and approaches are tools. They come out differently in different hands. Yet counselling psychologists are committed to personal development and place the therapeutic relationship, and indeed the ability to form relationships with other people, at the forefront of their practice (British Psychological Society, 2005). From this follows that the theoretical basis and values of using one's self in this person-to-person setting are vital to our understanding as therapists.

Accordingly, the present portfolio embodies a collection of theoretical knowledge and therapeutic work conceived of from a pluralistic perspective and practice.

### ***II.1. The Empirical Paper***

The rationale to investigate CM as a treatment approach to crack cocaine misuse was informed by two reasons; a) the limitations of the currently offered interventions to crack cocaine use, as well as the difficulties reaching this client group, suggested the need for an innovative and more intensive approach, b) my openness to other therapeutic approaches and my continuous attitude of curiosity prompted me to investigate an evidence-based approach that has demonstrated positive results in the US.

Counselling psychologists are scientist-practitioners who navigate different models in a constant process of reflection. Incorporating CM is an illustration of how counselling psychology can facilitate creative and sophisticated interventions within

its practice. Although as a counselling psychologist, I was at first hesitant about an approach that is derived from behaviour modification, implementing the CM programme at our service has shown me and some other colleagues that CM has its place as an intervention for crack cocaine misuse. Besides the presentation of the empirical paper (and its conclusions), I would like to highlight some anecdotal evidence in support of this statement. Conducting informal short interviews with most of the CM participants allowed for some interesting insights. For example, some of the clients that chose to attend the CM programme stated that they were glad that the service offered an intervention that had a clearly defined goal and did not relate to a 'talking therapy'. A few participants cherished the idea of 'earning money' through the monetary based vouchers because it was 'extra money' that was not anticipated and could be spend on leisure activities with family or friends (such as the purchase of a ball to play football in the park). This is in line with the CM literature that stipulates that the presented incentive should assist the client to engage in behaviours that support a drug free lifestyle. Two other participants stated that they used the vouchers to purchase birthday presents for their children, which they had not been able to effort before.

Some clients voiced that they were thinking about reducing or abstaining from crack cocaine prior to the programme, but were ambivalent about changing their behaviour. The participation in the CM programme seemed to resolve their ambivalence and moved these clients towards the 'action' stage (to use the language from the 'Stages of change theory'; Prochaska & DiClemente, 1986). On the other hand, several participants disliked the frequent attendance that was required, particularly at the beginning of the intervention. Others struggled to deliver a cocaine negative urine specimen because they consumed high doses of crack cocaine and the reinforcing effects of the drug was overwhelming. It seemed that the reinforcement from the incentives could not compete with the reinforcement of crack cocaine. As will be discussed in the empirical paper, modifications to the present structure of the CM programme may increase the acceptability and the success rate.

Clearly, CM is a mechanistic intervention and in order to implement it successfully, it must be employed systematically. However, its application helps to achieve defined and realistic goals that were discussed and set in collaboration with the

client. Furthermore, CM is a treatment that can flexibly be combined with other treatment approaches and it therefore is a natural candidate for incorporation into community services. Contingency management is an effective method in establishing initial abstinence, which can be a necessary prerequisite to engage a client in the therapeutic relationship and further therapy, not least because it can be extremely difficult to engage clients effectively in treatment and, if they do attend, their mental state may be adversely affected by substance misuse. Thus, implementing CM alongside opiate maintenance treatment can be very beneficial for some clients. Although contingency management says nothing about internal change processes that may be occurring during a period of change, it is likely that clients are reflecting on the consequences, both positive and negative, of their behaviour. One can therefore surmise that cognitions at least mediate behaviour change. Developing cognitive interventions that maximise the changes an individual can make through a CM programme may be worthwhile. It can be argued that paying attention to the cognitive change processes is a valuable exercise and an important source of information to help individuals sustain changes made in their substance use and achieve lasting recovery. Additionally, natural recovery processes that take place during periods of sustained abstinence, including gradual diminution of response to drug-related cues and lifestyle changes that provide alternative competing reinforcers, may then form the mechanisms for longer-term recovery of substance dependent individuals (Stitzer & Petry, 2006).

Counselling psychology through its plurality of expression and relation in the way that it engages with different contexts extends into arenas beyond therapy without undermining what it is or devaluing the principles at its core (McAteer, 2010). Its dialectical nature means that it is not a static discipline with fixed and unchangeable features – it is evolving, organic and adaptable and it has much to say.

I have not raised any ethical issues in the preface. I have however, addressed this topic in section V in the empirical paper.

## ***II.2. Professional Practice: Case Study***

In the first, relapse prevention therapy is a theoretically heavy and technique oriented approach to treating substance misuse problems (and other addictive behaviours). It is a relatively modern therapeutic approach to the human condition, evolving from the work of Marlatt and Gordon in the 1980s. The approach emphasises the role of our thoughts and beliefs (cognitions) in initiating and then maintaining our state of mind and mood (with the added complicity of our behaviours). Over the course of my training, as well as my work in a Women's prison and in substance misuse services, I read much CBT<sup>2</sup> oriented and specifically RPT literature. This background experience since qualification and a number of conversations with colleagues 'in the profession' have drawn me to the conclusion that when we talk of CBT, we may be coming from an array of quite different understandings. While there may be forces at work which seem to be promoting a narrow, unitary and dogmatic understanding of CBT and its application to practice, I also see other forces promoting CBT in a more open, pluralistic and flexible manner. In this understanding and application, CBT is a far less technically oriented approach where theory floats gently on the sea of core relational principles: warmth, respect, empathy, positive regard, congruence and autonomy (Boucher, 2010).

In my field – substance misuse and addiction – I regularly meet professionals who incorporate the concepts of motivational interviewing (Miller & Rollnick, 2002) and mindfulness reflection and meditation (Segal, Williams & Teasdale, 2002) into their practice, and seek out new ways of working in their particular areas of interest (as hopefully illustrated with the present portfolio). In my own practice, I find the theoretical concepts and framework of CBT, with its emphasis on assessment and case formulation, very valuable. It sensitises my attention to the interplay between a client's early experiences, beliefs about themselves and the world, patterns and rules for living, critical life-events, coping strategies and current thoughts and presenting issues. In so doing, it often but not always offers a structure on which I can build the therapeutic approach taken, as the 'assessment' phase evolves into the 'treatment'

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<sup>2</sup> CBT (cognitive behavioural therapy) is used as an umbrella term in the preface, unless I am referring to a specific type of therapy within the cognitive behavioural framework.

phase (arbitrary and medicalised terms necessitated by my therapeutic context) of therapy, with a client's guidance. In this building process, I am particularly attuned to a client's own understandings of their issues, the context and systems in which they exist, as well as their own values, and the meanings they draw from their life thus far (Boucher, 2010). Here, theoretical models other than CBT, drawing from humanistic, existential, psychodynamic and systemic traditions, are variously engaged within my own internal narrative of formulation as they emerge through a client's discourse, which I am actively exploring. I might be drawn to a transactional-analytic understanding (Harris, 1995) and think that relational difficulties are circular (Vetere & Dallos, 2003), due to a *system* need around a client's 'basic fault' (Balint, 1968), or be struck by Winnicottian ideas about true/false self-formation (Winnicott, 1969). Also, by giving the client the time and space to engage with past emotional experiences, s/he may feel validated and come to accept these emotions, which may enable her/him to move on. In this, I have made use of concepts such as limited re-parenting as understood by schema therapy (Young, Klosko & Weishaar, 2003) and mindfulness-based cognitive therapy (Segal et al., 2002).

I simply do not know where my thinking will go; what will turn up in my 'free-floating theoretical attention' (Boucher, 2010). I am with the client, with myself, and in this *with-ness*, I manage my anxieties about what a particular model might tell me to do and draw from an acceptance that at different points in time, different explanations will be true for different people (Cooper & McLeod, 2007). While this stance allows me an expansive array of ideas and concepts from which to draw, I find myself in my practice integrating what I take from different explanations, according to three considerations. First and foremost, a client's presentation, in the context of our relationship (i.e. what appears to resonate most with them during our explorative encounter) and second, in the context of how our encounter has impacted on me – I use *my-self*. Thirdly, the cognitive-behavioural '*mainframe*' of my therapeutic context. While I find, with my less prescriptive take on CBT and my relative autonomy in my current service, that such considerations more often than not coalesce with a general ease in helping clients, at times when they do not, I generally find support and understanding from my supervisor and colleagues when I explain, often *in the language of CBT* – the dominant language of my service – why an alternative approach to a 'straight' cognitive-behavioural one might be better taken.

While in many ways the discussion and practice outlined above could be taken as simply focusing on how I integrate CBT into my practice, in fact my aim is broader. What I am suggesting is that CBT, with its strengths and its limitations, can be used in the service of our therapeutic practice as a model in itself due to its strengths, and as a conduit to the introduction of *other* models due to its limitations. I feel that if we are open to and discursive about such issues, we could use CBT to broaden our professional practice, as well as that of other professionals, modelling pluralism and benefiting clients. To summarise my approach, and making use of an accurate and poignant metaphor from Boucher (2010, p. 167): “CBT is one arrow in my quiver, not my full crop (other theoretical models), and certainly not the bow (the therapeutic relationship). To extend the metaphor: I am the hand that holds and draws the bow, the client is the eye that guides the arrow and says when to release it. The relationship between us (both conscious and unconscious) determines the outcome. Sometimes we hit the target (unique to every client), sometimes we miss. We practice together, learning how we might work together and refine our skills.” It is through *being in* this process that I believe the relationship becomes *therapeutic*. The more sensitive we are to this process the better the relationship; the better the relationship the better the outcome (Keijsers, Schaap & Hoogduin, 2000; Krupnick et al., 1996).

### ***II.3. Critical Literature Review***

The literature review was the first piece of work I wrote towards this Phd. portfolio. My decision to focus on this particular aspect of counselling psychology was the desire to learn and understand more about the *self* of the therapist. Reading about the different philosophical concepts of the self and relating it to therapeutic practice has kept me intrigued and contributed (inter alia) to the formation of my-*self* as a practitioner. Also, I perceive it as a privilege that my work as a counselling psychologist entails thinking and learning about the paradox of human existence; well-being is necessarily intertwined with despair. As Kierkegaard argued, *life is not a problem to be solved, but a reality to be experienced*.

It is in this spirit that counselling psychology has created a legacy promoting the importance of personal and professional development through engagement with

personal therapy and supervision across one's professional career (British Psychological Society, 2005). Both activities are seen as invaluable to the practitioner's growth and competence since (self-) knowledge and meaning-making are viewed as the products of an engagement with others, rather than an internal monologue detached from our social context and other people (Wosket, 1999). The dissolution of dichotomies which the relational stance demands situates practitioners and clients, as well as supervisors and supervisees, in the interworld where everyday activity and the construction of ways of being take place (Carroll & Tholstrup, 2001; Shillito-Clarke, 2008).

Counselling psychology embraces the relational stance which springs from a philosophy that bridges the gap between body and mind, behaviour and experience and subjective/objective. It focuses on the space in between where life unfolds and offers an experiential account of human existence. Consequently, terms such as lived experience, life-world, temporality, embodiment and embeddedness replace the initial focus on the individual and emphasise the unitary phenomena of '*being-in-the-world*' and '*being-in-the-world-with-other-people*' – Heidegger's (1962) concepts of *Dasein* and *Mitsein*. Thus, *being-in-the-world-with-other-people* reflects the unity of the world and other people. This relational framework highlights the intersubjective nature of human existence. Emotions, no matter how extreme, reflect our clients' particular modes of being-in-the-world and ways of engaging with others. In therapy, it is important to clarify meaning so that their often pre-reflective – and hence uncontained – nature can become reflective and open for contemplation (Strasser, 2005). It is through this process that clients can begin to realise themselves and their place in the world and, consequently, shift to a position that will enable them to embrace different possibilities. As Camus (2000) argued, passionate engagement with life is tragic in nature because the heroes – ourselves – are conscious!

Counselling psychology pays great attention to the *process* in the therapeutic encounter as *other* meets *otherness* – a dynamic and ever-changing situation. It considers the mechanisms and values of using 'one's self' in this person-to-person setting. This is where counselling psychology stands out, through its underlying reflexive and reflective client-centered tradition, as a profession well positioned to generate creative, new and open-minded ideas about how process issues might be

recognised, valued more holistically and integrated into the practice of different therapeutic models.

Counselling psychology, with its inquisitive and open-minded attitude to how we come to 'know' and its relational framework, enshrines many of the principles that are part of a pluralistic stance. It resists theoretical dogma, repeatedly questioning its own assumptions in an attempt to gain a richer perspective on what it is to be human. It encourages a diversity of research perspectives and evidence sources as it attempts to build a collage of understandings rather than a single definitive image of truth. It challenges 'pathologising' trends and traditional ways of seeing the 'individual' as self-contained entities, pointing to the relational ways of humans *being* with each other, in both their internal and external states. But most importantly, counselling psychology holds a relational therapeutic model, where being with another's 'otherness', in all its richness and diversity, is the apex of the therapeutic encounter from which a broad theoretical literature can be drawn on. Thus, a pluralistic approach allows for creativity in the therapeutic work that not only reflects an individual's uniqueness, but also responds to and is nurturing of it.

The basic tenet of pluralism is very simple – there are many people and they are all unique – but on elaboration, what this implies is quite staggering. There are many ways of thinking; there are numerous ways of behaving; there are multiple ways of feeling; there are different ways of relating to ourselves and to others in the world; there is a large variety of ways of understanding the world, each as rich and as *valid* as the others (I have stressed 'valid' as beliefs as to the 'truth' of this underlie epistemological difference between competing theoretical models). The therapeutic encounter is by necessity a place where this multiplicity of ways of being human is likely to play out with regard to how one individual might approach and help another individual with their difficulties. Drawing from this perspective, Cooper and McLeod state of pluralistic therapeutic practice:

“A pluralistic standpoint holds that a multiplicity of different models of psychological distress and change may be 'true' and that there is no need to try and reduce these into one unified model... Different explanations will be true for different people at different points in time and, therefore, different

therapeutic methods will be most helpful for different clients at different instances.” (2007, p. 6)

In this, theoretical pluralism is embraced as a vital and necessary therapeutic stance, tailoring the therapeutic encounter to an individual’s uniqueness, in the here and now, and thus, making that encounter *therapeutic*. The pluralistic and dialectical counselling psychology’s professional identification has placed me, at times, as a trainee (and still does) in emotional turmoil with the struggle to get to grips with multiple theories, and the realisation that it is not possible to follow one single clear set of rules and thus, to navigate my way through the complex therapeutic landscape. I would like to think that these emotional challenges associated with my personality, allegiances, world views, value systems and ethics, contributed to my personal and professional growth. In pondering this, could it be that, as developing professionals, we are engaged in a process of ‘professional actualisation’ as we move, with greater experience, towards a more pluralistic outlook. Committing myself to such personal explorations will hopefully benefit the clients that receive my support.

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# **Incentivising Crack Cocaine Abstinence among Clients in Opiate Maintenance Treatment using Voucher based Contingency Management in a Community Drug Service**

## ***ABSTRACT***

The present study was part of a nationwide multisite trial of contingency management (CM) implemented by the National Treatment Agency for Substance Misuse (NTA). The research programme aimed to target drug using, health and attendance related behaviours to gain an understanding of the acceptability and feasibility of contingency management to the UK substance misuse population. The use of CM to incentivise abstinence from an illicit substance was recommended in the guidelines of the National Institute for Health and Clinical Excellence (NICE, 2007). This study examined whether CM reduced concurrent crack cocaine misuse among opiate maintenance clients at a community drug and alcohol service (NHS). The study employed a quasi-experimental design in which twenty-one ( $n = 21$ ) opiate maintenance clients voluntarily chose to participate in the CM group. The incentive consisted of monetary based vouchers in the CM group, contingent upon the submission of cocaine free urine samples. A natural unplanned comparison group ( $n = 21$ ) developed from participants that initially agreed to participate in the CM intervention but did not attend any of the scheduled reinforcement sessions. These clients continued to receive standard treatment (ST), including opiate maintenance treatment and key working. The data analysis consisted of two parts of data analysis; the first part employed a between-group analysis to compare the frequency of self-reported crack cocaine misuse for the CM and ST groups at baseline, 1 week after the 12-week CM intervention concluded and at 6 months follow-up. The analysis showed that there was a significant difference in crack use at follow-up and that there was a decrease in crack use over time in the CM group but not in the ST group. The second part utilised a within-group analysis, investigating study results for evidence of clinically meaningful changes on an individual participant level in the CM group. Accordingly, 5 participants (24%) demonstrated statistical and clinical improvement. Additionally, a survival analysis revealed that the estimated median time to study dropout was 14 days. These results seemed to indicate onset of crack abstinence is likely to occur early in treatment or not at all. The results of the study provide a tentative overview of the feasibility and generalisability of a voucher based contingency management programme reducing crack use among clients in opiate maintenance treatment in the UK. The

implications of the study will be discussed in relation to clinical practice and future research. Finally, a brief discussion of the moral and ethical concerns about using incentives in health care will be provided. This information will be useful in expanding this evidence-based approach into community settings.

## Part B: Empirical Paper

### **I. INTRODUCTION**

#### ***I.1. Background of the Area of the Study***

The ‘drug problem’ has become perhaps the archetypal social problem of our time – cross-cutting, globalised and apparently intractable. Its complexity is daunting, requiring engagement with some of the thorniest domestic and international issues, from poverty and crime through to international development and terrorism. Nor is this just a ‘phantom’ played up by the political classes – there is public concern and anxiety about drugs too (Seddon, 2010). History is replete with examples and reports of drug use, despite the current popular perspective that drug use is a relatively recent behavioural anomaly (Plant et al., 2011). The use of drugs has occurred for a very long time – probably ever since the time that early humans, eating plants that grew around them, found that some plants had medicinal properties and that some made them feel different. Since that time drug use has been part of the human lifestyle, with different societies using different ‘natural’ intoxicants depending on the indigenous flora (Ghodse, 2010). A few of these drugs have become familiar to many, beyond the confines of their original use and have been used for centuries, for example; opium, cocaine, cannabis, alcohol and coffee.

Many of these drugs were first used for medicinal purposes, even though they are now considered to have minimal or no therapeutic value, for example; alcohol, tobacco and LSD (lysergic acid diethylamide) (Plant et al., 2011). In the seventeenth century, shortly after its introduction to England, tobacco was believed to be good for the ‘the megrim, the toothache, obstructions proceeding of cold and for helping the fits of the mother (hysteria)’ (Arber, 1895). Although medical opinion remained

divided for centuries about the usefulness or harmfulness of tobacco, its dependence-producing properties gradually came to be acknowledged (Ghodse, 2010). Besides their medicinal value, many drugs (e.g. opium, cannabis, cocaine, mescaline and coffee) have been used in religious rituals, and the use of alcohol continues today in two of the world's three monotheistic religions. It is of interest that the third and youngest religion, Islam, bans its use altogether (Ghodse, 2010). A third way in which drugs are used is for social and recreational purposes. All of the 'old' drugs (those with a long history, e.g. opium, cocaine, cannabis and alcohol) were used in this way, and drug use was often the reason for a group coming together; the drug became the very substance of communication, the dynamic of the group activity (Berridge & Edwards, 1987). This continues with alcohol today in public houses, nightclubs, cocktail parties and so on, and for some drugs, notably cannabis and other psychedelic drugs, taken specifically by those interested in mysticism and exploration of the inner world, the setting in which the drug is taken and the shared group experience remain important. As far as illicit drug use is concerned, the very fact the drug is forbidden encourages the formation of a group (and often of a whole subculture), concerned, among other things, with obtaining the drug and concealing its use from the authorities (Ghodse, 2010).

The availability of the drug is obviously a prerequisite for misuse and dependence, and the rapid transport methods of the modern world ensure that most drugs are obtainable everywhere. Transportation of drugs is not, of course, a recent occurrence – opium was moved halfway round the world centuries ago – but modern communications have greatly increased the speed and volume of this traffic. For centuries there has been travel not only across countries but continents and humans have taken drugs with them on their travels (ibid). There is no doubt, however, that modern methods of travel and communication have had a profound effect on drug use and misuse because the physical transportation of drugs is so much easier and speedier. In addition, the rapid movement of large numbers of people allows exposure to the drug-taking practices of another culture. This is increased further by the effect of the media, so that no drug or drug-taking practice can remain localized. They are bound to spread and because of that, there is usually a loss of the traditional constraints upon drug use imposed by the family and society as a whole (ibid). This

means that new drugs and novel ways of taking them gain acceptance much more easily than when drug use was under strict, local, sociocultural control (ibid, p. 2).

In addition to the availability of a drug, the form in which it is available is very important. Modern chemical techniques permit the extraction of highly purified and very potent forms of drugs at source, making them easier to transport and smuggle, and because of their greater potency, much more efficient at causing dependence (Palfai & Jankiewicz, 1997). One example is cocaine, which is extracted from coca leaves, it is one of the oldest psychoactive substances. Coca leaves have been chewed and ingested for thousands of years, yet one can only conjecture how long it would take a Native South American to chew sufficient coca leaves to obtain the same dose of cocaine as that in a single vial of ‘crack cocaine’, the purified version of cocaine currently misused in the USA and Europe; and it is unlikely that the Native American ever achieved blood levels (or nervous-system levels) of cocaine sufficient to cause serious dependence (ibid).

Crack cocaine<sup>3</sup> misuse is a substantial and growing public health problem in the UK (Strang et al., 2008). Within the opiate-dependent treatment population in Britain, two thirds of clients also now use crack cocaine (Lewis & Horgan, 2013). The National Treatment Outcome Research Study neatly captured the emergence of this trend, with one quarter of non-crack-using participants at the start of the National Treatment Outcome Research Study having initiated crack cocaine use by the end of the 5-year follow-up period, two thirds of whom reported this as their first experience of crack cocaine (Gossop, 2006; Marsden et al., 2002a; Gossop, Stuart, Treacy & Marsden, 2002b).

Crack use within the methadone maintenance population is associated with poorer psychological health and increased incidence of acquisitive crime compared to non-crack users (Gossop, 2006; Marsden et al., 2002a; Gossop et al., 2002b). One feature of the opiate dependent crack using population is the high incidence of the practice of injecting crack, often as a ‘speedball’ – a cocktail of heroin and cocaine (Rhodes,

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<sup>3</sup> Cocaine is used in this thesis to refer to cocaine powder (usually injected or ‘snorted’). Crack cocaine (colloquial termed ‘crack’) is used to refer to the smokable base form of cocaine, sold as small lumps or ‘rocks’.

Briggs, Kimber, Jones & Holloway, 2007). Studies of crack injectors have also reported high rates of sharing injecting equipment and increased sexual risk behaviours (NIDA, 2010). This suggests increased risk of contracting blood-borne viruses in this population, with the potential for diminishing some of the HIV risk behaviours gained from receiving oral methadone maintenance.

Crack use is also associated with poorer compliance with methadone maintenance, which in itself can lead to poorer treatment outcomes (Magura, Nsakeze & Demsky, 1998; DeMaria, Stering & Weinstein, 2000; Rowan-Szal, Chatham, Joe & Simpson, 2000; Mitcheson, McCambridge & Byrne, 2007). Despite the growing importance of crack use, methadone maintenance itself is also now known to have a minimal impact on reducing crack cocaine use (Ball & Ross, 1991; Hser, Grella, Chou & Anglin, 1998; Williamson, Darke, Ross & Teesson, 2006). Against this backdrop, targeted interventions to reduce crack use in opiate treatment populations have been proposed by the UK National Treatment Agency (NTA, 2002a). In reality, however, there has been a wide variation in the uptake and implementation of psychosocial approaches to treatment across services (NICE, 2008). Furthermore, psychosocial interventions for crack cocaine dependence generally show modest results, and there is a lack of effective pharmacological interventions to treat crack cocaine dependence (Mitcheson et al., 2007; Nuijten, Blanken, van den Brink & Hendricks, 2011). Given the extent of multiple and complex problems found within opiate treatment populations which may preclude clients accessing high threshold psychological interventions, there are grounds to consider the potential of a systematic and comprehensive approach, that can provide a firm and consistent structure for the life of a person that is dependent on crack cocaine.

There is robust empirical evidence from the US that cocaine dependence is treatable with contingency management (Lussier, Heil, Mongeon, Badger & Higgins, 2006; Prendergast, Podus, Finney, Greenwell & Roll, 2006; Dutra et al., 2008). Based on the principles of operant conditioning, contingency management (CM) interventions offer incentives or rewards to encourage specific behavioural goals. In the case of treatment for cocaine dependence, monetary and non-monetary rewards typically have been made contingent on negative toxicology screens, indicating abstinence from cocaine use. The approaches have shown consistent success, with substance use

behaviours ranging from opiate and cocaine dependence to nicotine dependence (Dutra et al., 2008; Kidorf & Stitzer, 1996; Budney, Radonovich, Higgins & Wong, 1998; Higgins, Wong, Badger, Ogden & Dantona, 2000; Higgins et al., 2003; Shoptaw et al., 2002; Miller & Willbourne, 2002). Contingency management may be targeted at assisting clients to make decisions to change some aspects of their drug using behaviour, rather than itself providing skills to maintain change. It aims to promote reflection on drug use and consequences in the context of the individual's goals and values, for example, through the prolonged abstinence from drug use.

As the use of drugs both licit and illicit has become a major issue particularly for industrialised countries, and our understanding of the issues has become more dimensional in nature, then more and more professional groups are required to have an understanding of drug use and its related issues. Substance misuse is a complex multidisciplinary field, 'there's no one lead discipline that is committed to the drug abuse problem comprehensively' (Edwards, 2008, p. 37). Thus it is essential, whether one engages in theory building, researching or practically helping people, to leave one's professional specialism (Chick, 2002) and to collaborate across the broad areas of biology, psychology and sociology. Over recent years the developing consensus around *biopsychosociality*, which hypothesises that addiction is about more than the sum of its individual parts (Lindstrom, 1992; Lende and Smith, 2002) has challenged academics and practitioners to break out of their traditional areas of study, and to start to become acquainted with these other disciplines.

Yet, having acknowledged this complexity, the question remains how the present thesis can do justice to such a complex field. It may be that subject specific practitioners are left disappointed by a perceived lack of depth. Yet other readers may feel that some of the covered topics in the thesis are irrelevant. However, whilst acknowledging that danger, the purpose is to cover the ideas, knowledge and theories from other disciplines that seem relevant to gain a reasonable understanding of the material under discussion.

The present study is situated in the field of drug treatment outcome research. The behavioural treatment that is introduced here; contingency management, is investigated as an 'add-on' to standard key working, hence complementary to

standard treatment. For the sake of clarity, the introduction consists of 7 sections and is structured in the following order: (1) The first part is dedicated to a brief history of coca leaves and cocaine powder in Europe and specifically in Britain. (2) This section describes the psychological and physical effects of cocaine, and its purified and more potent version – crack cocaine. (3) The function of this part is to discuss and define some of the relevant terms regarding drug-related behaviours. (4) There exists a plethora of weighty tomes and a wealth of research literature that try to explain the causes of drug use and dependence. However, in a project of this size, it is only possible to introduce the most relevant factors that seem to interact to lead to a variety of drug-related behaviours. (5) Covers the National Institute of Clinical Excellence (NICE, 2008) recommended psychosocial interventions for the treatment of crack cocaine dependence. (6) Contingency management originated and was first systematically investigated in the US, thus the current research evidence base was derived from the US healthcare system prior to the changes that took place in 2014. The implementation of opiate maintenance programmes varies internationally with respect to structure, procedures and practice. Thus to gain an understanding, this section highlights some of the salient and relevant differences in the implementation of opiate substitution programmes in the US and UK. (7) Describes the two measures that were employed to monitor treatment outcome; Treatment Outcome Profile (Marsden et al., 2008) and Christo Inventory for Substance Misuse (Christo, Spurrell & Alcorn, 2000). (8) Serves as an introduction to contingency management. It discusses the theoretical foundations of the operant behaviour conceptualisation and the brain mechanisms underpinning instrumental learning. Next, an outline of the implementation of CM is provided. The remainder will be dedicated to the empirical research evidence of voucher based CM in cocaine misuse, and a discussion of the CM parameters that seem to impact on treatment outcome. The last section briefly discusses predictors of CM treatment outcome. (9) The concluding paragraph outlines the aims and the background of the study, and states the research questions.

## ***1.2. A Brief History of Cocaine***

In 1858 the Austrian frigate SMS Novara (Austro-Hungarian Navy, 1857 – 1859) was sent to South America on a most unusual mission. On board the Novara was a trade expert, Doctor Karl von Scherzer, who was intrigued by an Italian ‘renaissance’

started by Milan neurologist Paola Mantegazza (Siegel, 1984). Doctor Mantegazza, who had practiced medicine for some time in Peru, on his return to Italy, published in 1858 *“Sulle virtù igieniche e medicinali della coca e sugli alimenti nervosi in generale”* in which, while describing the hallucinatory effects which the coca leaves had on him, he recommended it for a range of illnesses including toothache, digestive disorders and neurasthenia (Berridge & Edwards, 1987). This paper was the newest curiosity of the European medical community which awarded Mantegazza a prize for this work in 1859 (Mortimer, 1901) The Novara stopped in Peru and Doctor Scherzer took a quantity of coca leaves back to the great chemist Professor Friedrich Woehler at the University of Gottingen in Germany. In 1859-1860 Woehler’s assistant, Albert Niemann, named the isolated alkaloid from the coca leaves ‘cocaine’ - a white crystalline powder that can be sniffed, dissolved and injected (Phillips & Wynne, 1980). After his death, his work was carried on by his disciple Wilhelm Lossen, who finally, in 1865, described its chemical formula and a description of other coca alkaloids followed later in the century (Grinspoon & Bakalar, 1976). This signalled the start of 125 years of changing patterns of cocaine use. Prior to that time, only coca products were available, and the patterns of their use had not changed substantially in over 4700 years (Siegel, 1984).

It was at about this time - in the mid nineteenth century - that a more scientific evaluation of the alkaloid began to prepare the way for its introduction into European medicine. The interest in the alkaloids of the drug can be seen as another illustration of the growth of scientific inquiry and specialization in the early decades of the century (Ashley, 1975). Yet, it was not until the powers of the alkaloid as a local anaesthetic were fully understood that the drug won complete medical acceptability (Markel, 2011).

Sigmund Freud, the founder of psychoanalysis and, for better or worse, probably the most influential psychological thinker of the 20th century, had considerable personal involvement with drugs, particularly cocaine (Gossop, 2007). Freud's use of cocaine was, because of his own enormous fame, well-known. What can almost be termed Freud's love affair with cocaine was an interesting episode in his career, albeit one which he preferred to disguise in later life (Platt, 1997). His enthusiastic advocacy owed something to his own personal circumstances, in particular the desire as a

young medical researcher to establish a serious reputation (Markel, 2011). He first became interested in the drug and its properties after reading a report in 1883 of how Dr. Theodore Aschenbrandt, a German army physician, issued cocaine experimentally to some Bavarian soldiers during autumn manoeuvres to overcome fatigue. The results were promising. Freud obtained some cocaine hydrochloride for himself from Merck in Germany, a pharmaceutical and chemical company and began to experiment (Linn, 2002). His central experimental subject was himself. But as impressive as his work was, Freud neglected to describe cocaine's most practical application: it was a superb local anaesthetic that completely numbed a living being's sensation to the sharp blade of a scalpel. Dr. Carl Koller successfully demonstrated the drug's power to eliminate pain. The discovery excited the entire medical world, much to Freud's chagrin (Markel, 2011).

In May 1884, influenced by American reports of the drug's use as a cure for morphine addiction, he began to administer cocaine to his friend Ernst von Fleischl-Marxow, who had become addicted to morphine to dull the pain of an amputated thumb (Platt, 1997). In his paper "*Über Coca*" (On coca) published in July 1884, he reviewed the scientific literature available on cocaine at the time (approximately twenty studies) and described the drug's therapeutic uses. Contending that it should be regarded as a stimulant rather than a narcotic, he blamed past failures on bad quality preparations (Linn, 2002). From his own experience, he recommended the drug for a variety of illnesses and especially for symptoms such as fatigue, nervousness, neurasthenia and, most significantly, as a cure for morphine addiction (ibid). Freud also treated his depression with cocaine and reported feeling "exhilaration and lasting euphoria, which is in no way differs from the normal euphoria of the healthy person. . . You perceive an increase in self-control and possess more vitality and capacity for work. . . . In other words, you are simply more normal, and it is soon hard to believe that you are under the influence of any drug" (Jones, 1981, p.82). Freud himself continued to experiment with the drug for several years; he published five papers in all on it, the last, "*Bemerkungen über Cocainsucht und Cocainfurcht.*" (Craving for and Fear of Cocaine), published in 1887. It is possible that his use of cocaine (which seems to have continued to some degree after the last paper was published in 1887) had mediated his change from physiological to mainly psychiatric interests (Linn, 2002).

The medical community became enthusiastic about this new wonder drug, the patent medicine manufacturers exploited it, and the non-medical use of cocaine for pleasure began to grow (Markel, 2011). There was general agreement among the medical profession that cocaine was a most valuable drug. Freud had called it an instrument of almost unbelievable curative power and an editorial in *The Lancet* (1885, p. 123) commented:

“The therapeutical uses of cocaine are so numerous that the value of this wonderful remedy seems only beginning to be appreciated. Almost daily we hear of some disease or combination of symptoms in which it has been tried for the first time and has answered beyond expectation.”

In addition to the numerous coca products, cocaine itself started to appear in flake crystals, tablets, solutions for injection, ointments, and nasal sprays (Berridge & Edwards, 1987). Both coca and cocaine were also used in a variety of soft drinks and tonics, the most famous being Coca-Cola. Indeed, from 1891 until 1903 Coca-Cola contained two main stimulants coca leaves and kola nuts, hence its name. The drink and drug became so closely identified that ‘dope,’ as in “let’s have a dope became the established, common term for Coca-Cola” (Ashley 1975, p. 49). It originally contained about 3% coca leaves, a significant dose (ibid).

Angelo Mariani, a Parisian chemist and entrepreneur, took a fancy to the drug and mixed coca extract into many of his products, which were intended for the temporary relief of hunger, thirst, fatigue, exhaustion, distaste for food, or nervous depression and weak digestion (Gossop, 2007). He successfully marketed Vin Mariani, Elixir Mariani, Pate Mariani, Pastilles Mariani, The Mariani (a non-alcoholic variety) and tea, in Europe. His crowning achievement, though, was the phenomenally successful Vin Mariani, a concoction of coca and wine. It had many faithful and famous devotees and advocates: President McKinley, Thomas Edison, the Czar of Russia and, eminent among them, Pope Leo XII, who issued Mariani a gold medal and cited him as a Benefactor of Humanity (Palfai & Jankiewicz, 1997). Mariani's were not the only commercial coca products on the market. In 1888, Messrs Ambrecht, Nelson & Co. of Duke Street, London, had several varieties of coca wine, including sweet Malaga (used by ladies and children) and a Burgundy coca wine for gouty and

dyspeptic cases; there was also coca sherry and coca port. In 1894 there were at least seven firms producing coca wines for the domestic market (Berridge & Edwards, 1987).

Medical approval began to wane in the late 1880s (Markel, 2011). In the scientific investigation of cocaine, negative effects were found. Consequences such as toxic reactions during ophthalmic surgery, cocaine related stroke, cardiac arrhythmias, and others were reported (Karch, 1993). Commercial coca products were separated from their previous semi-medical status and were incorporated in the general medical and pharmaceutical campaign against the availability of all patent medicines. This was part of a remarkable medical volte face on the use of cocaine in general (Markel, 2011). The euphoria of 1884-5 was soon replaced by an appreciation of the dangers which such unrestrained use could give rise to. By 1887 cocaine addiction had been reported in the literature and Dr. Mattison could comment in *The British Medical Journal* that, “the inevitable reaction against the extravagant pretensions advanced on behalf of this drug has already set in” (Mattison, 1887, p. 1229). The use of cocaine to treat morphine addiction was strongly called in question. Freud had praised the drug for its utility in this way. Ernst von Fleischl-Marxow, to whom he had administered the drug, became dependent on cocaine in place of morphine (Byck, 1974). When Albrecht Erlenmeyer, a fellow psychiatrist, charged Freud with unleashing the “third scourge of humanity” on the world – the first two being alcohol and opiates – Freud had begun to distance himself from his earlier opinion about the drug (Gold, 1992, p. 427). By 1888, 90 cases of toxicity, including 6 deaths, had been reported (Karch, 1993), in 1892, 21 fatalities were documented in France from accidents involving hypodermic injections of cocaine (Platt, 1997). The whole pattern of events was very similar to the earlier medical enthusiasm for, and subsequent partial rejection of, hypodermic morphine. With cocaine, the process was completed in a much shorter time. The wonder potion of the early 1880s cocaine had become, for at least some in the European scientific community, the “devil’s own device” by the late 1880s (Mattison, 1887, p. 1025). This disenchantment with cocaine was also found in the United States during the 1890s.

Withdrawal of scientific and popular praise of, and support for, the drug did little to curb its use (Platt, 1997). Reports from Europe in the period immediately after World

War I indicated widespread use of the drug, perhaps encouraged by the casualness in which physicians had prescribed it prior to the war (Spotts & Shontz, 1980). Thus in the 1900s recreational cocaine use spread in Europe and the United States. It became popular to snort cocaine, although to limited circles. It was carried around in small ornate boxes and snorted in a similar fashion as snuff. Early cocaine snorting was known as 'cocaine snuffing' and Harrods in London started selling cocaine, over the counter in 1910 (Berridge & Griffith, 1999). Observations on these patterns of use were made in both the medical and lay press during the early 20th century. Many of these articles suggested that cocaine was associated with uncontrollable addiction, physical and psychological deterioration, demoralization, and criminal violence (ibid). As a result, the UK government decided to prohibit cocaine as an illegal substance under the Dangerous Drugs Act in 1920 (Gossop, 2007). This started an illegal importation trade. Some enterprising traffickers used homing pigeons sent from France to bring in a gram at a time (Spotts & Shontz, 1980). Thus cocaine prices increased, due to tighter controls on dispensing and illicit dealing. Illicit cocaine became available (and still is) as a fine, white, crystalline powder and is also known as 'coke,' 'C,' 'snow,' 'flake,' or 'blow.' It is generally diluted with inert substances such as cornstarch, talcum powder, or sugar or with active drugs such as procaine (a chemically related local anaesthetic) or amphetamine (another stimulant). There are two chemical forms of cocaine that are abused: the water-soluble hydrochloride salt (cocaine) and the water insoluble cocaine base or freebase (crack cocaine), for a detailed description please see below (NIDA, 2010).

Between 1930 and the mid-1960s, both the medical and non-medical use of cocaine gradually declined, and general interest in the drug all but disappeared (Berridge & Edwards, 1987). From the late 1960s into the mid-seventies, the view of cocaine was once more that of an expensive and glamorous upscale treat – the 'Champagne of drugs' and was mainly associated with the so called 'rich and famous' (Palfai & Jankiewicz, 1997, p. 306). The popular image of the cocaine abuser centred on the glitter people: Hollywood actors, athletes, artists, jazz musicians, designers, etc. although the drug was in all social classes to some extent (ibid).

The 1990s were a turning point, bringing another surge in use, a leap in the practice of smoking was reported, and slang terms 'crack' and 'rock' began to appear in the

media (Parker et al., 1998). Crack is a freebased form of cocaine. In making it, the original, purer alkaloid (base) is freed from the cocaine hydrochloride by treating the crystals with a basic solution – usually water and baking soda. The result is small, white chunks of crack that resemble pieces of crumbled soap and that make a crackling sound when smoked. This turned out to be a great marketing innovation, and a vast improvement over the previous form of freebasing, which involved vaporizing the cocaine with hot, potentially explosive gases, such as ether, in a device known as base pipe (Ford, 2004). With crack, the freebase was sold readymade in small plastic vials containing one or two rocks, and costing ten to twenty pounds per rock, depending on the weight (ibid, 2004). This decreased the street prices, users could go to the ‘crack house’ more frequently with less money – a development that brought crack to the inner city. The small rocks could also be easily hidden or disposed of in the event of a police raid (Palfai & Jankiewicz, 1997).

Crack cocaine was used as far as Jersey and as far north as Aberdeen. Crack spread to heroin injecting users and was then distributed through heroin dealing networks, which made it easily accessible for even more heroin users (Shapiro, 2011). It also gained popularity with the dance drug culture/bars and clubs. Over that time, crack established itself as one of the main problem drugs in the UK alongside heroin. Until 2008 the estimated prevalence of crack cocaine users had increased steadily in to 337,000 (Drug Misuse Declared: Findings from the 2008/09, British Crime Survey, Home Office, 2009) Additionally, cocaine powder was estimated to have been used by nearly 800,000 people aged 25–59, and 360,000 16–24 year olds (Shapiro, 2011). However, between 2009/10 and 2010/11 the national prevalence estimates of opiate and/or crack users decreased to 298,752 in 2010/11 (Drug Misuse: Findings from the 2012/2013 Crime Survey for England and Wales; Home Office, 2013).

The latest Forensic Science service results showed an average purity of 26.4% although samples can fall into single figures (Shapiro, 2011). Cocaine purity has dropped off considerably over the last decade. DrugScope figures for 2009 revealed that cocaine and crack were implicated in 154 deaths, more than any other drug apart from heroin, methadone and similar opiate drugs. Overall, cocaine deaths have been steadily increasing over the years (Shapiro, 2011). As such, crack use remains visible as a serious drug and social problem.

### ***I.3. Short- and Long-term Effects of Cocaine and Crack Cocaine***

#### **I.3.1. Routes of Administration**

Cocaine may be administered by almost any route; a common way of taking cocaine is by sniffing (snorting) it (Gay, Sheppard, Inaba & Newmeyer, 1973). A line of cocaine hydrochloride (20–30 mg) is laid out and inhaled through a straw and the drug is absorbed through the vascular mucous membranes lining the nose (Cox, Jacobs, LeBlanc & Marshman, 1983). Because cocaine causes vasoconstriction (narrowing of the blood vessels), drug absorption is slowed and there is no rush. However, a period of pleasurable stimulation occurs, lasting 20 – 40 minutes (Higgins et al., 1990). Intravenous use is popular with some drug users because the drug reaches the brain rapidly, and subjective effects, including an intense rush of high, are reported within 1 or 2 minutes. They also abate rapidly over the next 30 minutes or so (Weiss, Mirin & Bartel, 1994).

Purified cocaine base (crack) is usually smoked in a glass water pipe, or it may be sprinkled on a tobacco or marijuana cigarette. It produces a sudden, intense high (the ‘rush’ or ‘flash’) comparable to that produced by intravenous injection, because cocaine is absorbed very rapidly by the large surface area of the lungs and reaches the brain within seconds (Weiss, Mirin & Bartel, 1994). The euphoria abates equally quickly, leaving the person feeling restless and irritable and craving for another dose (Palfai & Jankiewicz, 1997).

#### **I.3.2. Effects of Cocaine**

Cocaine is a powerful central nervous system stimulant producing increased energy, activity, confidence, and facilitating social interchange, and mental alertness, especially to the sensations of sight, sound and touch (Gossop, 2007). Some users reported that the drug helped them perform simple physical and intellectual tasks more quickly, although others have experienced the opposite effect (NIDA, 2010). Most important of all, it is a powerful euphoriant, giving the person a great feeling of wellbeing (Plant et al., 2011).

The physical effects of cocaine include a raised pulse rate, blood pressure and temperature, and dilated pupils. In addition to its local anaesthetic properties, it can also temporarily decrease the need for food and sleep (NIDA, 2010).

### I.3.3. Tolerance

It used to be believed that tolerance to cocaine did not occur and that large doses were taken only in a search for greater euphoria, rather than because small doses were no longer effective (Fischman, 1984). These observations were based on cocaine users who snorted cocaine hydrochloride intermittently, in what was described as ‘usual’ recreational doses, which were probably insufficient to induce tolerance (Ghodse, 2010). Now that pure cocaine freebase is available, a very different picture has emerged. Some users may take large doses – 30g in 24 hours has been reported – that would undoubtedly be toxic to a cocaine-naïve individual, but which the regular user can take without serious complication because of the development of tolerance to the hyperthermic, convulsant and cardiovascular effects of cocaine (Platt, 1997).

### I.3.4. Physical Dependence

A variety of symptoms have been described following cocaine withdrawal by users who habitually consume very large doses. The symptoms include lethargy, depression, apathy, social withdrawal, tremor, muscle pain and disturbances of eating and sleeping. When severe, they form a syndrome known as the ‘crash’ (Gawin & Kleber, 1986a), which begins 15 – 30 minutes after a ‘binge’ and which may last for a few hours or up to a few days, accompanied by dysphoria and high levels of craving (Gawin & Ellingwood, 1990; Schifano, 1996). There may also be excessive sleepiness, paranoid ideas, agitation and suicidal thoughts. When this acute phase subsides, there is a longer period, lasting for several weeks, when anxiety, craving and dysphoria may recur and when the risk of relapse is high. Only later, in the ‘extinction’ phase, which lasts for 3 – 12 months, do symptoms subside completely but, even then, exposure to particular cues may stimulate craving again (Grabowski, 1984; Margolin, Evans & Kosten, 1996). Despite long-standing opinion to the contrary, it is difficult to believe that the crash could be anything but the cocaine

abstinence syndrome, although it does not cause the major physiological disruption associated with the more familiar abstinence syndromes of opioids, alcohol or sedative hypnotics (Platt, 1997).

### I.3.5. Psychological Dependence

Cocaine can cause severe psychological dependence, with craving and drug-seeking behaviour so intense that the normal pattern of life is disrupted and everything becomes subservient to the need to obtain cocaine (Platt, 1997). Until recently, there was little evidence that cocaine has such compelling effects in humans and it was thought to be a 'safe' recreational drug. The advent of pure cocaine freebase has dramatically changed this view. Not only has it become apparent that cocaine can cause tolerance and physical dependence, but new patterns of consumption of cocaine have developed, with freebasers smoking cocaine almost continuously until either they or the supply of drug are exhausted (Ghodse, 2010). It has been suggested that this pattern of drug use is caused by the high concentrations of cocaine in the brain that are achieved by smoking crack, and that last for only a few minutes before a rapid decline in concentration occurs. It is possible, for example, that it is the sharp contrast between the 'rush' and withdrawal that generates the drive to use more drugs within a short period (ibid).

### I.3.6. Cocaine Toxicity/Psychosis

As the dose and frequency of use of cocaine increase, adverse reactions may occur. These start with feelings of anxiety, restlessness and apprehension and progress to suspiciousness, hypervigilance and paranoid behaviour. Stimulation of the nervous system occurs, causing muscle twitching, nausea and vomiting, increases pulse and blood pressure, irregular respiration and sometimes convulsions (Sherer, Kumor & Jaffe, 1989). In cases of severe toxicity, this is followed by depression of the nervous system with circulatory and respiratory failure, loss of reflexes, unconsciousness and death (Shapiro, 2011).

Cocaine psychosis has also been described with persecutory delusions and repetitive (stereotyped) behaviour, such as compulsively taking a watch or radio apart and

reassembling it or repeatedly tidying or rearranging a set of objects. There may be auditory hallucinations and sometimes tactile hallucinations, classically described as a sensation of insects crawling under the skin ('cocaine bugs') and causing incessant picking at the skin, or scratching (Mitchell & Vierkant, 1991; Serper, Chou, Allen, Czobor & Canero, 1999).

#### ***1.4. Drugs and Drug-Related Behaviours: Terminology***

A number of terms to describe drug and alcohol use and one of the consequences of this behaviour: addiction or dependence, which have already been used in the text. There is a great deal of debate about the meaning of the term 'addiction' and 'dependence'. It is used in academic circles as well as in everyday discourse (Mitcheson et al., 2010). However, as psychologists, wherever possible, we seek to describe behaviour and therefore also use the term 'addictive behaviour'. To be more specific, the term 'substance use problems' or 'substance misuse' will be used to indicate that the focus of this thesis is on the problematic use of substances (for example, cocaine misuse) not substance use *per se*. The term 'substance use problems' includes a range of substance-related difficulties, including addiction, and all the generally used diagnostic criteria for dependency and misuse (ibid). The term 'substance misuse' is also used in the context of describing services and with reference to the treatment field as this term is commonly used in these contexts (ibid). Other terms, such as substance abuse, are used with reference to their use in original texts. Whatever one prefers, but one must keep in mind that it is the language the client uses that is key. Language, even when technically accurate, can alienate and confuse, and medical descriptions in particular can stand in the way of sharing intimate experiences (ibid). The next paragraphs will elaborate on the terms, drug, drug dependence, psychological dependence and craving, and finally, physical dependence and withdrawal syndrome.

#### I.4.1. Definition of the Term - Drug

A drug is ‘any substance, other than those required for the maintenance of normal health, which, when taken into the living organism, may modify one or more of its functions.’ This very broad definition was developed by the World Health Organisation (WHO, 1969), and had the advantage of being used and understood internationally. Definitions change with time however and, more recently, the WHO has developed a *Lexicon of Alcohol and Drug Terms*, which acknowledges that ‘drug’ is a term of varied usage (WHO, 1994). In medicine it refers to any substance with the potential to prevent or cure disease or enhance physical or mental welfare, and in pharmacology to any agent that alters the biochemical or physiological processes of tissues or organisms. Hence a drug is a ‘substance that is, or could be, listed in a pharmacopoeia’ (Ghodse, 2010). In common usage, however, the Lexicon recognises that ‘drug’ often refers specifically to psychoactive drugs, which are separately defined as ‘substances that, when ingested, affect mental processes, i.e. cognition or affect’. ‘Psychotropic drug’ is used as an alternative and equivalent term for the whole class of substances, licit and illicit, with which drug policy is concerned (Palfai & Jankiewicz, 1997). The terms ‘psychoactive drug’ and ‘psychotropic drug’ share the advantage of being descriptive and neutral (i.e. non-judgemental). It is also worth noting that, nowadays, ‘substance’ (meaning psychoactive substance) is often used as synonymous with ‘drug’. The present work is concerned with psychoactive substances, and the term ‘drug’ and ‘substance’ will be used interchangeably.

#### I.4.2. Drug Dependence

Within this definition are two components of very different importance: *psychological dependence*, without which the state of dependence cannot be said to exist, and *physical dependence*, which may or may not be present (Ghodse, 2010). Thus an individual may be dependent on a drug without manifesting any physical dependence and, conversely, an individual taking drugs that cause physical but not psychological dependence, is correctly described as physically dependent, but not as drug dependent (ibid). However, in practice, physical and psychological dependence are often so closely linked that it can be difficult to make the distinction.

Therefore, in line with the approach adopted in *The ICD-10 Classification of Mental and Behavioural Disorders* (WHO, 1992), the WHO's Expert Committee developed the following more modern definition for drug dependence:

*A cluster of physiological, behavioural and cognitive phenomena of variable intensity in which the use of a psychoactive drug (or drugs) takes on a high priority. The necessary descriptive characteristics are preoccupation with a desire to obtain and take the drug and persistent drug-taking behaviour. Determinants and the problematic consequences of drug dependence may be biological, psychological or social, and usually interact (WHO, 2012, p. 23).*

#### I.4.3. Psychological Dependence, Craving and Drug–Seeking Behaviour

It will be perceived that at the core of the definition of drug dependence lies psychological dependence upon the drug. This is a “feeling of satisfaction and a psychic drive that requires periodic or continuous administration of the drug to produce pleasure or to avoid discomfort” (Eddy, Halbach, Isbell & Seevers, 1965, p. 723). Psychological dependence is an overriding compulsion to take the drug even in the certain knowledge that it is harmful, and whatever the consequences of the method of obtaining it.

Craving seems to be a fundamental component of psychological dependence and implies a constant preoccupation with the drug, with intrusive thoughts and obsessive thinking about the drug related lifestyle and context – particularly its desired effects and the need to obtain it (West & Brown, 2013). This in turn may be translated into action in the form of drug-seeking behaviour, which may involve literally searching for drugs, through different activities, both legal and illegal, to obtain money to buy them, identifying the source of supply, purchasing, etc (Preston et al., 2009). When craving is severe, drug-seeking behaviour dominates daily activity.

#### I.4.4. Physical Dependence and the Withdrawal Syndrome

Physical dependence is “an adaptive state manifested by intense physical disturbances when the drug is withdrawn” (Eddy et al., 1965, p. 723). Many, but not all, drugs cause physical dependence and of those that do, not all are drugs of abuse. The development of physical dependence depends on the drug being administered

regularly, in sufficient dosage over a period of time; the necessary dose and duration of administration depend on the particular drug and may also vary from person to person. Also, tolerance may develop over time which is a reduction in the sensitivity to a drug following its repeated administration in which increased doses are required to produce the same magnitude of effect previously produced by a smaller dose (WHO, 1993).

In the condition of physical dependence, the body becomes so ‘used’ or accustomed or adapted to the drug that there is little, if any, evidence that the person concerned is taking it (Eddy et al., 1965). However, sudden drug withdrawal is followed by a specific array of symptoms and signs collectively known as the withdrawal or abstinence syndrome (Palfai & Jankiewicz, 1997). The nature of the withdrawal syndrome is characteristic of each drug type, and the symptoms and signs tend to be opposite in nature to the effects of the drug when it is acutely administered (Eddy et al., 1965). Thus, physical dependence on a stimulant drug such as cocaine is manifested by drowsiness, apathy and depression when drug administration ceases. The withdrawal syndrome associated with cocaine was briefly described in the section on psychological and physiological dependence on cocaine.

Physical dependence is sometimes confused with the more general term of drug dependence, the WHO Expert Committee decided to focus on the phenomenon of abstinence and to use the term ‘withdrawal syndrome’, which is described in terms of its consequences:

*After the repeated administration of certain dependence producing drugs, e.g. opioids, barbiturates and alcohol, abstinence can increase the intensity of drug-seeking behaviour because of the need to avoid or relieve withdrawal discomfort and/or produce physiological changes of sufficient severity to require medical treatment (WHO, 1993, p. 5).*

### ***1.5. Causes of Drug Use and Dependence***

The cause or causes of drug dependence are not known. More specifically, it is not known why some people but not others in the same situation start experimenting with drugs, or why some but not others then continue to take them and, finally, why some

but not all become dependent on drugs (Ghodse, 2010). A vast range of dependence behaviour exists today; for example, the young drug abuser taking a wide range of drugs; the housewife dependent on benzodiazepines; the Middle Eastern opium smoker; the American freebasing cocaine; the mystic seeking truth with LSD; the doctor self-injecting with pethidine, to describe just a few (ibid). These many different scenarios of psychoactive drug consumption can be summarised in four categories which are not mutually exclusive: traditional/cultural, medical/therapeutic, social/recreational and occupational/functional. For example, drug consumption may start with a prescription for a diagnosed condition but may continue illegally; or stimulant drugs, taken initially to promote alertness when studying, may be continued purely for recreational purposes (ibid).

The social, cultural and even historical contexts in which a substance is taken can significantly affect both the drug experience and consequences of use for any one person or group of people (Keenan, 2004). “Substance use is fundamentally a social act—we obtain, consume, and construct the experience of using alcohol or other drugs in relation to others. The rituals associated with the consumption of alcohol and other drugs are an important part of creating meaning in relation to this behaviour” (Keenan, 2004, p.65). The media, cultural and religious practices, workplaces, families and friends, as well as the legal and health care systems, are all part of the spectrum of influences creating our beliefs and actions associated with substance use.

It is perhaps not surprising, therefore, that there are almost as many theories about dependence and its causes as there are types of dependence behaviour. The first comprehensive review of more than 40 theories of drug use and dependence was published in 1980 by the American National Institute on Drug Abuse (NIDA) (see Lettieri, Sayers & Pearson, 1980). The number of theories proposed today is even greater than this number (see Blane & Leonard, 1987; Baker 1988; Goode, 2011; West & Brown, 2013). Within a diversity of approaches and different models, three factors – the individual, the society and the drug – interact to lead to a variety of drug-related behaviours (Mitcheson et al., 2010). These factors can be translated into four main theories: (1) biological theories, (2) psychological theories, and (3) sociological theories; none of them alone is sufficient to cause drug misuse or

dependence and their relative importance varies in different circumstances (ibid). Most cover different aspects of the same phenomenon and may be regarded as complementary rather than contradictory (Seivewright, 2009). Of course, even within each broad type, there is a range of specific theories. All biological theories, and nearly all psychological theories, are individualistic in that they focus on differences between and among people. In contrast, most sociological theories tend to focus not on individual differences but group or category differences (persons belonging to group X are different from persons belonging to group Y), or structural differences (the larger structures or circumstances in which persons are located differ, such as cities, neighbourhoods, time periods, social conditions, or countries) (Goode, 2011). Further, macro processes may or may not be relevant to micro phenomena, and vice versa; accounting for drug experimentation may say nothing about dependence; explaining alcohol dependence may say next to nothing about heroin dependence; subcultural and biological processes may operate alongside psychodynamics, and so on (Goode, 2011).

Therefore, it is accepted that no theory or model in a single sphere can comprehensively explain addiction and that any understanding of addiction comes from looking at the interaction between the biological, psychological and social spheres (Mitcheson et al., 2010). Accordingly, there is general consensus, also shared by the present thesis, that addiction is a biopsychosocial phenomenon (Wanigaratne, 2006).

## ***1.6. Psychosocial, Pharmacological and Abstinence-Oriented Interventions to Crack Cocaine Use***

### **1.6.1. Current UK Treatments for Crack Cocaine Use**

Psychosocial approaches to the treatment of drug misuse have been the subject of much research and debate over the years (Wanigaratne, Davis, Pryce & Brothie, 2005). Such approaches vary depending on the theoretical model underpinning them but are broadly based on the use of the interaction between therapist and client to elicit changes in the client's behaviour (for example, drug use), as well as other

related factors including cognition and emotion (NICE, 2008). Despite the recent increase in research on psychosocial treatments, current UK practice is not underpinned by a strong evidence base and there is wide variation in the uptake and implementation of psychosocial approaches to treatment across services (ibid). A number of factors may contribute to this situation. First, the emphasis in many community based opiate treatment services is based on pharmacological management and supportive case coordination, with practice tending to be influenced more by the background and training of those delivering treatment within services than what research has shown to be effective. Second, a considerable amount of the evidence is extrapolated from other substance misuse problems (predominantly alcohol misuse) or other healthcare systems, for example, the US or Australia and, inevitably, this raises questions about the applicability of the evidence to UK drug misuse services. Third, there has been weak dissemination of the evidence base concerning psychosocial interventions until recently (Wanigaratne et al., 2005; NICE, 2008). Fourth, the limited availability of appropriately trained therapists also contributes significantly to variable access to such services in the UK (Lovell, Richards & Bower, 2003; NICE, 2008).

The National Institute for Health and Clinical Excellence published one technology appraisal (NICE, 2007a) and one national clinical practice guideline (NICE, 2008) on a range of drug treatment interventions, which endorse much of the mainstream psychosocial drug treatment provided in the UK as evidence based. These guidelines recommend (unstructured and structured) psychosocial interventions as the mainstay of treatment for crack cocaine use.

In the US, the 'National Institute on Drug Abuse' (NIDA) also discusses pharmacotherapies as possible treatment options, several medications (e.g. modafinil, dexamphetamine, topiramate) have been reported to reduce cocaine use in controlled clinical trials (Castells et al., 2010; Nuijten et al., 2011). Furthermore, NIDA is funding research endeavours to identify and test new medications, including a vaccination to treat cocaine dependence safely and effectively (NIDA: Research Report Series, 2010). These interventions are not recommended by the NICE guidelines. However, there are trials underway, for example, the multi-site trials, 'Cocaine Dependence Treatment with Modafinil & Voucher-based Reinforcement

Therapy' (COMBAT), in NHS drug treatment services, to test the effectiveness of modafinil with crack misuse within the opiate maintained population. Hence, for the sake of rigour and completeness, a section on pharmacotherapies is provided in this review.

The forthcoming section outlines psychosocial, pharmacological and abstinence-oriented interventions and its evidence base, which are endorsed by the NICE guidelines. These include the following: motivational interviewing and the model of change, cognitive behavioural therapies (including relapse prevention therapy), family based interventions, self-help groups (i.e. 12 step approaches), pharmacological treatments, detoxification and residential rehabilitation. Although non-residential 12 step programs are not considered to be a form of treatment *per se*, elements of the 12 step approaches are frequently incorporated in individual and group psychosocial interventions, residential rehabilitation and many health workers recommend the simultaneous attendance of self-help groups (Williams, 2007). Hence a short outline is included in this section. Additionally, it should be mentioned that the NICE guidelines (NICE, 2007) recommend the implementation of contingency management for stimulant drug use in UK treatment services, this will be covered in detail in section *I. 7 Contingency Management*.

### **I.6.2. Motivational Interviewing and Model of Change**

Until the 1980s, the usual therapeutic way of dealing with 'unmotivated' clients was a confrontational approach, which was thought to be necessary to overcome the resistance of the client, the 'pathological denial' of substance use, and the perceived inherent lack of motivation about changing substance use. These characteristics were often seen as inherent qualities of the clients themselves (Davies & Petersen, 2007). Around 1980, a new style of interviewing substance misusing people who were ambivalent about change emerged (Miller, 1983). In Miller's view, the interaction between the client and the therapist is critical in changing the ambivalence of changing substance abuse: the way clients are addressed by their therapists can either enhance or reduce motivation to change (ibid).

Ambivalence about changing drug use behaviour is a common reason for treatment failure, which may be particularly salient for psychostimulant users who have difficulty entering and remaining in treatment. Motivational interviewing (MI) is a technique that was developed when William Miller applied the principles of the Rogerian client-centred approach to alcohol-dependent clients (Miller, Benefield & Tonigan, 1993). Miller and Rollnick (2002) define MI as “a client-centred, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence” (p. 25). MI involves the application of four basic principles: (1) expressing empathy through techniques such as reflective listening, (2) developing discrepancy between the client's self-image as a drug user and other preferred non-drug-using self-images, (3) ‘rolling with resistance’ and avoiding argumentation, and (4) supporting self-efficacy or the client's personal sense of ability to change (Miller & Rollnick, 2002). MI relies upon counselling microskills, described in Rogers' client-centred approach, including open-ended questions, reflective listening, affirmations, and summarising (Egan, 1998). Various strategies may be used, depending on the client's circumstances (Jarvis, Tebbutt, Mattick & Shand, 2005). These include exploring the positive and the negative points about drug use, exploring the client's concerns, and looking back to past expectations and looking forward to future hopes. MI can be delivered in two phases; the first builds the client's motivation to enter treatment, and the second seeks to strengthen treatment adherence including compliance to prescribed medication (Zweben & Zuckoff, 2002).

A useful model for understanding motivation and, specifically, how behaviour change occurs is Prochaska & DiClemente's (1982) stages of change model, which has become known as the transtheoretical model of change. This stages of change model postulates that people progress through five stages when changing behaviours. The continuum includes the stages of ‘precontemplation,’ in which a person does not recognise a behaviour as problematic; ‘contemplation,’ in which a person begins to consider that a behaviour pattern might be problematic; ‘determination’ or ‘preparation,’ during which the individual resolves to change; and ‘action,’ in which a person initiates active behaviours to deal with the problem. Following ‘action’ is ‘maintenance’, if the behavioural change was successful, or ‘relapse’, if the person returns to the problematic behaviour. In the words of Prochaska and DiClemente

(1984): “Therapy with addictive behaviours can progress most smoothly, if both the client and the therapist are focusing on the same stage of change” (p. 6). For example, for persons at the precontemplative stage, motivational enhancement therapies or contingency management approaches promote therapeutic engagement, increased readiness, and movement toward the action stage. Offering active treatments (that is, those directed at achieving and stabilizing abstinence) at this juncture is premature, poorly received, and likely to be met with noncompliance (Chaney, O’Leary & Marlatt, 1978; Prochaska & DiClemente, 1986; Prochaska & Norcross, 2006).

The stages of change model is an extremely popular concept in addiction research and has been widely adapted in clinical settings as a heuristic for understanding motivation and, more specifically, readiness for change (Emmelkamp & Vedel, 2006). MI was found to be a useful adjunct to methadone treatment in opiate users (Saunders et al., 1995). Drug users (N = 122) received either motivational interviewing or psychoeducation. At six months follow-up, the clients who had received motivational interviewing showed less relapse than the clients in the control condition. Since then, another 15 randomised controlled trials demonstrated the feasibility of motivational interviewing for the drug dependent population, including cocaine dependent adults (Rohsenow et al., 2004; Secades-Villa et al., 2004). Most studies found that motivational interviewing led to better adherence and increased motivation, but only a few studies found that motivational interviewing led to decreased drug use or abstinence. However, not all studies supported the incremental value of motivational interviewing. In four studies the addition of motivational interviewing did not enhance treatment effectiveness in polydrug users (Booth, Corsi & Mikulich-Gilbertson, 1998; Schneider et al., 2000; Miller et al., 2003) and in cocaine dependent clients (Donovan et al., 2001). With drug use, there is some evidence that motivational interviewing is more effective for those who are ambivalent or not yet motivated to change substance use than for those already motivated. Two studies among cocaine dependent populations have supported the view that MI conveys the greatest benefit to clients with low initial motivation to change (Stotts et al., 2001; Rohsenow et al., 2005). These studies also suggested that MI could be counter-productive among more committed clients, whose drug use and treatment compliance outcomes actually appeared to deteriorate. As noted by the

authors, “It might be that the more permissive message used in Motivational Enhancement Therapy is maladaptive for the more motivated who may be impatient for a more directive approach” (Rohsenow et al., 2004, p. 872).

Two meta-analyses (Burke et al., 2002; Hettema et al., 2005) analysed the data of clinical trials into the effects of motivational interviewing, not only on substance misuse but also on health behaviour. MI was equivalent to active treatments and superior to no-treatment or placebo controls for problems involving alcohol and drug use, and overeating. MI resulted in a medium effect size in studies with drug dependence and in small to medium effect size in the area of alcohol addiction.

A large multi-site randomised clinical trial by Carroll et al. (2006) examined the effectiveness of integrating MI into the intake procedures of community drug treatment programmes (Carroll et al., 2006). Although MI significantly improved programme retention 1 month post enrolment compared with standard intake counselling, there were no differences in drug use across conditions. Primary cocaine and methamphetamine users comprised around a quarter of the sample (half of the subjects were primary alcohol users), and no detailed analyses for the stimulant subgroups were available. The lack of effect on substance use outcomes and longer term retention should be viewed in the overall context of high retention and good outcomes achieved at participating treatment centres.

### I.6.3. Cognitive Behavioural Therapy

The application of cognitive-behavioural theory to substance misuse is relatively recent. For most of the 20<sup>th</sup> century until the mid-1980s, the field of psychotherapy and psychological counselling largely ignored drug use, viewing it as a superficial symptom of more important underlying problems. As substance misuse became more widely recognised, interest in developing effective treatments increased (Emmelkamp & Vedel, 2006).

A wide diversity of treatment approaches fall under the umbrella of cognitive behavioural therapies (CBT), including relapse prevention techniques (see Marlatt & Gordon, 1985). All variants of CBT are grounded on social learning theories

(Bandura, 1986) and principles of classical and operant conditioning (Mitcheson et al., 2010). Cognitive behavioural therapy has developed from Aaron Beck's (1963, 1964, 2005) research and is an 'active, directive, time-limited treatment' that focuses on identifying a person's thoughts, beliefs, attitudes and assumptions that may be impeding positive behavioural change. Beliefs and assumptions that the person holds may be distorted (during childhood and learning experiences as an adult) and, as a result, the person may have negative beliefs which predispose, for example, towards low self-esteem or the continued use of substances. Not all thoughts or beliefs may support substance misuse. The individual may at times experience a degree of conflict between beliefs that support continued consumption and those that support abstinence. The number and strength of thoughts from each side of the argument will determine the individual's behaviour at any one time. Ironically, these conflicts may, in themselves, make the individual feel uncomfortable and increase the risk of substance misuse (Bennett, 2007).

Among psychostimulant users, CBT aims to help clients recognise and understand drug related problems and assists them to restructure or modify dysfunctional cognitions that may be perpetuating the problem behaviour (Baker, Gowing, Lee & Proudfoot, 2004; Mitcheson et al., 2010). The key active ingredients of CBT include (1) functional analysis; which explores the patient's<sup>4</sup> thoughts, feelings, and understanding of drug use within the context of its antecedents and consequences; (2) individually tailored training in relapse prevention skills; (3) monitoring thoughts about drugs; (4) identifying high-risk situations for relapse; (5) extra-session skills implementation ('homework'); and (6) within-session skills practice (Carroll, 1998). Putting these various elements together, substance use is initiated by the presence of either external or internal cues. These trigger both core and addictive beliefs. When the preponderance of thoughts supports consumption, these instigate cravings to use a substance. This is then maintained or ceased either by physical incapacity or further cognitive processes (Carroll & Onken, 2005).

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<sup>4</sup> *It is recognised that there are real and important arguments about the relative merits of the terms 'client' or 'patient' in psychotherapy. However, for simplicity, patient and client will be used throughout this portfolio interchangeably.*

With respect to empirical evidence, investigators have not made clear distinctions between the different cognitive behavioural approaches in substance misuse. Hence meta-analyses frequently summarise the outcome of different therapeutic approaches including relapse prevention, which makes it difficult to ascertain the key active components. Yet, it seems clear from reviews that the effectiveness of CBT in the case of substance dependence and misuse appears to be substance-specific (Mitcheson et al., 2010). This means that CBT is differentially effective in the treatment of different substances. Reviews such as by Morgenstern and Longabaugh (2000) and Miller and Wilbourne (2002) investigating alcohol misuse, Carroll et al. (2004) studying disulfiram and CBT, and finally, Wanigaratne et al. (2005) and Irvin et al. (1999) researching alcohol and drug misuses are all illustrative examples. In terms of stimulant misuse, CBT has not been shown to be better than any other form of psychosocial intervention in initiating abstinence (Gowing et al., 2001; Rawson et al., 2006; Mitcheson et al., 2010). Furthermore, randomised controlled efficacy trials of cognitive behavioural therapies for stimulant misuse have not, so far, indicated strong effects compared to control groups at follow-up (Gossop, Stewart, Browne & Marsden, 2003).

A meta-analysis of 26 clinical trials found CBT to be generally effective in reducing drug use and improving psychosocial functioning, although results were significantly better for alcohol and polydrug use than cocaine or tobacco (Irvin et al., 1999). CBT was also more effective when combined with medication, although this finding was based on only four trials (three in alcohol, one in cocaine) (ibid). A subsequent promising report of combined CBT and naltrexone in cocaine dependence was not replicated in dual dependence on cocaine and alcohol (Schmitz et al., 2001; Schmitz et al., 2004). An earlier qualitative meta-review of 24 RCTs found CBT to be more effective than no treatment but equally as effective as other treatment approaches (Carroll, 1996). In contrast to the meta-analysis published by Irvin et al., Carroll did not find that efficacy varied by drug type, although both reviews used the same three cocaine studies. Closer examination of these three studies showed only selective and modest support for the effectiveness of CBT. In the first study by Carroll, Rounsaville and Gawin (1991), the benefit of CBT over Interpersonal Psychotherapy (IPT) did not reach significance except in a subgroup of more severe users. Their second study (Carroll, Rounsaville, Nich et al., 1994) found improved outcomes for

CBT over case management only at 1-year follow-up, and this would not have been included in the meta-analysis by Irvin et al. The third study (Wells, Peterson, Gainey, Hawkins & Catalano, 1994) was a negative report when CBT was compared with 12 step based counselling where no difference was found in either treatment retention or cocaine use. Subsequent comparisons of individualised CBT with standard group counselling found no additional benefit for CBT except in patients already committed to complete abstinence (McKay et al., 1997; 1999).

In brief, cognitive behavioural approaches do not appear to be effective treatment options for stimulant users undergoing methadone maintenance treatment. The majority of trials found no benefit in comparison with control groups for abstinence and reduction in illicit stimulant use in opiate maintenance clients (NICE, 2008). Thus the NICE clinical guidelines (2008) do not recommend CBT as the first line of treatment for stimulant use. However, there was some evidence that standard CBT may be beneficial for a sub-sample who experienced high levels of psychiatric comorbidity (NICE, 2008).

#### I.6.4. Behavioural Couples and Family Therapy

Historically, the treatment community and the public at large have viewed alcohol and drug misuse as individual problems most effectively treated on an individual basis. However, during the last three decades, professionals and the public have come to recognize family members' potentially crucial roles in the origins and maintenance of addictive behaviour (Fals-Stewart, O'Farrell & Birchler, 2004; O'Farrell & Fals-Stewart, 2006). Treatment providers and researchers alike have begun conceptualizing substance misuse from a family systems perspective and treating the family as a way to address an individual's substance misuse (Fals-Stewart, O'Farrell & Birchler, 2004; O'Farrell & Fals-Stewart, 2006).

The defining feature of couples and family therapy is that drug users are being treated in the context of family and social systems in which substance use may develop or be maintained. Behavioural couples therapy (BCT) can be seen as a variant of family therapy, used for clients who have an established relationship with a drug-free partner (Velleman & Templeton, 2007; Ruff et al., 2010). Three

theoretical perspectives have come to dominate family based conceptualisations of substance misuse and thus provide the foundation for the treatment strategies most often used with substance users (for a more detailed review of these approaches, see Fals-Stewart, O'Farrell & Birchler, 2003).

- The family disease approach, the best known model, views substance misuse as illnesses of the family, suffered not only by the substance abuser, but also by family members, who are seen as co-dependent. Treatment consists of encouraging the substance misusing client and family members to address their respective disease processes individually; formal family treatment is not the emphasis (Fals-Stewart, O'Farrell, & Birchler, 2004).
- The family systems approach, the second widely used model, applies the principles of general systems theory to families, paying particular attention to the ways in which family interactions become organised around alcohol or drug use and maintain a dynamic balance between substance use and family functioning (Emmelkamp & Vedel, 2006). Family therapy based on this model seeks to understand the role of substance use in the functioning of the family system, with the goal of modifying family dynamics and interactions to eliminate the family's need for the substance misusing client to drink or use drugs (Emmelkamp & Vedel, 2006).
- A third set of models, a cluster of behavioural approaches (for example, behavioural couples therapy), assumes that family interactions reinforce substance misusing behaviour. Therapy attempts to break this deleterious reinforcement and instead foster behaviours conducive to abstinence (Fals-Stewart, O'Farrell & Birchler, 2004; Ruff et al., 2010).

Behavioural Couples Therapy (BCT) is typically used with substance using clients and their partners. The causal connections between substance use and relationship discord are complex and reciprocal. Couples in which one partner abuses drugs or alcohol usually also have extensive relationship problems, often with high levels of relationship dissatisfaction, instability (for example, situations where one or both partners are taking significant steps toward separation or divorce), and verbal and physical aggression (Fals-Stewart, Birchler, & O'Farrell, 1999; O'Farrell & Fals-

Stewart, 2006). Relationship dysfunction in turn is associated with increased problematic substance use and post-treatment relapse among alcohol and drug users (Maisto et al., 1988). Thus, substance use and marital problems generate a 'destructive cycle' in which each induces the other.

In the perpetuation of this cycle, marital and family problems (for example, poor communication and problem solving, habitual arguing, and financial stressors) often set the stage for excessive drinking or drug use. There are many ways in which family responses to the substance misuse may then inadvertently promote subsequent use (Fals-Stewart, O'Farrell & Birchler, 2004; O'Farrell & Fals-Stewart, 2006). In many instances, for example, substance misuse serves relationship needs (at least in the short term), as when it facilitates the expression of emotion and affection through caretaking of a partner suffering from a hangover. Recognising these interrelationships, BCT and family-based treatments for substance misuse in general have three primary objectives (Fals-Stewart, O'Farrell & Birchler, 2004; Ruff et al., 2010):

- To eliminate alcohol and drug misuse
- To engage the family's support for the client's efforts to change
- To restructure couple and family interaction patterns in ways conducive to long-term, stable abstinence

Its main components are focused on current behaviour. In BCT, the drug user states each day her/his intention not to use illicit drugs, and the partner expresses daily their support for their partner's efforts to stay abstinent (Emmelkamp & Vedel, 2006). It also aims to teach more effective communication skills, such as active listening and expressing feelings directly, and increases positive behavioural exchanges between partners by encouraging them to acknowledge positive behaviours and engage in shared recreational activities (Emmelkamp & Vedel, 2006; Ruff et al., 2010).

BCT attempts to create a constructive cycle between substance use recovery and improved relationship functioning through interventions that address both sets of issues concurrently (Fals-Stewart et al., 1996, 2000). BCT can be conducted in several formats and delivered either as a stand alone intervention or as an adjunct to individual substance misuse counselling. In standard BCT, the therapist sees the

substance misusing client and his or her partner together, typically for 15 to 20 outpatient couple sessions over 5 to 6 months. However, under some circumstances, therapists may administer group behavioural couples therapy (GBCT), treating three or four couples together, usually over 9 to 12 weeks (Fals-Stewart, O'Farrell & Birchler, 2004; Ruff et al., 2010).

In regard to the research evidence, comparing behavioural couples therapy (consisting of group, individual and behavioural couples therapy sessions) with an equally intensive individual based treatment condition, those couples receiving behavioural couples therapy reported less substance use, longer periods of abstinence, and higher relationship satisfaction. However, differences disappeared during follow-up and were no longer significant one year after treatment (Fals-Stewart et al., 1996, 2000; O'Farrell & Fals-Stewart, 2006).

In the treatment of substance using clients entering methadone maintenance treatment, Fals-Stewart et al. (2001) compared methadone maintenance with CBT or in combination with BCT among 36 substance abusing men. Clients in the BCT treatment condition had fewer opiate- and cocaine-positive urine samples during treatment when compared to clients in the standard treatment condition and at post-treatment, reported higher levels of dyadic adjustment and a greater reduction in drug use severity (Fals-Stewart et al., 2001; Ruff et al., 2010).

A possible disadvantage of behavioural couple therapy is that it is best applied by a relatively highly skilled clinician who not only has a clear understanding of the cognitive behavioural conceptualisation of substance use, but also has skills in working with couples and is able to move partners toward productive behavioural change (Fals-Stewart & Birchler, 2002). Comparing master's level counsellors versus bachelor's level counsellors in the treatment of BCT, Fals-Stewart and Birchler (2002) found adherence ratings among counsellors to be similar, but competence of treatment delivery to be superior from master's level counsellors.

The National Clinical Practice Guidelines (NICE, 2008) for psychosocial interventions recommend that behavioural couples therapy should be considered for people who are in close contact with a non-drug misusing partner and who present

for treatment of stimulant or opiate misuse (including those who continue to use illicit drugs while receiving opiate maintenance treatment or after completing opiate detoxification).

#### I.6.5. Self-Help Groups: Twelve Step Approaches

The concept of self-help, in the sense of mutual help within a community, is a traditional and valued approach to many problems. With the changing structure of society, due to increased mobility and the loosening of family ties, this type of community support seems to occur less easily and more rarely, and more formal self-help groups (SHG) have emerged to fill the void (Ghodse, 2010).

A self-help group is a group of individuals with similar problems who meet together voluntarily to help each other to help themselves. In the field of substance dependence, the best known SHG is Alcoholic Anonymous (AA; was founded in the US in 1935 and 1947 in the UK), followed by Narcotics Anonymous (NA; US in 1953 and UK in 1980) (White, 1980 see NICE full guidelines) and Cocaine Anonymous (CA; US in 1982 and UK in 1992) (Cocaine Anonymous UK, 2013). These are international fellowships or societies for recovering addicts who meet regularly to help each other to stay abstinent from drugs or alcohol. Non-residential 12 step programmes are not considered to be a form of treatment per se but may assist treatment maintenance (Jarvis et al., 2005).

Alcoholic Anonymous was founded by Bill Wilson and Bob Smith. They formulated the 12 steps and principles of AA from their own experiences of maintaining sobriety by sharing with others when they had not managed to do this alone (Williams, 2007). The book describing all this, *Alcoholic Anonymous*, published in 1939 is the core text of AA, affectionately known by members, as the 'the Big Book' (Sussman & Ames, 2001). The fellowships or societies for recovering addicts meet regularly to help each other to stay abstinent from drugs or alcohol. They are open to anyone with any type of drug/alcohol problem, and the only requirement for membership is the desire to stop using drug/alcohol. The approach is grounded in the concept of addiction as a spiritual and medical disease, a disease that, according to this approach, can be controlled but never cured (Yoder, 1990).

The movement is abstinence based but because addiction is viewed as a pattern of thinking and behaviour, recovery is not only about abstinence from a substance (Sussman & Ames, 2001). 'Sobriety' is seen as the development of a healthier attitude to oneself and others. In AA the state of 'abstinence' without 'sobriety' is often called being 'dry drunk' (Yoder, 1990). As relapse commonly occurs as a response to painful emotions (fear, anger, guilt, etc.) and emphasis is placed on learning to cope with these feelings and on lessening these by changing thinking in ways that enhance feelings of acceptance and wellbeing or 'serenity' (Sussman & Ames, 2001). Recovery is achieved by attendance at meetings and 'working the programme' with the mutual support of others who are trying to do the same.

The 12 step approach has elements common to other approaches. The belief that changed attitudes aid recovery may be seen as analogous with the principles of cognitive behavioural therapy (Williams, 2007). Similarly the use of slogans, short soundbites which aim to provide the individual with reassurance and a reminder of their goals, is similar to some techniques used in CBT. The non-judgmental philosophy is akin to the person centred approach of Carl Rogers (1951). Social learning theory (Bandura, 1977) suggests that behaviour is guided by expected consequences. Vicarious learning can influence the individual. The use of a sponsor as a role model is a form of positive learning (Sussman & Ames, 2001). Efficacy expectations are as important as outcome expectations. The structured building of esteem in the 12 steps includes the regular contact with others who are also 'succeeding' and may generate a belief that success is possible. Azjen and Fishbein (1980) claim that behaviour is influenced by the belief a person has about that behaviour and how strongly they feel that belief to be true, as well as the individuals' perceptions of what other people (that they value) will think of their behaviour. Where the individual values the members of the group, s/he will want to behave in ways that make her/him be accepted (Williams, 2007).

The Minnesota Model is an adaption of the 12 step programme used in some specialist treatment settings. This treatment model uses the principles and tools of the 12 step movement in a professional treatment context, alongside other treatment methods (Williams, 2007). Most treatment centres are residential. They have some overlap with broader therapeutic community approaches in that everyone is

encouraged to be part of the practical running of the house and decision making. Members are encouraged to use the support of others in the community to seek feedback and challenge unhealthy attitudes and behaviours, with staff help as necessary. Programmes typically involve a combination of group therapy, counselling, lectures and video-audio material (Williams, 2007). There may be 'share sessions' from recovering ex-residents and participants are encouraged to attend relevant local 12 step meetings.

Research data in relation to 12 step programmes has historically been notoriously difficult to obtain (Williams, 2007). Although it is appearing more often in contemporary literature, methodological challenges still remain, the main difficulties being the anonymity of group members and self-selecting nature of the organisation. While 12 step self-help groups are typically recommended for drug dependent clients as well, few studies separate individuals dependent on alcohol alone from those with drug dependence as their primary problem (Sussman & Ames, 2001). Benefits of 12 step affiliation have been reported among samples of alcohol and/or drug users combined (Christo & Franey, 1995; Miller & Hoffmann, 1995; Ouimette, Moos & Finney, 1998; Toumbourou, Hamilton, U'ren, Stevens-Jones & Storey, 2002; Moos & Timko, 2008) and drug users (Fiorentine & Hillhouse, 2000; Moos & Timko, 2008). In the Collaborative Cocaine Treatment Study (Crits-Christoph et al., 1999; Crits-Christoph et al. 2003), nearly five hundred clients were randomised to 12 step oriented individual therapy, individual cognitive-behaviour therapy, individual emotional-supportive therapy, or group drug counselling. In terms of drug use at one-year follow-up, the 12 step individual therapy was the most effective. In one large study (Moos, Finney, Ouimette, Suchinsky, 1999), the effectiveness of cognitive behaviour therapy and 12 step approaches was compared in over two thousand male veterans treated as inpatients for their substance use (36% for alcohol, 13% for drugs, 51% for both alcohol and drugs). Both treatments were found to be equally effective at one-year follow-up after discharge, the only notable exception being percentage of abstinence (Moos et al., 1999). At one-year follow-up, 45% of the 12 step clients reported being abstinent from alcohol and drugs, as compared to 36% of clients in the cognitive-behaviour therapy programmes.

A study by Wells and colleagues (1994) found 12 step counselling equally effective as relapse prevention (Wells et al., 1994). In 2005, a study by Weiss and colleagues examined treatment for individuals with cocaine dependence and found that active 12 step involvement in a given month predicted less cocaine use in the next month. Clients who received counselling and increased their 12 step SHG participation in the first 3 months of treatment had the best drug use outcomes at the end of treatment (Weiss et al., 2005). Moreover, the study showed that participation in treatment and participation in SHGs have independent effects on substance use outcomes and tend to augment each other. Clients who regularly engaged in 12 step activities but attended meetings inconsistently had better drug use outcomes than did patients who attended consistently but did not regularly engage in 12 step activities. Similarly, longer episodes of treatment and weekly or more frequent SHG attendance during and after treatment were each independently associated with 6 months abstinence (Fiorentine & Hillhouse, 2000a). Maintaining passive attendance may indicate reluctance to fully embrace 12 step group ideology and the goal of abstinence. Individuals who attend SHGs but are unable to embrace key aspects of the programmes are less likely to benefit from it (Shearer, 2007).

#### I.6.6. Pharmacological Treatment

The modest results of psychosocial treatments and the increasing knowledge about the neurobiology of cocaine dependence have led to an increasing number of studies searching for effective pharmacological agents that influence the neurochemistry of cocaine, including antipsychotics, anticonvulsants, antidepressants, psychostimulants and (other) dopamine agonists (Preti, 2007; Karila et al., 2008; Castells et al., 2010; Nuijten et al., 2011). Despite the considerable efforts in this field, there are no proven effective pharmacotherapies for cocaine dependence to date, and the testing of new medications for cocaine dependence continues to be high on the research agenda. Basically, the research efforts are focused on two pharmacological strategies (APA, 2007): one directed at abstinence from - or at least substantial reduction of - cocaine use and the other directed at minimizing cocaine-related harm by replacing short-acting, illicit cocaine by a long acting, legal stimulant that can be taken orally (Shearer et al., 2004; Ross et al., 2009; Herin et al., 2010). Concerning the first strategy, from the wide range of medications tested, topiramate and modafinil are

examples of new medications that are currently only registered for indications other than cocaine dependence, but have shown some beneficial effects in several studies in cocaine dependent populations in terms of abstinence or stimulant use reduction (Ballon et al., 2006; Castells et al., 2007; Alvarez et al., 2010).

With respect to the second strategy, harm reduction or drug use reduction oriented treatment, a growing number of pre-clinical and human studies suggest that the monoamine releaser dexamphetamine, used for the treatment of attention deficit hyperactivity disorder (ADHD) and narcolepsy, is an important candidate for replacement therapy (Castells et al., 2007; Castells et al., 2010). The basic rationale for substitution treatment for cocaine dependence is similar to that for other addictions (nicotine replacement therapy in nicotine dependence, methadone and buprenorphine in opiate dependence): it aims to replace uncontrolled and harmful drug use with regulated and safer use, in terms of dose, route of administration and adverse effects, and to facilitate engagement with health care services by attracting and retaining addicted individuals in treatment (Shearer & Gowing, 2004; Shearer, 2008). In addition, the regular supervised prescription regimen may by itself help patients to structure their daily life. In cocaine dependent clients, several controlled studies have shown significant improvements associated with the administration of sustained-release (SR) dexamphetamine without serious adverse events (including no serious cardiovascular complications). Shearer and colleagues (2003) reported positive results of dexamphetamine SR in a placebo-controlled study of cocaine dependent clients in terms of reduced cocaine use, craving, severity of dependence and delinquent behaviour, and dexamphetamine SR was found to attenuate cocaine use and improve treatment retention in combined cocaine and heroin dependent patients in controlled studies of Greenwald et al. (2010) and Grabowski et al. (2001, 2004).

In summary, a wide range of pharmacological agents has been tested for efficacy in cocaine dependence, but generally with disappointing or, at best, modest results. From the investigated candidate medications, topiramate, modafinil and dexamphetamine SR have shown the most promising results. The vast majority of these studies were conducted in the US, however, and therefore these study findings need to be confirmed in research outside the US (Nuijten et al., 2011).

### I.6.7. Detoxification

Crack cocaine users that consume large quantities and who are severely dependent may require inpatient detoxification. This is indicated if there have been repeated attempts at outpatient detoxification, or if drug withdrawal leads to severe depression or prolonged psychotic symptoms (Ghodse, 2010). Admission enables complete dissociation from sources of drugs and from drug using situations and also permits more attention to be paid to the patient's general health and nutritional status, which may have suffered neglect (ibid). However, this can only provide a temporary respite, and the high relapse rate after discharge from hospital emphasises the extreme importance of all the general measures of intervention outlined in this section, including contingency management.

### I.6.8. Residential Rehabilitation

Therapeutic communities offer detoxified/abstinent clients the opportunity for longer term maintenance of abstinence within a structured residential programme sometimes based on 12 step principles. The therapeutic community simulates a family model to act as a change agent for individual behaviour. Elements include strictly enforced behavioural norms, group and individual therapy, and clearly defined hierarchical roles and responsibilities with associated rewards and punishments (Platt, 1997). A randomised clinical trial (RCT) of a 90-day shelter based drug treatment programme in homeless cocaine-using men found significant declines in cocaine use compared with usual care after 21 months (Lam et al., 1995). Generally, however, there are logistic and ethical impediments in conducting RCTs in residential facilities, and most available evidence is from long-term treatment cohort studies (Shearer, 2007). Primary stimulant users enrolled in a UK drug treatment cohort study who received treatment in residential rehabilitation services significantly reduced drug use and associated problems at 1-year follow-up (Gossop, Marsden & Stewart, 2000). Drug Abuse Treatment Outcome Studies (DATOS), a US drug treatment cohort study, found that residential rehabilitation, outpatient programmes, and short-term inpatient programmes were all effective in improving treatment outcomes for cocaine dependence with higher problem severity and short treatment duration associated with higher cocaine relapses (Simpson, Joe, Fletcher, Hubbard & Anglin, 1999). A

longer term (5-year) follow-up of the DATOS cohort, however, found that clients in longer term residential rehabilitation reported significantly reduced cocaine consumption compared with those from outpatient methadone and outpatient drug free groups (Hubbard, Craddock & Anderson, 2003), although this result was influenced by significant attrition favouring treatment completers. These results were supported by the Australian Treatment Outcome Study, which found that residential rehabilitation was significantly more effective than methadone or detoxification in reducing cocaine use in heroin dependent individuals after 3 months of follow-up (Williamson, Darke, Ross & Teesson, 2006). The authors attributed this success to the broader aims of residential rehabilitation to help clients cease all drug use, whereas the other interventions were more narrowly focused on heroin use.

### ***1.7. Treatment Outcome Profile and Christo Inventory for Substance Misuse***

Monitoring outcomes assess the effectiveness of treatment interventions as they are delivered in practice (Affholter, 1994). The Treatment Outcome Profile (TOP) was conceived and implemented by the National Treatment Agency (NTA) in 2007 to monitor the demand and delivery of structured substance misuse services in the National Health Service (NHS) and non-governmental sector (Marsden et al., 2008). All service providers of structured treatment services for drug users (excluding primary alcohol users) are required to use it and submit regular data (NTA, 2010a). The TOP is a brief, health worker administered interview which is used in structured drug misuse treatment interventions as part of the care planning and review process. The TOP contains a set of questions based on the four domains established internationally and described in the NTA's guidance on care planning and review (NTA, 2007). These are drug and alcohol use, physical and psychological health, offending and criminal involvement, and social functioning. The TOP allows health workers and service users to track progress on measures within these domains, and compare pre-treatment behaviour with behaviour at stages in (and even beyond) treatment (Marsden et al., 2008).

The Christo Inventory for Substance-Misuse Services (CISS) is a standardised, validated tool (Christo, Spurrell & Alcorn, 2000; Christo, 2000a) commonly used in Scotland (Effective Interventions Unit, 2001), England & Wales (Christo, 1999a,b,c; Christo, 2000b,c,d,e,f; Christo, 2001; Audit Commission, 2002), and abroad (Christo & Da Silva, 2002). It is completed by the health worker with the client present or from case notes. It covers the domains; substance use, health and risk behaviours, psychological wellbeing, occupation, criminal activity, social functioning, social support, treatment compliance (i.e. adherence and reliability to treatment requirements, which is an indirect measure of the motivation to engage with treatment) and therapeutic alliance (i.e. working relationship between client and drug/alcohol worker). The last two items are not captured by the TOP but have shown to be good predictors for many different drug treatment outcomes (Simpson et al., 1997). The therapeutic alliance refers to the quality of the relationship between the client and her/his care providers and is the 'non-specific factor' that predicts successful therapy outcomes across a variety of different therapies (Luborsky et al., 1985, Orlinsky et al., 2004). The nature of the therapeutic alliance depends on both staff and client. For example, the practitioner's expertise and competence instils confidence in the treatment and strengthens the therapeutic alliance (Roth & Pilling, 2007), while the client's readiness to change also predicts a positive therapeutic alliance (Connors et al., 2000). In short, therapeutic relationships, pretreatment motivation and programme engagement have demonstrated to be central attributes of effective treatment (Simpson et al., 1997).

In other respects, there is considerable overlap between the TOP and CISS. Both instruments are completed by clinicians following an interview with the client, both have good psychometric properties (with correlation coefficients exceeding 0.70 between different indices) and have been validated in samples of several hundred clients (Marsden et al., 2008; Christo, Spurrell & Alcorn, 2000). There are several considerations for employing the TOP and CISS as outcome measures. The instruments are brief, easily administered and scored, pantheoretical, psychometrically sound, sensitive to change over a medium period of time, and have been developed and assessed in the National Health System in the UK (Marsden et al., 2008; Christo, Spurrell & Alcorn, 2000). The measures are in the public domain

and therefore can be used without cost but with due acknowledgement of its source (Marsden et al., 2008; Christo, Spurrell & Alcorn, 2000).

### ***1.8. Opiate Substitution Treatment in the United States and United Kingdom***

Methadone maintenance treatment is the most prominent form of pharmacotherapy treatment for illicit opiate dependence throughout the world, originally pioneered by Dole and Nyswander (1965) as a treatment for heroin dependence. Less commonly prescribed is buprenorphine, which is a partial opiate agonist but an accepted maintenance treatment for opiate misuse (NICE, 2006d). The rationale for maintenance treatment is that, by using a synthetic opiate, cravings are relieved and by substituting heroin for a controlled drug, risks and harms associated with illicit drug use can be reduced (for example; illegal activities associated with obtaining drugs) and stability can be increased (Zaric, Barnett & Brandeau, 2000; Wechsberg & Kasten, 2007; Center for Substance Abuse Treatment, 2009). The implementation of opiate maintenance programmes varies internationally with respect to structures, procedures and practice. Differences include: payment for opiate substitution treatment (substitution treatments are free of charge at the point of delivery in the NHS), the number of clients treated, type and qualifications of staff, the amount and type of counselling and medical services provided, methadone doses, policies about urine testing, take-home methadone and many other aspects of treatment (Gossop & Grant, 1991; Ball & Ross, 1991; Stewart, Gossop, Marsden & Rolfe, 2000). Therefore it seems imperative to highlight some of the salient and relevant differences in the implementation of opiate substitution programmes in the US and UK. These factors may vicariously affect the process and results of the current research project.

#### **I.8.1. United States**

The following is an outline of the structure of the opiate maintenance services until 2014, before the health care reform ‘The Affordable Care Act of 2010’ took effect. Besides the provision of substitute prescribing, maintenance treatment services in the United States were categorised into two groups: core and ancillary. Core services

include medical care (general medical and AIDS related medical care), psychological services and treatment for drugs other than heroin (detoxification from a substance other than heroin; treatment for dependence to alcohol, cocaine or other illicit drugs) (Wechsberg & Kasten, 2007). Ancillary services include educational, vocational, financial, legal, family, housing/shelter, acupuncture, transportation and child care services (ibid).

The American Society of Addiction Medicine (ASAM, 2001) has defined standard outpatient treatment in the US as organised, non-residential services with designated drug misuse professionals providing regular treatment sessions totalling fewer than 9 contact hours per week. Treatment might typically consist of weekly individual and/or group counselling, which would aim to address not only the drug misuse but also wider medical, psychological and social needs. ‘Treatment as usual’ in recent US-based multi-site clinical trials reflects this characterisation (for example, Rawson et al., 2004; Peirce et al., 2006). Timko and colleagues (2003) surveyed all 176 Veterans Affairs substance misuse treatment programmes across the US and found that nearly all (99%) provided some form of drug or alcohol counselling or psychotherapy as part of standard outpatient care, with correspondingly high (90%) utilisation by service users. Additionally, the National Survey of Substance Abuse Treatment Services report (SAMHSA, 2009) indicated that a range of therapeutic approaches were used by treatment facilities. The frequency with which the facilities used these different approaches varied substantially. The majority of substance misuse treatment facilities always or often used substance misuse counselling, relapse prevention, cognitive behavioural therapy, 12 step approaches, and motivational interviewing. Nearly half sometimes used anger management, brief intervention, and trauma related counselling. The types of therapeutic approaches used by substance misuse treatment facilities depended upon the characteristics of both, the facility and the clients served by the facility (SAMHSA, 2009).

Maintenance services may be covered by Medicaid, Medicare, Civilian Health, Medical Program of the Uniformed Services, private insurance, state and local governments or other sources (ASAM, 2012). In practice, they are usually financed from a combination of public and private sources and client self-payment, and the combination varies by state and by treatment service. However, many ‘cash-only’

clinics do not accept insurance, forcing clients to pay upfront and then seek reimbursement from their carrier, a process which is fraught with difficulty and a long history of denied claims (ASAM, 2012). Clients' inability to pay may limit both treatment entry and retention, especially in States where opiate maintenance is not covered by Medicaid, State funds, or private insurance (CSAT, 2012). One study found that randomly offering prospective clients either cost-free treatment or moderate fee rates significantly increased treatment entry and retention for the cost-free clients (Kwiatkowski et al., 2000). Consequently, CSAT recommended that clients' resources to cover treatment costs should be determined during screening and assessment. Frequently clients are uninsured or have not explored their eligibility for payment assistance. The consensus panel in the guidelines for 'Medication-Assisted Treatment for Opioid Addiction in Opioid Treatment Programs - a Treatment Improvement Protocol' (CSAT, 2012) stated that services are responsible for helping clients to explore payment options so that they have access to a full range of treatment services, including medical care, while ensuring payment to the methadone clinic. In situations of inadequate funding or client ineligibility for funds, another source of payment should be identified (ibid).

However, the Addiction Treatment Forum published figures showing that of the 286,000 clients in opiate substitution treatment in 2008, approximately half attended private for-profit programmes, and paid for their treatment out-of-pocket, at posted fees ranging from \$13 to \$43 a day (Addiction Treatment Forum, 2011). The Director of the National Association of State Alcohol and Drug Abuse highlighted that the information on client fees and the funding of such treatments are not transparent (ibid). In fact, he points out that the exact figures are unknown, since the information is not routinely collected, "It's disappointing, because this is an important and understudied topic" (ibid).

On a positive note, this has supposedly changed in 2014 as the health care reform 'The Affordable Care Act of 2010' took effect. SAMHSA (2013) reports that every citizen in the US will be eligible to be covered by Medicaid, Medicare or private insurance, and more people will have substance misuse medication coverage.

## I.8.2. United Kingdom

Standard care with substitute opiate medication typically consists of key working (Knight, 2006) which, as a matter of good practice, involves the building of a therapeutic relationship with the service user. A specified keyworker – sometimes a physician or psychologist, but usually a psychiatric nurse, social worker, or trained non-medical drugs worker – takes the lead role in the coordination of the client's care which includes:

- an initial care plan to address immediate needs (for example, providing information and advice on drug and alcohol misuse)
- harm-reduction interventions (for example, better management of drug use, learning safer drug-using practices and being informed about dose limits and overdose risk)
- motivational interventions to enhance retention in treatment
- developing and agreeing the care plan with the client and implementation of the care plan – with interventions relevant to each stage of the treatment journey and regular care plan reviews (NICE, 2008).

The NTA guidelines 'A framework and toolkit for implementing NICE-recommended treatment interventions' (Pilling, Hesketh & Mitcheson, 2010) was designed to support drug treatment services in the effective delivery of evidence based psychosocial interventions, both for drug misuse and for common co-morbid mental health problems. It focuses on evidence based treatment interventions recommended by the National Institute for Health and Clinical Excellence, and categorises them as either low-intensity or high-intensity structured psychosocial interventions, consistent with their likely place in any 'stepped care' framework of provision, and with reference to Models of Care: Update 2006 (NTA, 2006b).

Low-intensity interventions are generally delivered by keyworkers (i.e., drug workers), as their work already utilises components from motivational interviewing along with components drawn from other interventions such as relapse prevention, to reduce substance misuse (NTA, 2010a). Through regular clinic appointments,

keyworkers also organise access to community services (Department of Health, 2006). These interventions are particularly suited to engage service users in treatment and to support early changes in drug using behaviour as well as achieving harm reduction goals.

High-intensity interventions are defined as formal psychological therapies delivered by a specialist psychological therapist, offering interpersonal, motivational, or cognitive-behavioural therapies, or a combination, with no specific medication component (NTA, 2010a). During 3 to 20 sessions tailored to the client's needs, the interaction between therapist and client aims to elicit changes in the client's behaviour (for example, drug use), as well as other related factors including cognition and emotion (NICE, 2008).

Additionally, a few services offer increased intensity treatment, sometimes with educational and life-skills training, which is delivered as a 12-week programme with 3–5 days' attendance per week. These treatments are provided by trained practitioners on an individual or group basis, and in some services the client's partner or family can also participate (Marsden et al., 2009). These interventions are suited to service users with a sufficient degree of stability and those who may be working towards being drug-free (NTA, 2010a). In most cases, it is important to deliver low- and high-intensity interventions in the context of an agreed care plan, co-ordinated by a keyworker.

To summarise, there were at least two vital distinctions between US and UK opiate substitution programmes. First, many clients in the US were liable to self-fund some portion of their maintenance treatment, depending on their insurance status, the state they were seeking the treatment and whether there were some alternative funds available, whereas treatment in the UK is free of charge. Second, US services seemed to provide higher levels of social care, support and regular counselling, which was expressed in the categorisation of core and ancillary services (CSAT, 2012) and this has usually surpassed the available care in the UK (NICE, 2008). As mentioned above, the US contingency management evidence base that we consider to date was collected in the health system that existed until the changes took place in

2014. Hence, the above mentioned differences could *inter alia* effect the treatment outcome of the present voucher based reinforcement programmes.

## ***I.9. Contingency Management***

### **I.9.1. Historical Roots and Conceptual Foundations of Contingency Management**

As discussed above, available treatment options for crack cocaine dependent people are limited, and a substantial part of the crack cocaine dependent population is not reached by the addiction treatment system (Nuijten et al., 2011). Psychosocial interventions for crack cocaine dependence generally show modest results, and there are no registered pharmacological treatments to date, despite the wide range of medications tested for this type of dependence (Mitcheson et al., 2007; Nuijten et al., 2011). Study data and practice-based experiences indicate that poor compliance is a major complicating factor in these treatments (Magura, Nsakeze & Demsky, 1998; DeMaria et al., 2000; Rowan-Szal et al., 2000; Mitcheson et al., 2007). One of the more promising psychosocial treatments for cocaine dependence to date is contingency management, which has shown positive results in terms of improved treatment retention and reduction of substance use in a series of studies in the US (Lussier et al., 2006; Prendergast et al., 2006; Knapp et al., 2007; Dutra et al., 2008; Van Horn et al., 2010), and preliminary results from some studies in a community setting in Spain, using a behavioural approach and vouchers (Garcia-Rodriguez et al., 2007; Secades-Villa, Garcia-Rodriguez, Higgins, Fernandez-Hermida, & Carballo, 2008). CM is recommended as a key treatment intervention for stimulant drug users in the UK by the NICE guidelines (2008).

The contingency management approach to drug misuse treatment is derived from an extensive theoretical, laboratory, and clinical history (Higgins, Budney & Bickel, 1994). The historical roots of contingency management treatments for drug misuse lie in two general areas; the more general of these areas is the operant behaviour pharmacology conceptualization of drug use and drug self-administration; the more specific of these areas is work on the behavioural analysis and treatment of

alcoholism (Bigelow & Silverman, 1999). Work in each of these two areas originated relatively independently, with the themes joining only later. The behavioural pharmacology theme developed in the animal laboratory as a basic behavioural science strategy for developing experimental models of substance misuse and dependence. In contrast, the behaviour analysis and treatment theme began with the clinical phenomena of alcohol misuse and dependence and applied behavioural science principles to understanding and altering these clinical problems (ibid). It is interesting to note that both approaches derived from the same general theoretical and conceptual orientation of operant psychology, which has viewed substance use problems as instances of reinforced operant behaviour that are amenable to control by environmental consequences (i.e., behavioural contingencies) (ibid).

This operant behaviour perspective does not hold that drug reinforcement is the only mechanism involved in the development of drug misuse problems (Bigelow & Silverman, 1999). It recognizes that vulnerability to drug misuse can be influenced by a broad range of psychological, biological and environmental variables. However, one of the strengths of this perspective is that it suggests mechanisms for intervention-alteration of behavioural contingencies that are independent of specific etiologic factors.

In order to provide an accessible and logical structure to the present CM chapter, it is divided into four sections; (1) outlines the theoretical foundations of the operant behaviour conceptualisation and the brain mechanisms underpinning instrumental learning, (2) serves as an introduction of the implementation of CM, (3) this section reviews the empirical developments of CM in the field of crack cocaine misuse in outpatient psychosocial counselling programmes, and methadone maintenance programmes, (4) finally, an evaluation of the empirically examined CM intervention parameters.

### I.9.2. Theoretical Foundations and Biological Mechanisms

The principle aims of behaviourism are to elucidate the conditions of human learning and to develop a technology for behaviour change (Skinner, 1938, 1972). Behaviourists believe that most or all human behaviour is learned, including not only

adaptive but also maladaptive behaviour (for example, addiction) (Thombs, 2006). In terms of frequency of occurrence, addictive behaviours are presumed to lie along a continuum of use, rather than being defined in terms of discrete or fixed categories such as excessive use (loss of control) or total abstinence. All points along this continuum of frequency of occurrence are assumed to be governed by similar processes of learning (Marlatt, 1985). Thus, substance use is considered a behaviour subject to the same principles of learning as driving a car, typing a letter or building a house. One of the major premises, then, is that certain fundamental laws (known and unknown) govern the initiation, maintenance, and cessation of human behaviour (Thombs, 1994).

In the behavioural framework, addiction to substances arises from the operation of reward and punishment (West & Brown, 2013). There are many different variants of this approach and this section will examine the instrumental learning approach in quite general terms. Learned behaviour is usually classified according to whether it is the result of 'respondent conditioning' or 'operant conditioning.' This distinction is an important one. The two types of conditioning do not represent different kinds of learning but, instead, different types of behaviour (McKim, 1997). Respondent behaviour (classical conditioning) is under the control of a well-defined stimulus, whereas operant behaviour (instrumental learning) appears voluntary and is not directly elicited by a stimulus situation. Most human behaviour falls into the latter category (West & Brown, 2013).

The central tenets of this operant behaviour conceptualization are that similar learning processes occur in animals and humans, that behaviour is often controlled by its consequences, and that behaviour can be changed by changing its consequences (Higgins & Petry, 1999). Drug self-administration behaviour is seen as the behavioural core of drug abuse problems (Higgins & Silverman, 2008). Drugs of abuse function as positive reinforcers that strengthen and maintain drug self-administration behaviour (Higgins & Silverman, 2008). Drug use behaviour is considered abusive when it becomes excessively controlled by the reinforcing effects of drugs and inadequately controlled by the potential reinforcing effects of other activities and events. In this conceptualisation, the ability of drugs of abuse to reinforce behaviour is biologically normal, and drug abuse behaviour problems result

from inadequacies in the environmental contingencies of reinforcement rather than from defects within the individual (Skinner, 1975). An extensive scientific literature supports the view of drug reinforcement as biologically normal. Major elements of that literature include evidence of widespread vulnerability to drug reinforcement; laboratory experimental models involving drug self-administration by animals; and extensive cross-species commonalities in drugs that are self-administered, patterns of self-administration, and variables influencing self-administration (Griffiths, Bigelow & Henningfield, 1980). This is best demonstrated in a laboratory situation where an animal (usually a rat or a monkey) obtains a dose of a drug, such as cocaine, by pressing a lever. Thereafter the animal will press the lever repeatedly to obtain more cocaine and, as it receives more, will press the lever more and more rapidly. In other words, cocaine increases – or reinforces – behaviour resulting in its own administration, and is said to be a primary reinforcer and to have primary reinforcing properties (Miczek & Mutschler, 1996; Marrow et. al., 1999). Thus within the CM framework, operant behaviour is maintained in part by the reinforcing biochemical effects of the abused substance and by reinforcing environmental influences (respondent conditioning). Respondent conditioning, comes into effect when an environmental stimulus (person, place or thing) reliably predicts drug availability and administration (e.g., Schindler, Panlilio & Goldberg, 2002). Previously neutral environmental events that predict drug availability and use eventually acquire discriminative stimulus functions (i.e., they become occasion setters) for urges to use drugs as well as drug seeking and use (Higgins & Silverman, 2008). Not all drugs possess this property; those that do and which are administered by animals in a laboratory situation are the same as those commonly abused by humans (Deneau, Yanagita & Seevers, 1969). They include stimulants (e.g. amphetamines and cocaine), opiates (e.g. heroin), sedative hypnotics (e.g. sleep remedies), alcohol and some, but not all, hallucinogens (e.g. phencyclidine). Of these, cocaine and heroin stand out as the most powerful reinforcers, as defined by the rapidity of acquisition of self-administration (Ghodse, 2010).

Addictive behaviours become entrenched and difficult to stop through a process that can occur without the individual being aware, it does not even require the individual to feel positive pleasure from the behaviour (West & Brown, 2013). It seems that the process, reinforcement, involves a part of the brain that evolved many millions of

years ago because it 'trained' animals to engage in behaviours such as obtaining food, water, warmth and shelter – all essential to survival and reproduction (Ghodse, 2010). This could postulate that part of the motivation to take addictive drugs involves a learning mechanism that predates in evolutionary terms the development of conscious decision-making. Thus addiction involves the development of a habitual behaviour pattern that is independent of any conscious evaluation that might be taking place about the costs and benefits of the behaviour (West & Brown, 2013). The impulses to engage in dependence behaviour that are generated by this mechanism can be so strong that they overwhelm the desire of the dependent person to restrain themselves.

Animal research, supported by ever more sophisticated neuroimaging techniques in humans, now suggests that there is indeed a neural circuitry underpinning positive reinforcement (Nestler, 2004). It is believed that whatever the drug or activity, ultimately the final common pathway through which reinforcement operates is the medial forebrain bundle and an important part of that is the mesolimbic pathway, specifically the dopamine pathway extending from the ventral tegmental area to the nucleus accumbens (Tomkins & Sellers, 2000). The nucleus accumbens lies towards the front of the brain and receives major input from the midbrain called the ventral tegmental area (VTA) (Robbins et al., 2007). There are many variations on the Dopamine Theory of Positive Reinforcement, but they all propose that the action of dopamine on receptors in the nucleus accumbens plays a critical role (West & Brown, 2013). This particular theory focuses on the mechanism by which addictive drugs exert their rewarding effects. The understanding of the circuitry is developing rapidly, but at its simplest it states that drugs with addictive potential increase the concentration of the neurotransmitter dopamine in a part of the brain known as the nucleus accumbens (NAcc). They further state that this increase in dopamine is necessary for addiction to occur.

Stimulation of NAcc dopamine transmission by addictive drugs is shared by a natural reward like food but lacks its adaptive properties (habituation and inhibition by predictive stimuli) (Robbins et al., 2007). Thus it is suggested that the 'high' which is associated with the drug intake experience might be correlated with an increase in dopamine levels in the NAcc. Conversely, whenever the blood levels of the index

drug (i.e. cocaine, opiate, nicotine, etc) fall, the NAcc becomes depleted of dopamine, which is interpreted by the frontal lobe as ‘craving’ (i.e. desire to ingest the drug again) (Robbins et al., 2007). In plain words, one could refer to these neurochemical modifications as the ‘biological background’ of the so-called ‘psychological dependence/craving’ (Ghodse, 2010). Different types of dopamine receptors have now been identified and it appears that, initially, different drugs may act on receptors in different parts of the reward pathway which in turn influences the nucleus accumbens (DiChiara et al., 2004). Some scientists assume, therefore, that psychological dependence, which is central to any concept of drug dependence, is the real-life manifestation in humans of the reinforcing property of a drug, demonstrable in laboratory animals, and that reinforcement may be mediated via an identifiable pathway within the brain (Ghodse, 2010).

Clearly, there is a difference between a rat or a mouse pressing a lever to get a dose of a drug and an individual’s overwhelming craving for it. Moreover, the above description paints a picture that is relatively clear cut, but in fact, there is still a great amount of uncertainty about these mechanisms, not least because it is not clear how far humans share the same kinds of response as rats and mice, bearing in mind that rats and mice are different from each other in some important respects (West & Brown, 2013). There are, however, certain similarities between the two conditions: the rat will press the lever thousands of times just to get a dose of a powerfully reinforcing drug and, given unlimited access to it, may stop eating food and drinking water altogether, and will increase its intake of the drug to the point of starvation, dehydration, severe toxicity and death. There are obvious parallels with human drug-seeking behaviour so intense that it disrupts all normal activities, and sometimes so self-destructive that the individual dies as consequence (Ghodse, 2010).

Instrumental learning offers a very powerful and attractive explanation for many aspects of substance addiction (Higgins, Budney & Bickel, 1994). According to a simple instrumental learning model, drug use or another addictive activity not only becomes a deeply entrenched behavioural pattern ultimately under the control of the rewarding or punishing stimulus but also intricately tied into behavioural and social forces, and under impaired voluntary control (West & Brown, 2013). This can help

to explain how a conflict might occur between conscious desire to exercise restraint and motivational forces impelling the behaviour (ibid).

The therapeutic task in the operant behaviour conceptualisation is seen as that of bringing behaviour under the control of other alternative behavioural contingencies that selectively reinforce and promote drug abstinence or other non-drug-related prosocial behaviours (Bigelow, Brooner & Silverman, 1998; Silverman, 2004). As such, the likelihood of substance use should be influenced by the context in which use occurs. More specifically, alternative non-drug reinforcers should decrease substance use if they are available in sufficient magnitude and according to a schedule that is incompatible with drug use (Petry, 2000; Silverman, 2004).

### I.9.3. Contingency Management Implementation

The primary goal of drug misuse treatment in general, and of CM in particular, is to reduce or eliminate drug use behaviours (Stitzer & Petry, 2006). Behavioural analytic theory and the empirical literature on behaviour change suggests that the efficacy of CM interventions is influenced by 5 variables: the choice of the target behaviour, the monitoring of the target behaviour, the selection of the type of consequence (reinforcer), the magnitude of the reinforcer and the schedule used to deliver the reinforcers (Sulzer-Azaroff & Meyer, 1991; Stanger & Budney, 2010).

#### **Reinforcement of drug abstinence**

Abstinence is a primary behavioural outcome in drug misuse treatment, since periods of abstinence are associated with positive benefits both to the individual and to society (Stitzer & Petry, 2006). Controlled research reviewed below shows that CM procedures providing external reinforcement for evidence of drug abstinence can be highly effective for promoting sustained periods of abstinence, particularly while the interventions are in place (Petry & Simic, 2002). Natural recovery processes that take place during periods of sustained abstinence, including gradual diminution of response to drug-related cues and lifestyle changes that provide alternative competing reinforcers, may then form the mechanisms for longer-term recovery of dependent individuals (Stitzer & Petry, 2006).

Additionally, clients with substance misuse behaviours experience a variety of psychosocial problems that can also be modified via contingency management procedures (Petry & Simic, 2002). Some clinicians have found adaptations of the approach useful for altering other problematic behaviours and encouraging lifestyle changes. Reinforcement can be provided for attendance at therapy sessions (Stevens-Simon et al., 1997), for prosocial behaviours within the clinic (Petry, Bickel & Arnett, 1998), or for compliance with goal-related activities. In terms of this latter category, clients decided upon three discrete activities each week that are related to their treatment goals, such as attending a medical appointment if the goal is to improve health, going to the library with their child if the goal is to improve parenting, or filling out a job application if the goal is to obtain employment (Iguchi et al., 1997; Bickel et al., 1997; Petry, Martin, Cooney & Kranzler, 2000).

### **Monitoring of the target behaviour**

In CM interventions, the behaviour targeted for change must be measured frequently, and only reports that are objective, as opposed to subjective, can be usefully considered. Effective monitoring of the targeted behaviour is essential because reinforcement must be applied systematically (Petry, 2000). With substance users, this typically involves some form of biochemical verification of drug abstinence, usually via urinalysis testing (Stanger & Budney, 2010). Thus, when abstinence is the target behaviour for reinforcement, drug use is generally monitored several times (e.g., three times) weekly because most urine monitoring systems can detect only drug use that has occurred over the prior 48–72 hours (Petry, 2000). Frequent testing is ideal because it provides little opportunity for clients to use drugs without the test denoting a positive sample, while at the same time, it provides clients with frequent opportunities to earn reinforcement if they are able to refrain from substance use for a relatively short, 2–3 day period (Stitzer & Petry, 2006).

### **Selection of the type of reinforcer**

Each time a client tests negative for the targeted substance, the clinician provides the client with the reinforcer. The type of reinforcers used in a CM programme can be critical to its success (Stanger & Budney, 2010). Individuals vary greatly in terms of the types of goods and services that will serve as reinforcers. For example, a specific reinforcer (e.g., pizza or movie theatre passes) that serves as an effective incentive

for one client may not be reinforcing for another. Use of a range of incentives or allowing clients to choose their incentive can increase the probability that the incentive will serve as a reinforcer and facilitate the desired target behaviour (Stanger & Budney, 2010). The reinforcers used in CM interventions have varied from money (Shaner et al. 1997), to vouchers exchangeable for retail goods and services (Higgins et al. 1994), to the opportunity to win prizes of different magnitudes (Petry et al. 2000). In some settings, desirable clinic privileges (such as take-home doses of methadone) (Stitzer, Iguchi & Felch, 1992), employment or housing opportunities, and refunds on treatment service fees, have been provided (Higgins, Silverman & Heil, 2008)

### **Magnitude of the reinforcer**

The magnitude of reinforcement is also an important factor that can affect the efficacy of CM interventions. For example, if the goal is drug abstinence, a \$10 incentive for each negative drug test is likely to be more effective in increasing abstinence than one worth \$2.00 (Stanger & Budney, 2010). Given the resilience of substance use, strong reinforcers may be necessary to compete with the reinforcement derived from well-established use patterns. Multiple studies have demonstrated that greater magnitude schedules of reinforcement have resulted in better abstinence outcomes than lower magnitude (Lussier et al., 2006). Creative use of relatively low magnitude reinforcers and variable or intermittent schedules can successfully modify target behaviours among drug users (Petry & Martin, 2002). However, the larger the incentives the higher the probability of motivating behaviour change in a greater proportion of individuals. In addition, larger magnitude incentives have been shown to be more cost effective than lower magnitude incentives (Sindelar, Elbel & Petry, 2007; Olmstead, Sindelar, Easton & Carroll, 2007).

### **The schedule used to deliver the reinforcer**

The schedule of reinforcement refers to the temporal relation between the target behaviour and the delivery of the consequence. Generally, efficacy is likely to improve as the temporal delay between the occurrence of the target behaviour and delivery of the consequence decreases (Stanger & Budney, 2010). For example, all else being equal, providing positive reinforcement for drug abstinence five minutes

after a client submits a negative urine specimen would likely engender greater rates of abstinence than waiting a week before reinforcement is delivered (Petry, 2000). Similarly, more frequent schedules of reinforcement are usually preferable to less frequent schedules in establishing an initial target behaviour like drug abstinence or regular attendance at counselling sessions. Frequent schedules allow multiple opportunities to reinforce and thereby strengthen the target behaviour. Once a target behaviour is established, less frequent schedules are typically considered for maintenance of behaviour change (Stanger & Budney, 2010). Research in behaviour analysis demonstrates that behaviours that are ultimately reinforced under variable schedules are less likely to extinguish if reinforcement is omitted. Descriptions of rats lever-pressing thousands of times without reinforcement, for example, are noted (Ferster & Skinner, 1957), as are descriptions of humans working for many hours for a single drug reinforcer (McLeod & Griffiths, 1983). In CM interventions for substance users, the situation becomes a bit more complicated because reinforcement may not be provided for a behaviour *per se*, but instead for the lack of one (non-drug use). The submission of drug-negative specimens is reinforced, as a proxy for refraining from drug use for a several-day period (Stitzer & Petry, 2006).

Reinforcement principles have been applied both in outpatient psychosocial counselling programmes that treat alcohol, marijuana, and stimulant users, and in methadone maintenance programmes that treat opiate users. The following sections review relevant studies that have targeted abstinence from cocaine in these two types of settings. The last section discusses the research evidence of the common intervention parameters in CM.

#### I.9.4. Contingency Management in Psychosocial Counselling Programmes and Methadone Maintenance Programmes

##### **Psychosocial Counselling Programmes**

Psychosocial counselling programmes refer to clinics providing counselling and psychotherapy without methadone or other agonist pharmacotherapies. They typically offer individual and group counselling of either a structured format (e.g., cognitive-behavioural therapy) or an eclectic approach.

### **Cocaine abstinence - voucher reinforcers**

Psychosocial counselling programmes have been the focus of a number of CM studies, including one of the first voucher CM studies conducted at the University of Vermont (Stitzer & Petry, 2006). Higgins et al. (1994) randomly assigned forty cocaine dependent adults to a behavioural treatment with or without an added incentive programme. The behavioural treatment was provided to both groups and was based on the community reinforcement approach (CRA), an individualised and intensive intervention in which therapists may go out into the community to engage clients in treatment and facilitate expansion of their non-drug using networks (for details please see Higgins et al., 1994; Smith, Meyers & Miller, 2010). All clients left urine samples twice weekly, which were screened for the presence of cocaine. Half of the clients ( $n = 20$ ) were randomly assigned to receive CRA alone, and the other half ( $n = 20$ ) received CRA plus vouchers for every specimen that tested cocaine negative. Voucher amounts escalated for each consecutive negative specimen, such that the first negative sample resulted in \$2.50 in vouchers, the next sample \$3.75, then \$5.00 and so on. Over a 12-week period, clients could earn about \$1.000 if they provided all negative specimens. Vouchers could be spent upon retail goods and services that were consistent with a drug-free lifestyle, and were typically used for gift certificates, clothing, electronics, etc. Clients who were assigned to the voucher + CRA condition remained in treatment significantly longer and achieved greater durations of abstinence from cocaine than did those assigned to receive CRA alone (Higgins et al. 1994). Three-quarters of clients receiving CM completed the study, compared with 40% receiving CRA alone. Over half of those in the CM condition achieved at least two months of continuous cocaine abstinence versus only 15% in the non-CM condition. At 24-weeks after treatment entry, the voucher group evidenced significantly greater improvement than the no-voucher group on the Drug scale of the Addiction Severity Index (ASI). Combined with a behavioural counselling intervention, this voucher intervention produced some of the most impressive published results in the treatment of primary cocaine dependent clients (Higgins et al., 1991, 1993, 1994).

Higgins et al. (2000) subsequently found that it was not just the availability of vouchers, but rather the contingent delivery of them, that improved outcomes. In that study, all cocaine dependent clients again received CRA as the platform therapy and

they also all received up to \$1.000 in vouchers. In one condition, the vouchers were contingent upon cocaine abstinence ( $n = 36$ ), but in the other (non-contingent) condition ( $n = 34$ ), clients received vouchers regardless of the outcomes of their sample results. Provision of non-contingent vouchers resulted in similar proportions of clients remaining in treatment for six months (56% versus 53% in contingent and non-contingent, respectively). However, a higher proportion of those in the contingent (38%) versus the non-contingent (10%) condition achieved 12-weeks of continuous abstinence during treatment. Thus, a longer period of sustained abstinence was seen when vouchers were contingent upon providing negative samples (Higgins et al., 2000).

Higgins and colleagues also investigated the longer-term post-treatment effects of voucher reinforcement targeted on cocaine abstinence. In one study (Higgins et al., 2000), the benefits of contingent versus non-contingent voucher reinforcement were apparent for up to 12 months after treatment ended, resulting in higher rates and longer durations of cocaine abstinence for those treated with contingent vouchers. Importantly, Higgins and colleagues (Higgins, Badger & Budney, 2000) have shown that the likelihood of post-treatment abstinence is directly related to duration of abstinence achieved during treatment. This observation emphasizes the importance of during treatment abstinence as a primary treatment goal. It also supports the speculation that mechanisms for long-term beneficial effects of CM lie in natural recovery processes and lifestyle changes that take place during periods of prolonged abstinence (Pettry & Simic, 2002).

CM was also effective when it was implemented by other investigators and in different treatment models. Jones et al. (2004) tested the efficacy of abstinence-contingent vouchers for preventing relapse to cocaine use. After a brief residential stay, cocaine dependent clients were randomly assigned to conditions in which they could earn up to \$1.155 in abstinence-contingent ( $n = 103$ ) or non-contingent ( $n = 96$ ) vouchers during a 12-week, once weekly outpatient phase. Statistically significant benefits of contingent vouchers were found for the number of cocaine negative samples submitted and days of continuous cocaine abstinence in this treatment model, in which detoxification was followed by aftercare (ibid).

## **Methadone Maintenance Programmes**

### **Cocaine abstinence - voucher and prize reinforcers**

Some of the initial studies of voucher reinforcement were conducted within methadone clinics because many methadone clients misuse stimulants in addition to opiates. Silverman et al. (1996), for example, utilized a matched-control design similar to that of Higgins et al. (2000). In this seminal report on vouchers with opiate dependent cocaine users, 37 methadone maintenance clients who were regular cocaine users participated in a 12-week intervention (Silverman et al., 1996). Clients were randomly assigned to receive vouchers contingent on cocaine negative urinalysis results or independent of urinalysis results and according to a schedule that was matched to the contingent group. Under this schedule, urine samples are collected three times per week and clients received a voucher for each cocaine free urine sample provided. Voucher values began around \$2.50 each and increased to around \$50 each. Clients exposed to this intervention were able to earn approximately \$1.156 in vouchers for providing cocaine free urine samples over a 12-week period. Voucher value and schedule were largely identical to that used in study by Higgins et al. (1994). During baseline conditions, clients in both treatment conditions were positive for cocaine use throughout baseline monitoring. Following the introduction of the voucher intervention, abstinence levels increased substantially among those who received contingent vouchers but not those who received them non-contingently. Almost half of the clients in the abstinence reinforcement group (9 of 19 patients) achieved between 7 and 12 weeks of abstinence during the 12-week period. In contrast, no client in the non-contingent control group achieved over 6 weeks of abstinence (only 1 control client (6% of controls) achieved more than 2 weeks of sustained cocaine abstinence).

Similarly, robust effects of vouchers were noted in a subsequent trial by this group (Silverman et al., 1998). Even though vouchers were contingent only on cocaine abstinence in this latter trial, opiate abstinence also increased. These trials established the efficacy of the voucher intervention for increasing cocaine abstinence in methadone maintenance clinics (Higgins, Alessi & Dantona, 2002). In a field that had failed to find effective treatments for cocaine misuse in methadone clients, these effects were striking (Stitzer & Petry, 2006).

Other studies have added considerable weight to the evidence that CM is efficacious in reducing stimulant use during methadone treatment and also have tried to identify improved intervention parameters. One study (Silverman et al., 1998) replicated prior observations that vouchers could significantly reduce cocaine use during treatment, but found that adding up to twelve \$50 bonuses during the first six weeks of treatment based on early abstinence initiation did not improve outcomes. More recently, Silverman and colleagues (2004) examined the additive benefits of abstinence contingent take-homes and voucher reinforcers in a study that extended the intervention duration to 52 weeks. Methadone clients ( $N = 78$ ) with evidence of ongoing cocaine use were randomly assigned to conditions where they could (a) earn methadone take-homes (three per week) for providing opiate and cocaine free urine samples, (b) earn take homes as above and also vouchers (maximum of \$5.500 over 52 weeks) for cocaine free urine samples, or (c) participate in usual care without the opportunity to earn abstinence contingent incentives. The results were impressive, with statistically significant between group differences in overall rates of cocaine negative urine samples submitted (Silverman, 2004). In addition, 42% of participants were continuously abstinent from stimulants for six months or more in the take home plus voucher group as compared with 8% in the take-home only and 0% in the standard care groups. Further, initiation of long periods of sustained abstinence was observed across the first nine months of the trial. These data suggest a benefit of long-term implementation of CM with clients in methadone maintenance treatment (Stitzer & Petry, 2006).

Other types of reinforcers have also been investigated for reducing stimulant use in methadone treatment programmes. This research extends beyond the university setting to community based clinics, with an aim of reducing costs of the vouchers. Rather than earning escalating amounts of vouchers for successive cocaine negative specimens, clients earn the chance to draw a slip of paper from an urn, and each draw is associated with the chance of winning a prize (Stitzer & Petry, 2006). Colloquially, this is referred to as the *fishbowl* method. Only about half the slips result in a prize, as about 50% state, “Good job!” When prize slips are drawn, they are associated with three prize categories, in decreasing probabilities: small \$1 prizes (e.g., choice of fast food gift certificates, bus tokens), large \$20 prizes (e.g., watches, Walkmans), and jumbo \$100 prizes (e.g., TVs, DVD players, stereo equipment). The

overall cost of prizes per client using this technique ranges from approximately \$240 to \$400 during a 12-week treatment period.

The prize CM technique is also efficacious in cocaine using methadone clients (Petry et al., 2004; 2005; 2006). Petry and colleagues (2005) randomly assigned 77 cocaine using methadone clients to standard treatment or standard treatment plus prize CM. Clients receiving CM had about twice the rate of cocaine abstinence as those in the standard condition (35% versus 17%, respectively). A similar study was conducted in six methadone maintenance clinics throughout the US as part of the National Drug Abuse Treatment Clinical Trials Network. Peirce et al. (2006) randomly assigned 388 cocaine using methadone clients to standard treatment alone or with prize CM. Clients could earn up to \$400 during a 12-week study if their samples tested negative. The overall proportion of cocaine negative samples submitted in the CM group (54%) was statistically significantly greater than in the standard group (37%), and the odds that a stimulant negative sample would be submitted during treatment were doubled by the CM intervention (Peirce et al., 2006).

#### I.9.5. Evaluation of the Contingency Management Intervention Parameters

The preceding sections have documented that cocaine misuse can be modified using CM techniques and it was noted that a number of different reinforcers are efficacious in altering cocaine use. Several technical commonalities are noted in successful CM interventions, the forthcoming section outlines and evaluates the most vital commonalities. The last section briefly discusses predictors of CM treatment outcome.

##### **Schedules of reinforcement - escalating and reset features**

Both voucher and prize CM studies have applied escalating schedules of reinforcement with resets back to low levels of reinforcement following a lapse to inappropriate behaviour, a strategy designed to reinforce sustained behaviour change. Specifically, as clients achieve longer periods of abstinence, the value of the vouchers or number of draws increases. By the end of the 12-week treatment period in Higgins's studies (1994, 2000, 2003), for example, clients could earn over \$30 for

each drug-free urine specimen. Similarly, in the prize CM procedure, clients can earn up to 10–15 draws. If a sample is positive, refused, or missed (e.g., unexcused absence), the next negative sample provided results in a reset to \$2.50 in vouchers or one draw from the fishbowl.

Eliminating the escalation feature and delivering a constant rate of reinforcement may make the voucher system less expensive and easier to implement. A study by Roll, Higgins and Badger (1996) compared in cigarette smokers the escalating approach to one that provided a constant rate of reinforcement, with both procedures providing equivalent total amounts of reinforcement. Although both schedules engendered similar amounts of overall abstinence, the escalating system resulted in longer periods of continuous abstinence, which in turn have been associated with good long-term outcomes (Higgins, Badger & Budney, 2000; Petry et al., 2006). These results suggest that an escalating system may be necessary for inducing significant periods of sustained abstinence, at least initially. Once behaviour change has occurred, and sustained abstinence is ongoing, the value of the reinforcer may be reduced (e.g., \$1 lottery ticket) without a detrimental impact on outcomes (Stitzer & Petry, 2006).

The importance of engendering stable initial abstinence was highlighted in a study by Kirby et al. (1998), where few cocaine dependent clients initiated abstinence under a traditional escalating schedule. However, much better outcomes were achieved in this population with a schedule that provided higher-valued reinforcers initially for each negative sample and then tapered the density of reinforcement using a fixed ratio schedule (i.e., requiring an increasing number of consecutive negative urines to receive the reinforcer).

### **Reinforcer immediacy and magnitude**

Learning occurs best when each time the target behaviour is exhibited it is followed by its consequence without delay (Zeiler, 1977). Voucher programmes use this behavioural principal by providing vouchers immediately after submission of a negative specimen. Moreover, samples are screened within minutes of collection, and data suggests that onsite testing systems engender greater abstinence than sending samples offsite for testing (Schwartz et al., 1987). Similarly, draws from the fishbowl

or exchange of vouchers for retail items occur with minimal delay, 2–3 days from request. Meta-analyses demonstrate that immediacy of reinforcement appears to be linked to effect sizes in CM studies (Griffith, Rowan-Szal, Roark & Simpson, 2000; Lussier et al., 2006; Prendergast et al., 2006).

Behaviour is determined not only by the rate of reinforcement but also by its magnitude (Catania, 1966), and studies of CM likewise find that magnitude of reinforcement affects outcomes. Stitzer and Bigelow (1983, 1984) found that nicotine abstinence increased as a function of the magnitude of the reinforcer, ranging from \$0 to \$12 per day. Silverman et al. (1999) found that some cocaine using methadone clients who were ‘treatment resistant’ at standard voucher amounts achieved abstinence if amounts were increased threefold. Dallery, Silverman, Chutuape, Bigelow and Stitzer (2001) noted a direct relationship between voucher amounts and abstinence in another study of methadone clients. These studies all suggest that larger magnitude reinforcers may improve outcomes. Yet, some studies employing low magnitude reinforcers have demonstrated positive effects. Rowan-Szal et al. (1994) found that stars exchangeable for \$5 items reduced drug use. Petry et al. (2000, 2002, 2004, 2005, 2006) found that prize systems based on intermittent reinforcement reduced alcohol, cocaine, and opiate use despite relatively low overall cost. Thus, when principles associated with learning are applied, positive outcomes may be achieved with lower magnitude reinforcers (Stitzer & Petry, 2006). However, more research is needed to identify characteristics of clients who can benefit from low-magnitude reinforcers versus those that require higher-magnitude reinforcers for effective behaviour change. For example, there is currently no evidence to indicate that individuals with lower versus higher income levels differentially benefit from CM interventions. However, it may be the case that income status could influence the reinforcer magnitude that is effective with a given individual.

### **Reinforcement of successive approximation (Shaping)**

All of the above discussed studies employed standard qualitative urinalysis testing. Under that testing method, urine samples are considered positive for cocaine if the concentration of the cocaine metabolite, benzoylecgonine, in the urine sample is at or above 300 ng/ml. However, toxicological studies in chronic cocaine users suggest that some individuals, many of whom achieve urinary benzoylecgonine

concentrations exceeding 100,000 ng/ml during active use, may continue to provide urine samples that exceed the standard 300 ng/ml threshold for several days after initiating abstinence (Preston et al., 2002). As a result, using standard qualitative testing, a participant may have to remain abstinent for several days before earning a voucher for a negative sample. To develop a more sensitive method of detecting recent cocaine abstinence, Preston, Silverman, Schuster, and Cone (1997) proposed rules for detecting recent abstinence based on amounts of decreases in benzoylecgonine concentrations across days. To implement these rules, the authors employed quantitative testing, which provided more continuous measures of the benzoylecgonine concentrations. This principle allows the reinforcement of successive approximations or shaping, to establish new behavioural patterns. In establishing a pattern of drug abstinence, substance use can be reinforced for approximations of abstinence. Preston et al. (2001) showed that an initial ‘shaping’ procedure that reinforced reductions in urinary cocaine metabolite during the first three weeks of an eight-week intervention led to higher rates of abstinence during a subsequent abstinence-based reinforcement phase, possibly because the shaping procedure allowed more participants to earn reinforcers and thus come into contact with the benefits of the incentive programme (Stitzer & Petry, 2006).

Although the reinforcement of cocaine abstinence based on decreases in benzoylecgonine concentrations has been examined under limited conditions, its clinical utility has yet to be demonstrated (Katz et al., 2002; Sigmon et al., 2004). In general, it appears that this method can increase the percentage of people who can come into contact with the reinforcement contingency (Robles et al., 2000; Preston, Umbricht, Wong & Epstein, 2001), it can increase cocaine abstinence relative to a no reinforcement condition (Robles et al., 2000; Katz et al., 2002;), and there is some evidence that it can produce better outcomes than abstinence reinforcement based on qualitative urine testing (Preston et al., 2002).

#### I.9.6. Predictors of Treatment Outcome: Individual, Psychosocial and Treatment-Related Aspects

While CM outcome research continues to grow, relatively few studies have examined associations between individual-level characteristics and response to CM

treatments. Moreover current research findings are equivocal among different trials, making it difficult to identify robust predictors (Poling, Kosten & Sofuoglu, 2007; Sun, 2007; Garcia-Fernandez et al., 2011).

However, some progress has been made in identifying predictors of cocaine treatment outcome, some of these factors include individual aspects, such as sociodemographic characteristics (Heinz, Wu, Witkiewitz, Epstein, & Preston, 2009), concurrent mental health problems (McMahon, 2008; Messina, Farabee, & Rawson, 2003; Tate et al., 2008; Waldrop, Back, Verduin, & Brady, 2007), addiction severity (McCamant, Zani, McFarland, & Gabriel, 2007; Poling, Kosten, & Sofuoglu, 2007), low self-efficacy (Dolan, Martin & Rohsenow, 2008; Hser et al., 2006), craving (Weiss et al., 2003; Lopez et al., 2010), alcohol use (Alterman et al., 2000) or greater presence of psychosocial problems (Simpson, Joe, & Broone, 2002). It was also found that income does not affect CM efficacy (Rash, Olmstead, & Petry, 2009), and that the effectiveness of abstinence-based incentives interacts with intake stimulant urinalysis results (Stitzer et al., 2007).

Additionally, Dobkin, De Civita, Paraherakis & Gill (2002), demonstrated that social support is also important in predicting treatment retention. A comparison of the results from Buchanan & Latkin (2008) and Bohnert, German, Knowlton and Latkin (2010) suggest that social interactions, behaviour of drug consumption and treatment participation are related. Hence, it is possible to affirm that social operations are in direct relation to treatment success (Simpson et al., 2002).

Recent studies investigated treatment-related variables that seem to be associated with better outcome, such as use of psychiatric services (Ray, Weisner & Mertens, 2005), advice about legal matters (Hser, Joshi, Anglin & Fletcher, 1999), sustained self-help participation (McKay, Merikle, Mulvaney, Weiss & Koppenhaver, 2001) and greater service intensity and satisfaction (Grella, Hser & Hsieh, 2003; Hser, Evans, Huang & Anglin, 2004). Some studies have demonstrated that the amount of services received by clients exerts a considerable impact on patient outcomes (e.g. McLellan, Alterman, Cacciola, Metzger & O'Brien, 1992; McLellan et al., 1995; Hoffmann et al., 1996; Hser, Polinsky, Maglione & Anglin, 1999). For example, McLellan and colleagues (1995) demonstrated that clients who received a broader

array and increased frequency of services stayed in treatment longer and showed 15% better outcomes than clients who did not. Because longer duration of treatment has been the most consistent and important predictor of favourable treatment outcomes, Simpson (2000) conducted a series of studies that showed that greater programme participation was associated with better therapeutic relationships and that both of these factors promoted positive changes in treatment, which are related to longer retention. With some exceptions (McLellan, Hagan, Levine, Gould, Meyers, Bencivengo & Durell, 1998), several studies have found that clients who are engaged in and satisfied with their treatment experience tend to stay in treatment longer or have better treatment outcomes (Holcomb, Parker & Leong, 1997; Sanders, Trinh, Sherman & Banks, 1998; Kaspro, Frisman & Rosenheck, 1999;).

A comparison of the results obtained from the previous investigations suggested that social interactions, behaviour of drug consumption and treatment participation are related (Buchanan & Latkin, 2008; Bohnert, German, Knowlton & Latkin, 2010). Hence, it is possible to affirm that social operations are in direct relation to treatment success (Simpson et al., 2002).

### ***1.10. Background of the Study, Research Aims and Questions***

The current study was conducted at a service in Greater London, it was part of a nationwide multisite contingency management trial commissioned by the National Institute for Health and Clinical Excellence (NICE). It was implemented and funded by the National Treatment Agency for Substance Misuse (NTA)<sup>5</sup> in 2008 and 2009. The research programme aimed to target substance misuse related behaviours to gain an understanding of the acceptability and external validity of contingency management to the UK substance misuse population. In 2007 the NTA approached potential sites to declare their interest to conduct a contingency management study at their service. A variety of treatment settings were addressed as possible demonstration sites, these included: community drug services, residential drug

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<sup>5</sup> The National Treatment Agency for Substance Misuse (NTA) was established in 2001 by the government as a special health authority within the National Health Service, with the aim of improving the availability, capacity and effectiveness of treatment for drug misuse in England. In April 2013 the NTA became part of Public Health England, an executive agency of the Department of Health.

services and prison based drug services. The participation in the CM trial was optional for the drug services. The invitation letter stated a variety of drug using, health and attendance related behaviours that could be incentivised, such as the uptake of Hepatitis B vaccinations in previously reluctant clients or the collection of Hepatitis C test results by the clients, drug-free tests or attendance for primary crack users, elimination of usage of illicit drugs on top of the prescribed medication, reduction or elimination of injecting behaviour, increased attendance at drug worker and psychosocial interventions for those in optimised oral maintenance programmes. Interested services were asked to familiarise themselves with the NICE guidelines (2007) that described the behavioural principles underpinning contingency management and the key elements in the delivery of a programme in the NHS. Furthermore, the NTA also recommended reading a selection of research papers that highlighted the underlying principles of the effective delivery of CM in the US. Additionally, interested services were required to complete a proposal that outlined the nine general CM requirements, namely, the target behaviour the service wished to address (a single behaviour for e.g., crack cocaine use, marihuana use) and the target population, the incentive schedule, the nature of the incentive (e.g. voucher, bank account), value and scaling of the incentive, client non-compliance, length of programme (usually 12 weeks for an individual client), length of project (usually 6 months), staff training for CM and staff 'fidelity' to the CM model, budgeting for CM programme and onsite research capacity. In order to define and formulate the aspects of the proposal, the NTA provided a guideline that accurately described the principles and general requirements for the contingency management demonstration projects. However because of brevity reasons these principles cannot be outlined here, suffice to say that the principles and general requirements of drug using, health and attendance related behaviours were addressed to guide the design and implementation of the incentive programmes. These were based on the principles that underlie the effective delivery of CM programmes. Within strict limits, services could negotiate individual specifications for the general requirements to better meet the needs of their client population. We devised a protocol that aimed to incentivise the abstinence of crack cocaine in opiate maintenance clients using retail vouchers, with an escalating incentive schedule over a 12-week period. In consideration of the specific and general requirements of the CM protocol, permissions were given by the NTA and the Expert Advisory Group (EAG). Final approval for the nationwide

multisite trial was given by the Department of Health. For a more detailed description of the individual specifications of our CM programme please see section, *II.1. Study Setting and Research Design*.

As a result of the above highlighted considerations, the present study's purpose was to determine whether voucher based contingency management reduces concurrent cocaine use among clients in opiate maintenance treatment, when implemented adjacent to standard care in a community drug and alcohol service in Greater London. We aimed to investigate how much and how many participants reduce their cocaine use over a course of a 12-week CM intervention period. The central tenets of the CM intervention were to (a) urine test clients on fixed intervals according to a standardised incentive protocol in a 12-weeks intervention period, (b) provide monetary based incentives when cocaine abstinence is demonstrated, (c) withhold the incentive when cocaine use is detected. The incentives consisted of monetary based vouchers. As will be detailed later, a natural unplanned comparison group developed from participants that initially agreed to participate in the CM intervention but did not attend any of the scheduled reinforcement sessions. These clients continued to receive standard treatment (ST), consisting of opiate maintenance treatment and psychosocial interventions. Frequency of crack cocaine use in the previous 28 days was monitored by self-report and verified by weekly/fortnightly urine analysis.

Briefly, four research questions were examined in the present study. The primary research question was whether abstinence from crack cocaine misuse can be increased among clients on opiate substitution treatment, using contingent positive reinforcement. The present voucher CM schedule was similar to that from Silverman et al., 1996, albeit for the first time systematically employed and documented in a European cultural context and in a community setting. The second question was connected to the first, which pattern will the abstinence curve exhibit? The meta-analysis from Dutra et al., (2008) found that although CM interventions in cocaine using clients yielded the largest effect size, it also yielded the largest dropout rates, and this dichotomous finding may suggest that rather than pursuing stepwise gains, many clients make an early decision between targeting abstinence or dropping out of treatment. The third research question was whether treatment compliance (i.e., adherence and reliability to treatment requirements) and therapeutic alliance (i.e.,

working relationship between client and drug worker) were associated with CM treatment outcome. Past research has shown that therapeutic relationships, pre-treatment motivation and programme engagement have demonstrated to be central attributes of effective treatment (Simpson et al., 1997; Roth & Pilling, 2007). The last research question pertains to the comparison between the standard treatment and the voucher CM groups. Is there a difference in self-reported frequency of crack use in the previous 28 days between the standard and voucher CM groups at timepoints 2 and 3.

The project is of scientific importance because it aims to evaluate whether the US study findings in CM can be generalised to UK crack cocaine misusers that receive opiate substitution treatment. As discussed above, there were at least three important distinctions between US and UK opiate substitution programmes and the respective client groups. First, many clients in the US were liable to self-fund some portion of their maintenance treatment, depending on their insurance status, the state they are seeking the treatment and whether there were some alternative funds available (ASAM, 2012; CSAT, 2012). Second, US services seemed to provide higher levels of social care, support and regular counselling, which was expressed in the categorisation of core and ancillary services (CSAT, 2012) and this usually surpassed the available care in the UK (NICE, 2008). Third, US research has involved highly deprived urban populations from areas where crack cocaine misuse was endemic (NTA: 2002b). How this evidence relates to the UK context where crack cocaine misuse and urban deprivation are less entangled, less extreme and less entrenched is an open question.

The study is of clinical importance because it emphasises the use of positive reinforcement as a means to shape behaviour with the goal of improving retention and outcomes for crack cocaine using clients who have not stopped their using while in opiate substitution treatment. Besides the value of achieving abstinence in this difficult to treat and often disenfranchised population, there is evidence that CM has a great potential to enhance the engagement of these clients with their drug workers and additional treatments, and therefore providing a more fertile basis for counselling based interventions, i.e. motivational interviewing, cognitive-behavioural therapy and relapse prevention (Weaver et al., 2007). Additionally, a clinically meaningful

period of abstinence allows individuals to make a more informed decision on their using behaviour and cognitive functioning improves after a few days of abstinence (Stitzer, Iguchi & Felch, 1992). Natural recovery processes that take place during periods of sustained abstinence, including gradual diminution of response to drug-related cues and lifestyle changes that provide alternative competing reinforcers, may then form the mechanisms for longer-term recovery of dependent individuals (Stitzer & Petry, 2006).

The objectives of the study are wholly consistent with the emerging field of practice-based evidence research, which aims to examine what treatments or services are provided, and in what ways, to individuals within service systems, as well as to evaluate how to improve treatment or service delivery (Street, Niederehe & Lebowitz, 2000). Such a development would not only provide data to support good practice but also advance an agenda in which research effort is focused on activities that are designed to support decisions in the delivery of substance misuse services (Newman & Tejeda, 1996).

A word of caution is imperative at this point. Although generalisability is usually high in practice-based evidence designs, the results from the present study should be seen as tentative, due to sample constraints i.e. small sample size in the contingency management group ( $n = 21$ ) and the nature of the comparison group. Yet the sample size is in agreement with several other CM studies (see for example, Higgins et al., 1994; Silverman, 1996; Silverman, 1998; Groß, Marsch, Badger & Bickel, 2006).

## **II. METHODOLOGY**

### ***II.1. Study Setting and Research Design***

The study was conducted at a community drug and alcohol service in Greater London. The service operated from a harm minimisation model and hence focused on minimising the negative outcomes of continued substance misuse. It thereby aimed to address the conditions and context of substance use while addressing drug use itself. The team at the service was multidisciplinary, consisting of trained non-

medical drug and alcohol workers (keyworker), nurses, psychologists, physicians and psychiatrists.

The service provided clinical interventions such as substitute prescribing services or access to in-patient services. It incorporated a spectrum of strategies, ranging from a full assessment of treatment needs for drug and alcohol users, individual support, psychological counselling, psychotherapy, assessment for funding for detoxification and rehabilitation programmes, alternative therapies (for example, auricular acupuncture, shiatsu) and referral to other services. It also offered information and testing to clients on blood borne viruses like HIV and hepatitis, as well as sexual health advice. Referrals were accepted from any source including self-referrals and referrals from family members.

The project leaders were a clinical psychologist and the aforementioned doctorate student. The CM programme was designed within the general requirements and principles that were set out by the NTA. The following will attempt to outline the contributions of the researchers to the pre-existing design features from the NTA. The target behaviour (abstinence from crack cocaine), the selection of the eligibility criterion (a minimum of twice weekly self-reported crack use), the voucher value and scaling of the incentives was defined by the researchers. For example, the magnitude of the reinforcement vouchers; starting with a monetary value of £5, rather than £2 as the NTA proposed, and increasing by increments of £5 to a maximum of £20. So was the decision to use vouchers from the retailers; Argos, Boots, JJB Sports, MK One, Shoe Express, Virgin Megastores, WH Smith and Woolworths. The specifications of these CM protocol features were achieved in discussions with the clinical psychologist and the doctorate student, and negotiations with the NTA.

The incentive schedule was outlined by the NTA, so was the rule of ‘resetting’ the value of the incentive at the next appointment to the starting level if non-compliance occurred. Also, the recommended length of the programme was 12 weeks. The budget was calculated by Dr. Christo on the basis of the results of the random urine checks from the opiate maintenance clients that were on the caseload at the service, for more details please see section; *III.3.3. Changes in the Planned Data Analyses.*

Equally, the costs for the two research assistants were estimated and included in the budget.

Regarding the staff training at the service; the project development was supported by the NTA with a template PowerPoint presentation and trainer's notes. These resources were used by the clinical psychologist to train the staff at our service. Teaching of the material was spread over two conventional weekly team meetings. The two training events consisted of a mixture of didactic and participatory learning. Specific topics and clinical issues were addressed through role-play exercises, with theoretical background lectures as necessary. Drug and alcohol workers and two research assistants supported the implementation. Dr. Christo and myself attended the training session at the NTA.

Monitoring of the data collection process and a minimum of weekly consultations with the research assistants were undertaken by myself. Additionally, the doctorate student performed data processing into Excel and SPSS spreadsheets, and the evaluation of the study independently and autonomously. The anonymised data set was supplied to the NTA, at several timepoints. Additionally, the doctorate student presented the results of the investigation at an NTA workshop in 2009.

A quasi-experimental design with a convenience sampling method was employed to monitor client's frequency of crack cocaine use. Clients on opiate maintenance that fulfilled the eligibility criteria (please see section; *II.2 Participants*) were asked if they were interested to participate in the CM programme. From this group of clients, a sample of clients agreed to participate and attended the scheduled reinforcement sessions. The remainder of clients agreed to participate but did not engage with the intervention. As a result, a natural unplanned comparison group (Standard treatment group; ST) developed from participants that initially agreed to participate in the CM intervention but did not attend any of the scheduled reinforcement sessions. These clients continued to receive standard treatment, including opiate maintenance treatment and key working.

The central tenets of the intervention in the CM group were to (a) urine test clients at fixed intervals according to a standardised incentive protocol in a 12-weeks

intervention period (for the incentive protocol, please see section; *II.4.2. Contingency Management Group*), (b) provide monetary based incentives when cocaine abstinence was demonstrated, (c) withhold the incentive when cocaine use was detected. The incentive consisted of monetary based vouchers. Participants can earn a maximum of £240 in vouchers if they submit all 21 scheduled negative specimens. Two dependent outcome measures were employed; self-reported crack cocaine consumption (verified by a minimum of fortnightly urine analysis) and quantitative urinalysis results.

The first part examined between-treatment group differences in the standard treatment and the voucher CM condition. The primary dependent measure was self-reported crack cocaine use (responses extracted from the TOP questionnaire) at three time-points; at baseline (a four week period) – timepoint 1, 3 months + 1 week (i.e., on average 1 week after the CM programme intervention concluded) – timepoint 2, and at 6 months follow up (on average) – timepoint 3. We also explored the remaining relevant responses from the TOP and CISS questionnaire.

The second part investigated within-group differences in the voucher CM group. The primary dependent outcome measure was crack cocaine abstinence measured by objective urinalysis results over the 12-weeks intervention period (for the incentive schedule, please see section *II.4.2. Contingency Management Group*), and responses from timepoint 1.

The following measures of control were employed:

1. Researchers were trained by the NTA and the research assistants were trained by one of the researchers, to assure accurate and reliable application of the CM protocol with clients.
2. Researchers monitored study procedures weekly to ensure appropriate conduct.

## ***II.2 Participants***

Participants were 42 outpatients receiving opiate substitution treatment between February and August 2008. Participants were eligible for the study if they had been enrolled with the NHS service, provided objective evidence of current opiate dependence and at least 1 year of opiate use and had been stabilised on an opiate substitute (i.e. methadone or buprenorphine) dose for at least 1 month. They also provided objective evidence of cocaine use and reported smoking crack cocaine a minimum of twice<sup>6</sup> a week, were 21 years or older (the minimum required age at the service for opiate substitution treatment was 21 years), and spoke English. Except where otherwise indicated, the term cocaine misuse is used in this study in a generic sense and not according to the *Diagnostic and Statistical Manual of Mental Disorders* (4<sup>th</sup> ed.; American Psychiatric Association, 1994).

Participants were excluded from the study if they were unable to comprehend it, had a psychotic disorder (schizophrenia, bipolar disorder) that was not adequately controlled by medication, were currently suicidal or were affected by serious unstable medical illnesses. Further, clients who already participated in another research project were also excluded. Study criteria were not restrictive to increase generalisation of findings. Participation in the research project was voluntary, informed consent was obtained and confidentiality of the responses was assured by anonymising the data. For more details please see section, *II.7. Ethical Considerations and Consent*.

A convenience sampling method was employed. Research assistants and drug and alcohol workers presented and discussed the study with 49 clients. Those not consented stated that they were not interested to participate in the study ( $n = 4$ ), or did not meet the study criteria ( $n = 3$ ). Twenty-one (50%) clients agreed to participate in the contingency management group and started to attend scheduled reinforcement sessions. A further twenty-one (50%) clients initially agreed to participate in the CM group but did not attend any of the scheduled reinforcement sessions. It was spontaneously decided that this group of clients could function as a

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<sup>6</sup> Crack cocaine is often taken repeatedly over a period of time that may last hours or days, called a 'crack cocaine binge', this count frequently refers to a binge.

comparison group (standard treatment group). Clearly, the nature of this group and the non-randomisation of the participants carry certain implications in terms of the conclusions that can be drawn from the study, please see section, *IV. Discussion*. Inspection of the data revealed that the 7 excluded patients were similar to the 42 patients who represented the final sample, in terms of years of heroin and cocaine use, demographics, previous drug treatment attempts and opiate substitution dose (for more details regarding the final sample please see section, *III.4. Demographic and Baseline Characteristic section*, Table 1).

Representativeness of the sample was examined by pertaining to the statistics from the National Drug Treatment Monitoring System (NDTMS: Annual Report, 2008/09), regarding the following client characteristics; age, gender and ethnicity. First, the average age for the CM group was 42 years ( $SD = 10$ ) and 42 years ( $SD = 7$ ) for the standard treatment group, this is comparable to the average age of 44 of opiate and crack cocaine users in the NDTMS report. Second, the NDTMS report did not provide any data on opiate and crack cocaine users in London compiled by gender. However, 30% of all clients seeking treatment in drug and alcohol services in London were female. This number was slightly higher in the CM group 48% (female participants) and slightly lower 24% (female participants) in the ST group. Third, according to the NDTMS report, 67% of all clients' seeking treatment for drug and alcohol problems in London reported to be White and 33% belonged to other ethnic groups (i.e., 'Mixed', 'Asian British', 'Black British', 'Other Ethnicity' and 'Not stated'). This was comparable to 76% and 86% of clients who reported to belong to a White ethnic group in the CM and standard treatment group, respectively. Moreover, the distribution of ethnicity was representative of the General Population census in London (2001) where 72% reported to be White British and 28% belonged to other ethnic groups. Equally, the distribution of ethnicity was representative of the population served by this Trust (Dr. N. Margerison, personal communication; April 2008).

### ***II.3. Research Assistants and Drug and Alcohol Workers***

The team consisted of 9 drug and alcohol workers, 5 female and 4 male, and 2 female research assistants. The drug and alcohol workers had a minimum of 1 year

work experience at the service. Their formal education ranged from no degree to a master's degree in substance misuse. The research assistants held a bachelor degree in psychology. All had completed a minimum of 2 hours introductory behavioural modification training and were required to apply the NTA treatment guidelines. The drug and alcohol workers and research assistants were able to discuss any questions at weekly team meetings.

## ***II.4. Study Groups***

### *II.4.1. Standard Treatment Group (ST)*

Participants in both groups received the clinic's standard treatment. This consisted of opiate substitution treatment and psychosocial interventions. Standard opiate substitution treatment was delivered by drug and alcohol workers, and included issuing fortnightly methadone or buprenorphine prescriptions. Methadone and buprenorphine are both long-acting, orally effective opiate medication that are used to treat opiate dependence. Standard treatment group participants ( $n = 21$ ) presented their prescriptions to a pharmacy that dispensed the opiate substitute on a daily or weekly basis. Participants ingested an opiate substitute dose daily and attended individual drug and alcohol worker session, which included psycho-education, crisis intervention, HIV education, 12-step oriented treatment, relapse prevention treatment (including life skills training) and motivational interventions, which ranged from 2 times per week to once fortnightly. This depended on the desired engagement of the client. Additionally, regular reviews of the adequacy of the medication dose (methadone or buprenorphine) and harm reduction advice was conducted by medical doctors.

Clients' frequency of cocaine, amphetamines, benzodiazepines, opiates, buprenorphine and methadone use was monitored by self-report (TOP questionnaire) and a minimum of fortnightly urinalysis by drug and alcohol worker. Participants received immediate feedback on their results. Staff congratulated participants when s/he tested negative for any of the above substances and encouraged them to stop using when they tested positive. This was part of the service protocol.

#### *II.4.2. Contingency Management Group (CM)*

Contingency Management group participants ( $n = 21$ ) received the standard treatment protocol and the behavioural intervention. For the arrangements of the standard treatment including the opiate substitution delivery, please see section, *II.4.1. Standard Treatment Group*.

Cocaine use, as measured by urine analysis, was the principal dependent measure during treatment. Urine specimens were collected by staff according to a fixed monitoring schedule 3 days/week during weeks 1 – 3 (e.g., Monday, Wednesday and Friday), 2 days/week during weeks 4 – 6 (e.g., Monday and Friday) and 1 day/week during weeks 7 – 12 (usually Wednesday). In total, up to 21 specimens could be submitted over a 12-week treatment period. A negative urine sample for cocaine was required to earn a voucher. In week 7 of the incentive schedule, two participants submitted two urine samples instead of one and hence earned two vouchers worth £15. It was decided to continue with the incentive schedule as planned.

Participants earned vouchers with a specified incentive value (please see below), exchangeable for retail goods, for each cocaine-negative sample they submitted. Voucher amounts started at £5 with submission of the first negative specimen up to a maximum of £20 per negative sample. Voucher amounts were reset to £5 with submission of a positive specimen, refusal to submit a specimen, or an unexcused absence (not approved by the research assistant at least 24 hrs in advance). The next consecutive negative specimen was reinstated stepping up from £5. There was no change to the incentive schedule.

Participants could earn a maximum of £240 in vouchers if they submitted all 21 scheduled negative specimens. Vouchers could be redeemed at the following retail stores: Argos, Boots, JJB Sports, MK One, Shoe Express, Virgin Megastores, WH Smith and Woolworths. Vouchers could be spent on virtually any item, except alcohol and cigarettes, and were usually used for food, clothing and electronic equipment.

Incentive schedule:

|                |                              |     |     |     |
|----------------|------------------------------|-----|-----|-----|
| <b>Week 1</b>  | = 3 drug-free urine analyses | £5  | £5  | £5  |
| <b>Week 2</b>  | = 3 drug-free urine analyses | £5  | £5  | £5  |
| <b>Week 3</b>  | = 3 drug-free urine analyses | £10 | £10 | £10 |
| <b>Week 4</b>  | = 2 drug-free urine analyses | £10 | £10 |     |
| <b>Week 5</b>  | = 2 drug-free urine analyses | £10 | £10 |     |
| <b>Week 6</b>  | = 2 drug-free urine analyses | £15 | £15 |     |
| <b>Week 7</b>  | = 1 drug-free urine analysis |     | £15 |     |
| <b>Week 8</b>  | = 1 drug-free urine analysis |     | £15 |     |
| <b>Week 9</b>  | = 1 drug-free urine analysis |     | £20 |     |
| <b>Week 10</b> | = 1 drug-free urine analysis |     | £20 |     |
| <b>Week 11</b> | = 1 drug-free urine analysis |     | £20 |     |
| <b>Week 12</b> | = 1 drug-free urine analysis |     | £20 |     |

Travel fares were reimbursed on receipt of a valid bus / tube ticket from the home address or other evidence e.g. oyster card printout. Clients that had additional appointment/s at the service on the same day were only reimbursed once for their fares. The highest amount that was reimbursed was £4.80 where an off peak travel card had been purchased. Researchers monitored study procedures in both conditions at least weekly to ensure appropriate conduct.

## ***II.5. Procedure***

All clients that fulfilled the above mentioned inclusion criteria received an Invitation letter of the CM trial (Appendix III), either at the service or via mail. A follow up phone call or in person contact at the service was made by the research assistant to establish whether the client was interested to participate. If the client declared her/his interest to participate in the study, the research assistant verbally explained the content of the Information letter (Appendix III) and highlighted what it would

involve to participate. The research assistants assured themselves that the client had understood the requirements and pointed out that s/he had 7 to 14 days to make a decision. If at the next scheduled psychosocial session with the drug worker, the client expressed her/his interest to participate in the study, the researcher verbally explained the content of the standardised NHS consent form (Appendix III) and had it signed by the client and a witness. The researcher completed the TOP and the CISS questionnaire with the client. It is common practice that clients are asked to complete the TOP and CISS questionnaire at regular intervals. Relevant demographic information was recorded by the researcher, from the clinical file of the clients, in order not to inundate the participants with further questions. An appointment was made to start the CM protocol, usually within the next two weeks of signing the consent form. At the first CM session the participants submitted a urine sample and thereby started the CM protocol (for the incentive schedule, see section *II.4.2. Contingency Management Group*). If the client decided not to attend the scheduled CM appointment but continued to attend standard treatment, s/he was assigned to the comparison group receiving the usual standard opiate substitution treatment at the service, for more information please see section *II.4.1. Standard Treatment Group*. However, in first six months of the CM programme it was possible for a client in the comparison group to change her/his mind and join the programme if s/he wished to do so. None of the clients in the comparison group made use of this option.

For both groups, the responses from the questionnaires (TOP and CISS) were used as the baseline (timepoint 1), including the response for the crack consumed in the past 28 days and were cross-checked with the routine weekly/fortnightly urinalysis results. There were no discrepancies regarding the self-reported cocaine consumed in relation to the urinalysis results in either group.

All urine samples were tested immediately using an onsite testing system EZ-Split Key Cup (Quantum Diagnostics, Waltham Abbey, U.K.) that detected cocaine, amphetamines, benzodiazepines, opiates, buprenorphine and methadone (for the urine sample collection and testing, see section *II.6.1. Urine Toxicology*). In the CM group, a negative urine sample for cocaine was required to earn a voucher.

Study participation did not impact standard care services. The service placed no systematic contingencies on drug use, as long as clients did not attend the service grossly intoxicated. Overt intoxication would result in no clinic services that day. However, no instances of gross intoxication occurred with any study participants during the course of the study. The NHS service operates from a harm minimisation model and hence the emphasis is on treatment retention and no sanctions are applied for illicit drug use. Participants could continue receiving standard treatment without continuing in the study and after study completion. Although the information letter stated that the participant could ask the drug and alcohol worker and/or the researcher (telephone number and email address were provided) for further information, none of the participants made use of these options. Finally, the debriefing letter (Appendix III) was either presented by the researcher at the last scheduled contingency session or by the drug and alcohol worker if the client did not attend CM sessions.

Follow-up evaluations were scheduled for both groups at: Timepoint 2, one week after completion of the intervention period (12 weeks + 1 week) and timepoint 3, (6 months after the CM intervention concluded). Research assistants completed the TOP and the CISS with the participants present, and urine samples were collected within 1 – 2 weeks.

No clients refused participation in the follow-up evaluation, not even those who had withdrawn from the urine collection portion of the study. The decision to withdraw from the urine collection portion was made at the discretion of the participant. Follow-up participation rates did not differ significantly by group. One participant in the CM group lost his life tragically in a drug related crime and hence no follow-up data could be collected.

## ***II.6. Outcome Measures and Assessments***

### **II.6.1. Urine Toxicology**

All urine samples were tested immediately using an onsite testing system EZ-Split Key Cup (Quantum Diagnostics) that detected cocaine, amphetamines,

benzodiazepines, opiates, buprenorphine and methadone (for further information and instructions, please see Appendix IV). Attention was paid to sample veracity. Participants were asked to leave their coats / jackets / bags etc. outside of the toilet cubicle. Samples were provided directly into a plastic, disposable receptacle. Validity checks included the use of an external temperature strip, the range for a unadulterated specimen is 32–38°Celsius (Quantum Diagnostics, 2007). A minimum sample size of 25mls was required for the urine test to be effective. Among other substances, valid samples were qualitatively tested for the metabolites of cocaine (benzoylecgonine). The test identifies specimens as positive if metabolite concentrations are greater than or equal to 300ng/ml. The approximate cut-off detection time for benzoylecgonine is 2 – 7 days. For the cut-off levels and times for the other substances, please refer to Appendix IV. Urine samples that failed the validity check were discarded and participants were asked to provide another sample. If a concern remained that the provided urine sample was not genuine, the test was invalid and a positive result was assumed (please see, Appendix III – Information Letter). This did not occur in the study.

## II.6.2. Treatment Outcome Profile

The Treatment Outcomes Profile (TOP) is a multidimensional structured interview for the evaluation of substance misuse treatment and has been developed by the National Treatment Agency for Substance Misuse (Marsden et al., 2008). It is one of the most commonly used standardised assessment instruments to evaluate the effectiveness of drug treatments in the field of substance use in the UK (for the questionnaire, please see Appendix IV). It is used at the start of treatment, in care plan reviews and is reported through the National Drug Treatment Monitoring System (NDTMS). The TOP is partially based on the Maudsley Addiction Profile (Marsden et al., 1998) and was developed as a brief alternative. The TOP comprises 20 items representing the following four key drug treatment outcomes, targeting the past four weeks:

- Substance use
- Injecting risk behaviour
- Offending and criminal involvement

- Health and social functioning

The TOP features three types of responses: (a) Timeline, the participants are invited to recall the number of days in each of the past four weeks in which they engaged in the behaviour stated in the question, for example, the number of days they used opiates and the number of days they attended college. A total score is calculated which can range from 0 – 28 days. (b) Yes and no, a simple tick for yes or no. (c) Rating scale, a 20 – point scale, where a score of 0 = poor and a score of 20 = good.

Psychometric properties of the TOP have been reported in detail elsewhere (Marsden et al., 2008) and results will only be summarised here. A prospective cohort study of 1021 service users, aged between 16 – 62 years, were recruited from 63 treatment agencies in England. These drug and alcohol treatment agencies provided the following services; opiate substitution treatment, psychosocial interventions, in-patient detoxification and residential rehabilitation. The personal interviews were conducted by 163 drug and alcohol workers. The test-retest stability was moderate to high, using a 1-week and 1-month interval (Marsden et al., 2008). The twenty outcome measures met inter-rater reliability criteria: days used alcohol, opiate, crack cocaine, cocaine powder, amphetamines, cannabis and one other named substance; days injected and period prevalence of direct or indirect needle/syringe sharing; subjective rating of physical and psychological health; days committed shop theft and drug selling, period prevalence of vehicle, property, fraud/forgery and assault/violence offences; rating of quality of life; days worked and attended for education/training; and period prevalence of acute housing problems and risk of eviction. Intraclass correlation coefficients for scale measures and Cohen's kappa for dichotomous measures reached or exceeded 0.75 and 0.61, respectively (Marsden et al., 2008). Convergent validity was assessed with other instruments in the field, for example, the Life Stressors and Social Resources Inventory (Moos, Fenn & Billings, 1988), the Addiction Severity Index (McLellan, Luborsky, Woody, & O'Brien, 1980; McLellan et al., 1992) and self-reported behaviours, and items were found to be in the range of moderate to good. There were satisfactory validity assessments and change sensitivity of scale items judged by effect size and smallest detectable difference. In conclusion, the TOP is a reliable and valid 20-item instrument for treatment outcomes monitoring (Marsden et al., 2008). The TOP is in the public

domain and therefore can be used without cost but with due acknowledgement of its source (Marsden et al., 2008).

### II.6.3. Christo Inventory for Substance Misuse Services

The Christo Inventory for Substance-Misuse Services (CISS) is a standardised, validated tool (Christo, Spurrell & Alcorn, 2000; Christo, 2000a) now commonly used in Scotland (Effective Interventions Unit, 2001), England & Wales (Christo, 1999a,b,c; Christo, 2000b,c,d,e,f; Christo, 2001; Audit Commission, 2002), and abroad (Christo & Da Silva, 2002). The CISS is a single page outcome evaluation tool completed by drug and alcohol service workers, either from direct client interviews or from personal experience of their client supplemented by existing assessment notes (for the questionnaire, please see Appendix IV). Its purpose is to elicit workers' impressions of their clients in the past 30 days in a quick, quantitative, standardised and reliable way. The 0 to 20 unidimensional scale consists of 10 items reflecting clients' problems with:

|                                   |                       |
|-----------------------------------|-----------------------|
| Drug / alcohol use                | General health        |
| Psychological functioning         | Social functioning    |
| Sexual / injecting risk behaviour | Occupation            |
| Criminal involvement              | Ongoing support       |
| Compliance                        | Working relationships |

These outcome areas are scored on a three point scale of problem severity (0 = none, 1 = moderate, 2 = severe), each point is illustrated with relevant examples for guidance. To avoid the use of the number 0 in the data analysis, the scale was transformed to 1 = none, 2 = moderate, 3 = severe. Thus, a CISS score of 10 would indicate no problems and a score of 30 would indicate severe problems in all outcome areas. Use of a single outcome measure produces a simple and readable report. The process is further simplified because the CISS outcome score can be reduced to two or three categories, e.g., 'good/poor' outcome or 'low/average/high' problem severity. For abstinence-oriented treatment, a score of 6 (transformed score = 12) or less is indicative of a good outcome. For drug services based on harm minimisation, a score of 0 (5) to 5 (10) = low problem severity, 6 (12) to 12 (24) =

average, 13 (26) to 20 (40) = high problem severity. For outpatient alcohol services, the score distribution is similar but shifted down one point less than drug users. Alcohol users are less likely to score on problems of social functioning, HIV risk behaviour and criminal involvement, but they are more likely to score on psychological problems. The spread of CISS scores cover the entire range, and there are no restricted variance, floor or ceiling effects in the score distribution (Christo, Spurrell & Alcorn, 2000).

Psychometric properties of the CISS have been reported in detail elsewhere (Christo, Spurrell & Alcorn, 2000) and results will only be summarised here. In a validation study (Christo, Spurrell & Alcorn, 2000), comparison scores indicating low, average or high problem severity were produced by 243 drug users attending a harm minimisation outpatient service and 102 alcohol users at an outpatient alcohol service. Means and cut-off scores for abstinence oriented treatments were derived from a 6-month follow-up of 90 treated drug users. The item alpha coefficient of internal consistency was 0.74, thus indicating that scale items were sufficiently different to avoid redundancy, yet sufficiently related to form an acceptable unidimensional scale. The test-retest coefficient was 0.82, and the inter-rater coefficient was 0.82. The inter-rater coefficient increased to 0.91 when re-tests were conducted the same day. These figures indicated the scale to be of satisfactory reliability. The CISS demonstrated good face validity as its items were acceptable to drug and alcohol workers, and clients. Clients generally preferred face to face interviews that did not require self-completion (Christo, Spurrell & Alcorn, 2000). Given that the CISS was developed from relevant outcome research and existing multidimensional instruments, all CISS items addressed areas considered relevant to substance misuse outcome, thus content validity is good.

The concurrent validity of the CISS was satisfactory, its scores correlated well with other measures of treatment outcome. Among the abstinence oriented treatment sample, the CISS produced correlations ranging from 0.43 to 0.99 with the Opiate Treatment Index (Darke et al., 1991, 1992), Spielberger trait anxiety inventory (Spielberger et al., 1984), the Rosenberg self-esteem inventory (Rosenberg, 1965), and the custom scales; unpleasant life events (Christo, Spurrell & Alcorn, 2000) and quality of life (Christo, Spurrell & Alcorn, 2000).

The simplicity, flexibility and brevity of the CISS make it a useful tool allowing comparison of clients within and between many different service settings (Audit Commission, 2002). The tool is freely distributed via the internet (Christo, 2008), the conditions for use being that it is not sold for profit and the title, instructions and item wording are not altered.

For the purpose of the present study, only two items from the client-support interaction were extracted from the CISS; *Compliance* – measuring client compliance and reliability with treatment requirements. This is a clinician observed measure of reliability, the absence of which is one of the first indicators of an addiction problem. Many clients will have lost jobs through being late or absent. The ability to turn up on time and co-operate with requirements of others is a critical indicator of recovery and re-integration with society (Christo, 2000a). *Working Relationship* – measuring the quality of the working relationship between worker and client. This is a directly observed measure of the client's ability to interact with others. While the item pertains to interaction with the clinician, the behaviours usually generalise to all individuals the client may have contact with. For example, it has been found in clinical practice that clients that present with a dual-diagnosis of severe depression, personality disorder or psychosis score particularly highly on the 'compliance' and 'working relationships' items (Christo, 2000a). Yet, if these symptoms decrease, the individual becomes more able to engage in social interactions and relationships (Christo, 2008).

These items are not captured by the TOP but have shown to be good predictors for many different drug treatment outcomes. Specifically, therapeutic relationships, pre-treatment motivation and programmes engagement have demonstrated to be central attributes of effective treatment (Simpson et al., 1997). Given that we aimed to identify client characteristics that are predictors of CM treatment outcome, it seemed important to complement the four outcome variables from the TOP with the two client-support interaction items from the CISS. This was discussed in detail and supported by the author from the CISS (Dr. G. Christo, personal communication; February 2008). All other questionnaire items from the CISS are very similar to the TOP.

## ***II.7. Ethical Considerations and Consent***

The National Treatment Agency for Substance Misuse (NTA) commissioned a nationwide trial of contingency management at drug and alcohol NHS services, in the UK, in 2008 - 2009. The trials were in accordance with the guidelines for 'Drug Misuse: Psychosocial Interventions' published by the National Institute for Health and Clinical Excellence (NICE, 2007) and these guidelines have been developed by the 'The British Psychological Society' and 'The Royal College of Psychiatrists'.

General approval for the trial was sought by the NTA from the Department of Health. The regional approval from the Trust's Clinical Director and Clinical Governance Committee was sought by the service manager. For a letter stating that these permissions were granted please see, Appendix II. The study adhered to the British Psychological Society's Code of Ethics and Conduct (2009) and the Ethical Principles for Conducting Research with Human Participants (2010). The ethics release form from City University was completed (Appendix I).

**Informed Consent** – Clients received an invitation letter (Appendix III) that outlined the nature of the study and what it involved to participate. If the client declared her/his interest after reading the invitation letter, the participant was given the client information letter (Appendix III) which explained in detail the aims of the study, a short summary explaining the motivations of the research, and reasons they were chosen to participate. The information letter stated the rules of the CM trial and the incentive schedule with the escalating voucher earnings for each submitted cocaine negative urine sample. The drug and alcohol worker also explained that participation is voluntary and that s/he can withdraw at any time, without giving any reason, without the participant's medical care or legal rights being affected. The information letter also stated that travel expenses were reimbursed. It also provided the telephone numbers and addresses of the researchers. The client kept a copy of both, the information letter and the consent form.

Regarding the allocation of the clients to the standard treatment group, clients that had signed the informed consent form but did not attend any of the scheduled CM sessions were asked verbally by the drug worker/research assistant, if we could

continue to collect their data for the study. Only data that was gathered through routine clinical treatment evaluation (i.e., TOP and CISS questionnaires) was congregated from the case notes. Importantly, all clients in the study had signed ‘the consent to share information’ in the initial assessment form from our service, which is the formal; ‘Substance misuse services initial assessment form’. Specifically, consent was given to share information with staff at the service, National Drug Treatment Monitoring System (NDTMS), and in some cases a related drug and alcohol service in the area, the client’s GP and other involved organisations. Thus clients in the standard treatment group were not burdened with any further questions or demands, and continued to receive standard treatment including maintenance prescription of methadone or buprenorphine, and key working sessions from drug workers who acted as case co-ordinators for their care. However, in the first six months of the CM programme drug workers occasionally reminded clients that the CM programme was running and that it was possible for a client in the standard treatment group to change her/his mind and join the programme if s/he wished to do so. If a client declared her/his interest, clients were informed that they could arrange an appointment for a CM session and thereby start the CM programme. None of the clients in the comparison group made use of this option.

It should be noted that the idea to proceed to gather the data from the clients that had not attended the CM sessions was spontaneous. The realisation was that important baseline information had been collected and that it was likely that these clients would continue to visit our service. Thus a decision was made that we would try to continue to collect this valuable information in order to create a comparison group.

When the 12-week CM programme concluded, we implemented a similar behavioural model, whereby drug workers and psychologists tailored incentives to individual clients. In accordance with the harm minimisation model we embraced rehabilitation, recovery and self-sufficiency as primary treatment goals in collaboration with the client. All opiate maintenance clients were offered incentives as a possible intervention if they wished to attain objective treatment plan goals they had not mastered so far. Setting of the treatment plan goals was established in collaboration with the client and drug worker/psychologist.

The content of the invitation letter, information letter, consent form and debriefing letter were verbally explained to the participants. Given that the current participants were substance users, it was particularly important to clarify that rejecting or withdrawing from participation, at any point would not have any impact on their standard care treatment. Moreover, the information and debriefing letter stated that the participants could ask the drug and alcohol workers and/or the researchers if they wished to receive any further information about the study. The research assistants made an effort to invite participants to ask questions. A standardised NHS consent form (Appendix III) was signed by the individuals prior to participation. A debriefing letter (Appendix III) was handed to each participant either by the research assistant at the last contingency session or by a drug and alcohol worker if the client did not return for further contingencies.

**Confidentiality and anonymity** – The names of the participants were not used in the study and the questionnaires are not identifiable. The research assistants held a list of identification numbers which were assigned to clients immediately after consent forms were signed, and were used on recording sheets to preserve client anonymity. For the duration of the study, the research assistants were required to keep the list in their possession so as to correctly assign the collected urine specimen at each contingent. At the conclusion of the study, the list was handed over to the lead researcher. All clients were made aware and consented to staff being privy to her/his notes.

**Ownership of data and conclusions** – The data is owned by service and will be destroyed one year after submitting the research. It will be kept securely in a locked filing cabinet. The conclusions will be given to the service and are its intellectual property. In the debriefing letter, the client is offered the opportunity to contact us at the service in person or via the telephone if s/he wants to know the results of the research or for further questions.

### **III. RESULTS**

### ***III.1. Software for the Statistical Analyses***

The statistical analysis was conducted with the software SPSS 20.0 for Apple Mac Personal Computer 2012 and Microsoft Office Excel 2007 for Microsoft Windows XP 2002.

### ***III.2. Statistics for the Measured Variables***

The assumption of univariate and multivariate normality were evaluated for both groups separately (Appendix VI). The continuous variables: age, years of cocaine use, years of heroin use, methadone and buprenorphine dose, mean number of previous treatment attempts, and the continuous variables from the TOP questionnaire; crack, cocaine, opiates, alcohol, cannabis use, days attended work and/or college, psychological health, physical health and overall quality of life, criminal involvement, and the ordinal variables from the CISS questionnaire; working relationship and compliance and reliability with treatment requirements were examined through various SPSS programmes for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis.

The mean, standard deviation, skewness and kurtosis for the standard and contingency management groups were inspected. The Shapiro-Wilk test was used to assess numerically if the variables were normally distributed (the test is recommended for sample sizes  $< 50$ ) (Bortz & Lienert, 2008). The convention is that a  $p$ -value of  $\geq .05$  for a variable indicates that the distribution is significantly different from a normal distribution (Backhaus, Erichson, Plinke & Weiber, 2006). This was observed on the majority of the variables. Additionally, visual examination of the histograms confirmed this conclusion, showing skewness and kurtosis of the variables.

The conservative convention of the interquartile range (IQR) was used to define outliers from the normal distribution. IQR is defined as the range of the middle 50% of the observations, or the difference between the 25<sup>th</sup> percentile and the 75<sup>th</sup> percentile (Aitken & Cardinal, 2006). An observation is called an outlier if it exceeds

the IQR by 1.5 times and an observation is deemed extreme if it differs 3 times (ibid). Inspection of the boxplots showed outliers on the majority of variables and a few extreme cases were also observed.

Thus, considering the results from the diagnostic analyses outlined above and the small sample size, non-parametric statistical methods are recommended for all variables, for the purpose of rigour and consistency.

The procedure of the Mahalanobis distances score was used to identify multivariate outliers (Tabachnik & Fidell, 2001). The procedure calculates the distance of particular scores from the centre cluster of the remaining cases and produces a  $z$  score. The  $z$  score for each participant is calculated and is considered an outlier if it exceeds a critical value. No cases were identified as multivariate outliers, that is, no variable was in excess of a  $z$  score of 56.892 ( $df = 28$ ;  $p < .001$ ) (Tabachnik & Fidell, 2001).

A missing data analysis was conducted, which showed that the missing values were randomly distributed and each variable had less than 5% missing values (Tabachnik & Fidell, 2001). In fact, a visual inspection of the data revealed that the responses of only one participant in the CM group at timepoint 3 were missing. Therefore, analyses that involved data from timepoint 3 was calculated by applying the SPSS default command – ‘listwise deletion’, otherwise  $N = 42$  out of 42 cases were available for data analysis. All the analyses were performed on raw data, provided in Appendix V.

### ***III.3. Statistical Methods***

The results section is composed of two parts; the first part is concerned with the between-groups analysis, i.e. the comparison between the CM and ST groups, and the second part is dedicated to detailed within-group analyses of the CM group.

#### **III.3.1. Between-Group Analyses**

Data analyses of the demographic and baseline characteristics for the standard treatment and the contingency management groups were conducted using Mann-Whitney *U* tests for continuous and ordinal variables, and chi-square for categorical variables (Appendix VI).

The data for the three measured timepoints 1, 2 and 3 were examined using Mann-Whitney *U* tests for between group differences, and Friedman tests to compare the three timepoints for the standard treatment and contingency management groups separately (Appendix VI). Where appropriate, *post-hoc* analyses with Wilcoxon signed-rank tests were conducted with a Bonferroni correction applied. That is, pairwise contrasts between timepoints were conducted with  $\chi^2$  tests using  $\alpha$  levels determined by dividing the conventional  $\alpha$  of .05 by the number of pairwise comparison made. For the three timepoints, the following outcome variables from the TOP questionnaires were examined; crack, cocaine, alcohol, opiates, cannabis use, days attended work and/or college, criminal involvement, psychological health, physical health, quality of life, and the two extracted outcome variables from the CISS questionnaire; measured quality of the working relationship between drug worker and client, and compliance and reliability with treatment requirements.

The following outcome measures of the TOP will not be presented in the results section, due to no or too few responses: (a) None of the participants reported any cocaine use (b) Acute housing problem and/or at risk of eviction; two participants reported problems with their accommodation at timepoint 2. (c) Injecting risk behaviour; three participants reported high-risk injection practices. (d) One person reported using amphetamines twice a month and two participants reported the use of illicit diazepam 1 – 3 times a month at timepoint 2. Regarding the questionnaire items ‘days paid work’ and ‘days attended college or school’, the responses to these two separate, but related measures were consolidated to one category because there were too few participants responding positively to either of the questions.

### **III.3.2. Within-Group Analyses**

#### **Conditional Probabilities of Change and Clinical Improvement**

Regarding the within-group analyses for the CM group, study results were investigated for evidence of clinically meaningful changes on an individual participant level. We operationalised the statistical method of conditional probabilities of change and the criteria of clinically meaningful change to assess outcome. These conventions were also used by Gawin et al., (1989), Stitzer et al., (1992) and Iguchi et al. (1997) to evaluate CM programme outcome. The definition of conditional probabilities of change is as follows; participants who could improve were defined as those whose baseline rate of cocaine free urines was 90% or less; these participants were classified as improved if their rate of cocaine free urines increased by 10% or more during the intervention. Participants who could deteriorate were defined as those whose baseline cocaine free urine rate was 10% or more; these participants were classified as deteriorated if their rate of cocaine free urines decreased by 10% or more during the intervention. Clients whose cocaine positive urine test rate for baseline versus intervention period remained within  $\pm 10\%$  were classified as unchanged. The 10% urine improvement criterion was selected to eliminate small changes based on chance fluctuations (Gawin et al., 1989; Higgins et al., 1991; Carroll, Rounsaville & Gawin, 1991; Stitzer et al., 1992; Iguchi et al., 1997).

In order to apply an even more stringent definition of clinical improvement, a further standardised evaluation of treatment for crack cocaine misusing clients, namely the requirement of 3 consecutive cocaine free weeks was employed. The rationale for the 3 week requirement of cocaine free urines was that this represented a clinically meaningful period of abstinence and, at the same time, constituted an achievable goal for the population of chronic supplemental users of cocaine in a 12 week intervention period (Stitzer et al., 1992; Iguchi et al., 1997).

To give equal weight to urine results of early dropouts and those retained throughout the evaluation, data analyses were based on the overall percentage of cocaine positive urine samples given by each participant during baseline and during the portion of the intervention in which s/he participated. In this way, data from each

client contributed equally to the analysis whether or not the client stayed through the entire intervention period (Stitzer et al., 1992). Therefore, urine specimens not collected from participants leaving treatment prior to the end of the intervention period were counted as cocaine positive and missing urine samples were considered positive samples, which is predicated on a widely used approach in CM trials (for example, Silverman et al., 1996; Budney et al., 2000).

### **Baseline and Crack Use During CM Intervention**

A non-parametric procedure, the Spearman's rank order correlation coefficient (i.e., Spearman's *rho*) was performed to address the question whether self-reported baseline cocaine consume (timepoint 1) was associated with crack cocaine abstinence during the CM intervention period (Appendix VI).

### **Survival Analysis**

A survival analysis Kaplan-Meier product-limit procedure (non-parametric) was employed to estimate time-to-event models and to examine the distribution of the time-to-event variables (Appendix VI). A great advantage and a unique characteristic of this method is that it accounts for censored observations, i.e. cases where the critical event (event of interest) has not occurred in the observed intervention period, and cases that are lost to analysis because of participants leaving treatment prior to the end of the intervention period. The latter are so-called 'right censored cases', of which the present sample comprised a fair amount.

Two modelling strategies for retention data were used. For the first model, the outcome ('event') was determined as time to study dropout. The event was defined as the second consecutive occasion a scheduled reinforcement session was not attended and the absence was not authorised prior to the appointment. The second non-attendance was selected because several participants missed one scheduled reinforcement session but did not dropout of the study at that point.

For the second model, outcome was specified as time to first positive cocaine urinalysis or second consecutive unexcused non-attendance (see first model). The event was specified as occurring when the first positive cocaine urinalysis or second unexcused non-attendance was produced (whichever occurred first).

For both models, the event (i.e. time to dropout or first positive cocaine urinalysis) was calculated from the first day of the study. If the event did not occur during the 12-week period, data were censored at the last day of the intervention (usually Day 84). Retention analyses are reported using the estimated survival function, mean, median and 95% confidence intervals (CIs).

### **III.3.3. Changes in the Planned Data Analyses**

At the time of the proposal for the study (in 2008), the drug and alcohol service held a caseload of 270 opiate maintenance clients. In order to qualify for opiate substitution treatment, the policy at the service required weekly or fortnightly urine tests. An examination of 52 random urine samples revealed that 32 tests were positive for cocaine, that is 62%. It was extrapolated that approximately 167 clients (62% from 270 clients) consume cocaine or crack cocaine. Thus, the assumption was that approximately 50 clients use crack cocaine on a regular basis, have a desire to abstain from crack use and are interested to participate in a CM intervention.

Within the realm of the (methodological) restrictions from the NTA, the study was designed. One of the aims was to investigate predictors of CM treatment outcome (please see section, *I.10. Background of the Study, Research Aims and Questions*), for example the two implemented measures from the CISS; treatment compliance and working relationship. To investigate these treatment outcome predictors, the statistical method of a logistic regression would have been indicated. However, the small sample size and the relatively few participants that remained abstinent for extended durations of time prevented the application of this method. Advanced statistical methods, such as logistic regression models, require greater sample sizes. Bergtold, Yeager, Jason and Featherstone (2011) established that sample size can affect parameter estimates and hence, the robustness of the inferences from logistic regression analysis. Equally, using a survival analysis model (for example, a Log rank (Mantel Cox test)) to establish whether gender differences can be observed with regard to treatment response was not feasible.

### ***III.4. Demographics and Baseline Characteristics***

Table 1 shows demographic characteristics collected at intake for participants in standard treatment ( $n = 21$ ) and contingency management ( $n = 21$ ) groups. Data analyses were conducted using Mann-Whitney  $U$  tests for continuous and ordinal, and chi-square for categorical variables. Of the 23 baseline variables tested, only 2 differed significantly between the two groups; self-reported years of cocaine use and the rated working relationship between the client and the drug worker, extracted from the CISS questionnaire. A Mann-Whitney  $U$  test revealed a statistically significant difference of the self-reported years of crack use between the standard treatment (median = 10; IQR = 10) and the contingency management groups (median = 15; IQR = 13), ( $U = 138.5$ ;  $N_1 = 21$ ;  $N_2 = 21$ ;  $p = 0.039$ ). Additionally, the working relationship between the client and the drug worker, as rated by the drug worker, showed a significant difference between the standard treatment (median = 3; IQR = 0) and the contingency management groups (median = 2; IQR = 1), ( $U = 144.5$ ;  $N_1 = 21$ ;  $N_2 = 21$ ;  $p = 0.024$ ). No differences were evident across groups on any other demographic variables.

During the 28 days baseline phase (timepoint 1), the median numbers of self-reported crack use (verified with weekly or fortnightly drug tests) were 12 (IQR = 22) for the standard treatment group and 14 (IQR = 20) for the contingency management group. These numbers of crack use did not differ significantly across groups ( $U = 207.5$ ;  $N_1 = 21$ ;  $N_2 = 21$ ;  $p = 0.739$ ). This result seems to indicate that the initial frequency of cocaine consumption was very similar in both groups.

The maintenance dose of methadone for clients in the standard treatment and contingency management groups was not significantly different ( $U = 139.5$ ;  $N_1 = 21$ ;  $N_2 = 18$ ;  $p = 0.160$ ) and the median was 60 mg/day (IQR = 28) and 70 mg/day (IQR = 39), respectively. This average daily dose is comparable to a study by Silverman et al. (1998). Additionally, the recommended methadone maintenance dose range in the UK is 60–120 mg/day (NICE, 2007b).

**Table 1***Baseline Characteristics and Demographics of Study Participants (N = 42)*

| Variable                                                                            | Standard Treatment Group (n=21) | Contingency Management Group (n=21) | Statistical Test            | Value of Test Statistic    | P-Value            |
|-------------------------------------------------------------------------------------|---------------------------------|-------------------------------------|-----------------------------|----------------------------|--------------------|
| Age in years, Median [IQR] (n)                                                      |                                 |                                     |                             |                            |                    |
|                                                                                     | 44 [11] (21)                    | 40 [16] (21)                        | MWU-Test (N=42)             | U=199                      | 0.588              |
| Gender, % (n)                                                                       |                                 |                                     |                             |                            |                    |
| Male                                                                                | 76.2 (16)                       | 52.4 (11)                           | X <sup>2</sup> -Test (N=42) | X <sup>2</sup> =2.59;df=1  | 0.107              |
| Female                                                                              | 23.8 (5)                        | 47.6 (10)                           |                             |                            |                    |
| Ethnicity, % (n)                                                                    |                                 |                                     |                             |                            |                    |
| White British                                                                       | 76.2 (16)                       | 85.7 (18)                           | X <sup>2</sup> -Test (N=42) |                            | 0.697 <sup>a</sup> |
| Other                                                                               | 23.8 (5)                        | 14.3 (3)                            | Fisher's exact test         |                            |                    |
| Marital status, % (n)                                                               |                                 |                                     |                             |                            |                    |
| Married/Cohabiting                                                                  | 42.9 (9)                        | 42.9 (9)                            | X <sup>2</sup> -Test (N=42) | X <sup>2</sup> =0.00;df=1  | 1.000              |
| Single                                                                              | 57.1 (12)                       | 57.1 (12)                           |                             |                            |                    |
| Employment status, % (n)                                                            |                                 |                                     |                             |                            |                    |
| Employed                                                                            | 14.3 (3)                        | 4.8 (1)                             | X <sup>2</sup> -Test (N=42) |                            | 0.606 <sup>a</sup> |
| Unemployed                                                                          | 85.7 (18)                       | 95.2 (20)                           | Fisher's exact test         |                            |                    |
| Social income support, % (n)                                                        |                                 |                                     |                             |                            |                    |
| Yes                                                                                 | 81.0 (17)                       | 95.2 (20)                           | X <sup>2</sup> -Test (N=42) |                            | 0.343 <sup>a</sup> |
| No                                                                                  | 19.0 (4)                        | 4.8 (1)                             | Fisher's exact test         |                            |                    |
| Years of cocaine use, Median, [IQR] (n)                                             |                                 |                                     |                             |                            |                    |
|                                                                                     | 10 [10] (21)                    | 15 [13] (21)                        | MWU-Test (N=42)             | U=138.5                    | 0.039*             |
| Years of heroin use, Median, [IQR] (n)                                              |                                 |                                     |                             |                            |                    |
|                                                                                     | 17 [16] (21)                    | 20 [7] (21)                         | MWU-Test (N=42)             | U=212                      | 0.830              |
| Methadone dose, mg/day, Median, [IQR] (n)                                           |                                 |                                     |                             |                            |                    |
|                                                                                     | 60 [28] (21)                    | 70 [39] (18)                        | MWU-Test (N=42)             | U=139.5                    | 0.160              |
| Buprenorphine dose, mg/day, Median (n)                                              |                                 |                                     |                             |                            |                    |
|                                                                                     |                                 | 12 (3) <sup>b</sup>                 |                             |                            |                    |
| Median number of previous treatment attempts, Median, [IQR] (n)                     |                                 |                                     |                             |                            |                    |
|                                                                                     | 1 [1] (21)                      | 1 [2] (21)                          | MWU-Test (N=42)             | U=-213.5                   | 0.848              |
| Psychiatric diagnosis and/or current involvement with Mental Health services, % (n) |                                 |                                     |                             |                            |                    |
| No Diagnosis                                                                        | 61.9 (13)                       | 47.6 (10)                           | X <sup>2</sup> -Test (n=42) | X <sup>2</sup> =0.865;df=1 | 0.352              |
| Diagnosis                                                                           | 38.1 (8)                        | 52.4 (11)                           |                             |                            |                    |

**Table 1**

*Baseline Characteristics and Demographics of Study Participants (N = 42), continued*

| Variable                                                                                 | Standard Treatment Group (n=21) | Contingency Management Group (n=21) | Statistical Test | Value of Test Statistic | P-Value |
|------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------|------------------|-------------------------|---------|
| <b>Treatment Outcome Profile</b>                                                         |                                 |                                     |                  |                         |         |
| <b>Days of substance use in past 28 days – Crack <sup>c</sup>, Median, [IQR] (n)</b>     |                                 |                                     |                  |                         |         |
|                                                                                          | 12 [22] (21)                    | 14 [20] (21)                        | MWU-Test (N=42)  | U=207.5                 | 0.739   |
| <b>Days of substance use in past 28 days – Opiates <sup>c</sup>, Median, [IQR] (n)</b>   |                                 |                                     |                  |                         |         |
|                                                                                          | 12 [24] (21)                    | 11 [28] (21)                        | MWU-Test (N=42)  | U=190                   | 0.433   |
| <b>Days of substance use in past 28 days – Alcohol <sup>c</sup>, Median, [IQR] (n)</b>   |                                 |                                     |                  |                         |         |
|                                                                                          | 3 [28] (21)                     | 0 [17] (21)                         | MWU-Test (N=42)  | U=165.5                 | 0.127   |
| <b>Days of substance use in past 28 days – Cannabis <sup>c</sup>, Median, [IQR] (n)</b>  |                                 |                                     |                  |                         |         |
|                                                                                          | 0 [0] (21)                      | 0 [2] (21)                          | MWU-Test (N=42)  | U=174                   | 0.088   |
| <b>Days attended work and/or college in past 28 days <sup>c</sup>, Median, [IQR] (n)</b> |                                 |                                     |                  |                         |         |
|                                                                                          | 0 [0] (21)                      | 0 [0] (21)                          | MWU-Test (N=42)  | U=208.5                 | 0.591   |
| <b>Criminal involvement in past 28 days <sup>c</sup>, Median, [IQR] (n)</b>              |                                 |                                     |                  |                         |         |
|                                                                                          | 0 [0] (21)                      | 0 [10] (21)                         | MWU-Test (N=42)) | U=162                   | 0.057   |
| <b>Psychological health in past 28 days <sup>d</sup>, Median, [IQR] (n)</b>              |                                 |                                     |                  |                         |         |
|                                                                                          | 10 [7] (21)                     | 10 [5] (21)                         | MWU-Test (N=42)  | U=192.5                 | 0.476   |
| <b>Physical health in past 28 days <sup>d</sup>, Median, [IQR] (n)</b>                   |                                 |                                     |                  |                         |         |
|                                                                                          | 10 [10] (21)                    | 10 [5] (21)                         | MWU-Test (N=42)  | U=214                   | 0.869   |
| <b>Overall Quality of Life in past 28 days <sup>d</sup>, Median, [IQR] (n)</b>           |                                 |                                     |                  |                         |         |
|                                                                                          | 10 [9] (21)                     | 10 [8] (21)                         | MWU-Test (N=42)  | U=209.5                 | 0.781   |
| <b>Christo Inventory for Substance Misuse Services <sup>e</sup></b>                      |                                 |                                     |                  |                         |         |
| <b>Compliance with treatment requirements, Median, [IQR] (n)</b>                         |                                 |                                     |                  |                         |         |
|                                                                                          | 2 [1] (21)                      | 2 [2] (21)                          | MWU-Test (N=42)  | U=175.5                 | 0.227   |
| <b>Quality of working relationship, Median, [IQR] (n)</b>                                |                                 |                                     |                  |                         |         |
|                                                                                          | 3 [0] (21)                      | 2 [1] (21)                          | MWU-Test (N=42)  | U=144.5                 | 0.024*  |

*Note.* All  $p$  values are for two-tailed test and significance value is set at  $p < .05$ . Only relevant responses from the questionnaires were reported and items with more than one positive response.

<sup>a</sup> The analysis showed that 2 cells had an expected count less than 5, in this case SPSS does not provide a Fisher's Exact value.

<sup>b</sup> Only 3 participants in the CM group received buprenorphine. Hence, no IQR could be calculated and no between-group test could be performed.

<sup>c</sup> The responses to these items from the TOP are scored on a timeline response, the participants were invited to recall the number of days in the past four weeks in which they engaged in the behaviour stated in the question, for example, the number of days they used opiates and the number of days they attended college. A total score was calculated which could range from 0 – 28 days.

<sup>d</sup> The responses to these items from the TOP are scored on a rating scale, a 20 – point scale, where a score of 0 = poor and a score of 20 = good.

<sup>e</sup> The responses to these two items from the CISS are scored on a three point scale of problem severity (1 = none, 2 = moderate, 3 = severe). Thus, an item score of 1 would indicate no problems and a score of 3 would indicate severe problems.

### ***III.5. Between-Group Analyses for the CM and ST Group***

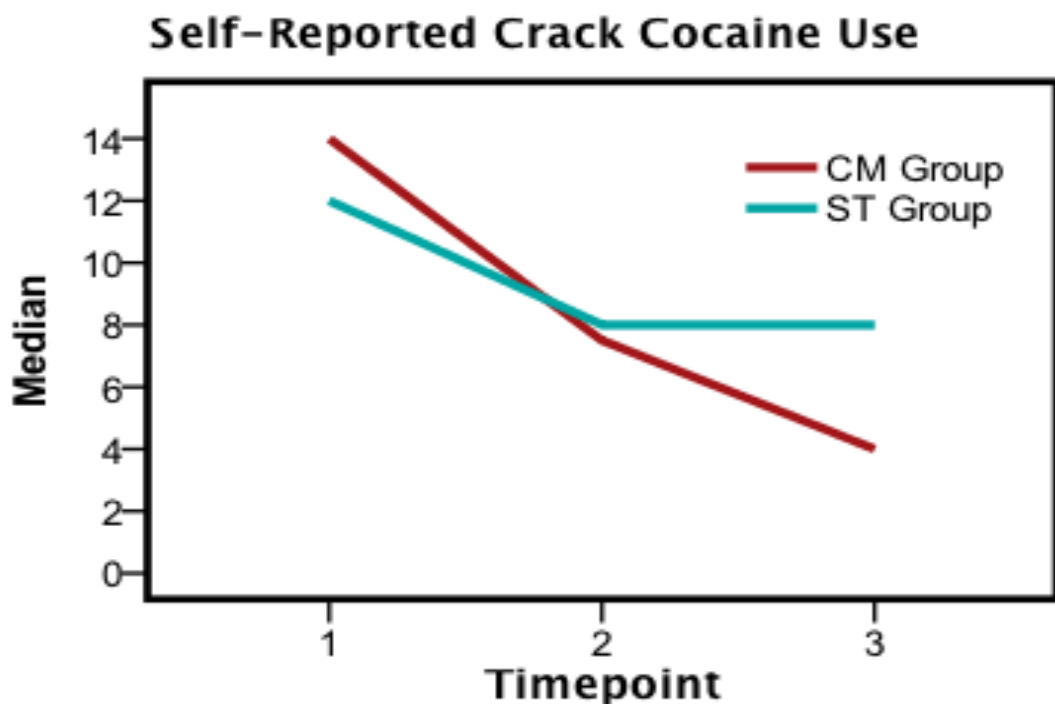
#### **III.5.1. Self-Reported Crack Cocaine Consume**

There was no statistically significant difference between the standard treatment and CM groups on self-reported crack consume (in the past 28 days) at timepoint 1, as reported above (please see section, *III.4. Demographics and Baseline Characteristics*) and timepoint 2 ( $U = 194.5$ ,  $N_1 = 21$ ,  $N_2 = 20$ ,  $p = 0.684$ ). There was, however, a statistically significant difference between the two groups at timepoint 3 ( $U = 130.5$ ,  $N_1 = 21$ ,  $N_2 = 20$ ,  $p = 0.036$ ). The median crack cocaine consume at timepoint 3, was 8 (IQR = 16) for the standard treatment and notably lower for the CM group 4 (IQR = 8).

A Friedman test was used to examine the differences between the three timepoints within the standard treatment and the CM groups separately. Median crack cocaine consume for timepoint 1, 2 and 3 in the standard treatment group were 12 (IQR = 22), 8 (IQR = 13) and 8 (IQR = 16), respectively. There was no statistically significant difference between the timepoints 1, 2 and 3 in the standard treatment group, ( $\chi^2 = 0.909$ ;  $df = 2$ ;  $p = 0.635$ ), yet there was a reduction in self-reported

crack cocaine use from baseline to timepoint 2. Therefore, no post-hoc test was conducted.

There was a statistically significant difference between the timepoints 1, 2 and 3 in the CM group, ( $\chi^2 = 12.265$ ;  $df = 2$ ;  $p = 0.002$ ). *Post-hoc* analysis with Wilcoxon signed-rank tests was conducted with a Bonferroni correction applied, resulting in a significance level set at  $p < 0.017$  ( $\alpha = 0.05/3$ ). Median crack cocaine consume for timepoint 1, timepoint 2 and timepoint 3 in the CM group were 14 (IQR = 20), 7 (IQR = 11) and 4 (IQR = 8), respectively. These numbers differed significantly between timepoint 1 to timepoint 2 ( $Z = -2.693$ ;  $n = 20$ ;  $p = 0.007$ ) and timepoint 1 to timepoint 3 ( $Z = -3.242$ ;  $n = 20$ ;  $p = 0.001$ ), showing a reduction in crack cocaine use over time. Although there was a reduction in crack cocaine use between timepoint 2 and 3, this reduction was not statistically significant ( $Z = -1.819$ ;  $n = 20$ ;  $p = 0.069$ ).



**Figure 1.** Median self-reported crack cocaine consumption (in the past 28 days) at timepoint 1 (baseline), timepoint 2 (1 week after the CM intervention) and timepoint 3 (6 months after

the CM intervention concluded), for the standard treatment (ST;  $n = 21$ ) and contingency management groups (CM;  $n = 21$ ).

### **III.5.2. Treatment Outcome Profile and Christo Inventory for Substance Misuse Services**

Mann Whitney  $U$  tests of the TOP and the CISS questionnaire responses showed the following results; there were no statistically significant differences between the ST and the CM groups at timepoints 1, 2 and 3 on the following measured variables: alcohol, opiates, cannabis use, days attended work and/or college, criminal involvement, psychological health, physical health and quality of life, and the variable compliance and reliability with treatment requirements from the CISS questionnaire.

Regarding the measured quality of the working relationship between drug worker and client (derived from the CISS questionnaire), there was a statistically significant difference between the ST and CM groups at timepoint 1, as reported above (please see, *III.4. Demographics and Baseline Characteristics section*), and timepoint 3 ( $U = 142$ ,  $N_1 = 21$ ,  $N_2 = 20$ ,  $p = 0.034$ ). There was no statistically significant difference between the two groups at timepoint 2 ( $U = 152.5$ ,  $N_1 = 21$ ,  $N_2 = 20$ ,  $p = 0.078$ ), median 3 (IQR = 1) and median 2 (IQR = 1) for the ST and CM groups respectively. The median of the rated quality of the working relationship at timepoint 1, was 3 (IQR = 0) for the standard treatment and 2 (IQR = 1) for the contingency management groups. At timepoint 3, the median was 3 (IQR = 0) for the ST group and 2.5 (IQR = 1) for the CM group. As can be postulated by the IQR, there was very little statistical variability in the data. The collected data at timepoint 1 and 3 suggests that the measured quality of the working relationship between the drug worker and client was rated as marginally less functional for the participants in the ST group compared to the participants in the CM group.

A Friedman test was used to examine the differences between the three timepoints within the ST and the CM groups separately. There was no statistically significant difference between timepoints 1, 2 and 3 in the ST group, ( $\chi^2 = 2.000$ ;  $df = 2$ ;  $p = 0.368$ ) and the CM group ( $\chi^2 = 2.000$ ;  $df = 2$ ;  $p = 0.368$ ); therefore, no post-hoc test was conducted. This result seems to indicate that there was no improvement in the measured quality of the working relationship between the client and the drug worker in the ST and CM groups over time. Thus, although the crack cocaine consume decreased over time in the CM group, this seemed to have no effect on the measured quality of the working relationship. However, the results regarding the working relationship should be interpreted with caution, for reasons that are outlined in section *IV. Discussion*.

### ***III.6. Within-Group Analyses for the CM Group***

#### **III.6.1. Treatment Acceptability, Voucher Earnings, Voucher Delivery and Baseline Use**

Treatment acceptability was informally inferred from the number of participants who attended more than one contingency session. This method was employed by Higgins, Budney et al., (1994), evaluating CM treatment acceptability. In their study, high levels of treatment acceptability were detected, that is 100%. In the present study, 13 participants (62% participants) attended more than one contingency session, indicating slightly more than an average level of initial client acceptance.

Mean voucher earnings for the CM group was £63 ( $SD = 102$ ) and the total was £1.315. Nine (43%) of the participants submitted their first positive cocaine urine sample at the first contingency session and 6 (29%) of participants in the CM group failed to earn a single voucher.

In an attempt to examine whether baseline (timepoint 1) crack use was associated with in-treatment abstinence, a Spearman correlation coefficient was used. There was no statistically significant correlation between the number of days of self-reported

baseline crack cocaine use and the number of cocaine free urine samples during treatment, ( $\rho = -0.047$ ;  $n = 21$ ;  $p = 0.839$ ). Thus, baseline drug use severity was not related to the initiation of abstinence in that individuals with more heavy use were not less likely to initiate abstinence. Some studies have shown that individuals who are abstinent or who evidence infrequent use prior to CM treatment have better outcomes than those who are using cocaine heavily and provide positive samples at study initiation (Poling, Kosten, & Sofuoglu, 2007; Stitzer et al., 2007).

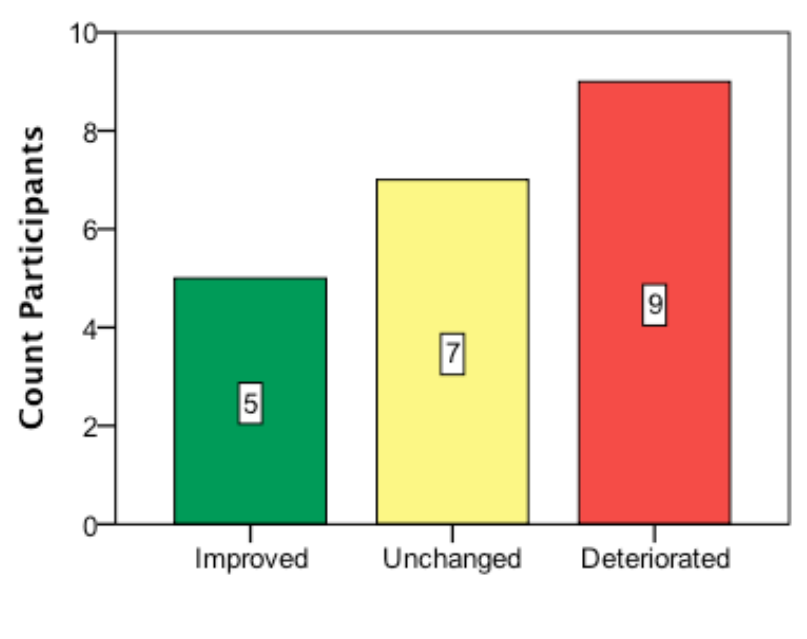
### **III.6.2. Conditional Probabilities of Change and Clinical Improvement**

Figure 1 is a visual illustration of the clinical improvement status of the participants after CM intervention. Overall, 21 participants delivered less than 90% cocaine free urines during the baseline period and, therefore, could have shown clinically significant improvement according to the a priori criteria. Conversely, 14 participants delivered more than 10% cocaine free urine samples during baseline, therefore, having the potential to meet the a priori criteria for clinically significant deterioration during intervention.

Five of the 21 participants who could improve did improve their percentage of cocaine free urine tests by 10% or more and met the a priori criteria for clinical improvement - 3 consecutive cocaine free weeks. Those 5 participants (24%) delivered 21 cocaine free samples and hence, were abstinent for the entire intervention period (12 weeks).

Nine of the 14 participants who could deteriorate met the 10% criterion for statistically significant deterioration. That is, 43% of the participants delivered less cocaine free samples in the intervention period than in the baseline period. Overall, 7 participants remained within the  $\pm 10\%$  range of cocaine positive urine samples and hence, were classified as unchanged. It is worth noting again at this point that missing urine specimens were counted as cocaine positive.

## Statistical and Clinical Improvement Status after CM Intervention



**Figure 2.** The green bar depicts the number of participants who improved their cocaine free urine test results by  $\geq 10\%$  or more, from baseline (timepoint 1) to intervention period and submitted at least 3 consecutive cocaine free weeks during the intervention period. The yellow bar shows the number of participants whose urine positive test rate for baseline versus intervention periods remained within the  $\pm 10\%$  range, these participants were classified as unchanged. The number of participants that were classified as deteriorated are depicted in the red bar, these participants increased their crack cocaine use from baseline to intervention period by  $\geq 10\%$ .

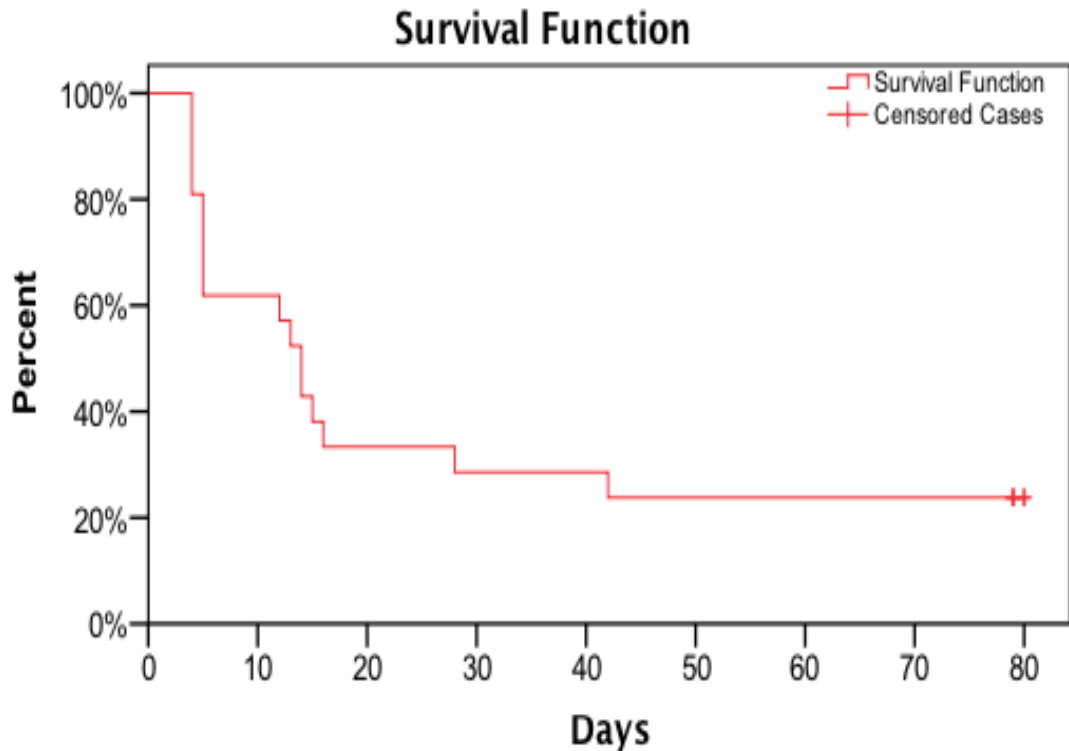
### III.6.3. Survival Analyses

#### *Model 1*

The first Kaplan Meier model was computed using time to study dropout, i.e. the event was defined as; second consecutive unexcused non-attendance. The median time until the second consecutive scheduled reinforcement session was not attended was 14 days (CI = 11 – 17), and mean time was 28 days among participants in the CM group. The large difference between the estimated mean and median survival time was due to the majority of participants failing to attend two consecutive

scheduled reinforcement sessions at the beginning rather than towards the middle or the end of the CM intervention.

### Survival Function – *Study Dropout*

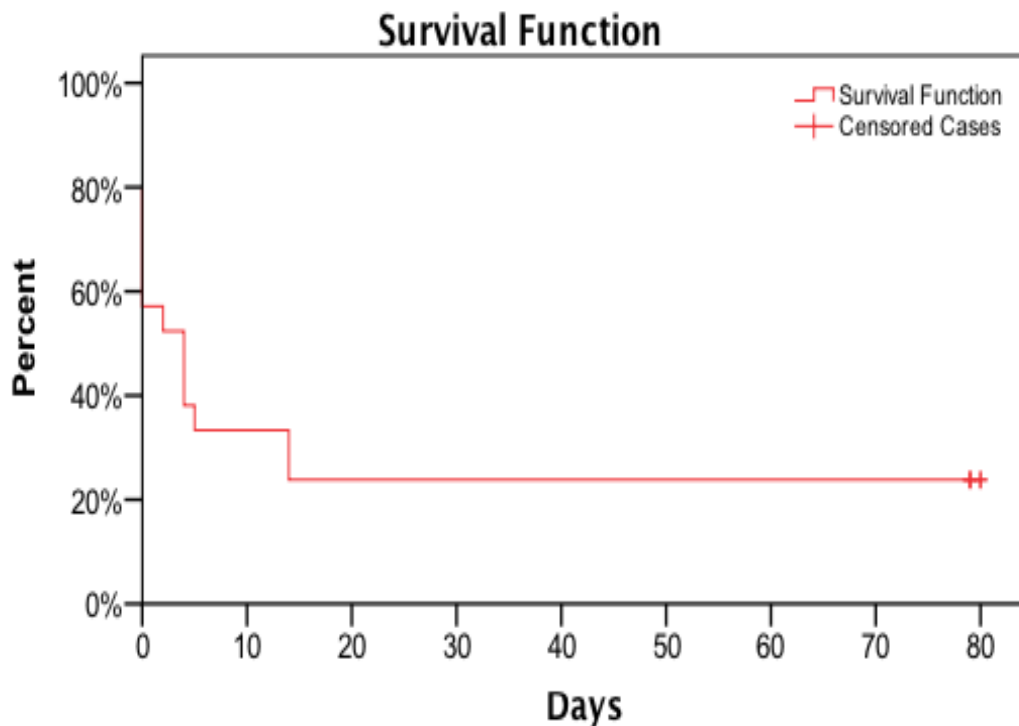


**Figure 3.** Observed cumulative survival rates in percent among CM participants ( $n = 21$ ). The y-axis (vertical) shows the percentage of participants surviving, i.e. continuing to attend the CM programme, while the x-axis (horizontal) shows the time in days since the initiation of the CM programme. Please note that the calculations of survival analysis start at day 0 which is equal to day 1 of the CM programme, i.e. first attended reinforcement session. The status variable is defined as dropout; second consecutive unexcused non-attendance. If the event did not occur during the 12 week period, data were censored at the last scheduled reinforcement session (usually at day 84). Horizontal lines with vertical steps correspond to censored cases. The survival curve shows that 19% of the participants had failed to attend two consecutive reinforcement sessions by day 4 of the intervention period, and at day 14 the percentage had increased to 57%. By day 42 of the programme only 24% of the participants continued to attend the reinforcement sessions until the end of the study.

### **Model 2**

For the second Kaplan Meier model, the outcome variable was defined as; first positive cocaine urinalysis or second consecutive unexcused non-attendance (whichever occurred first). The median time until the first positive cocaine urinalysis or second consecutive unexcused non-attendance was produced was 4 days (CI = 0 – 8) and mean time was 21 days among participants in the CM group. Again, the large difference between the estimated mean and median survival time was due to the majority of participants either delivering a positive urinalysis or failing to attend two consecutive scheduled reinforcement sessions at the beginning rather than towards the middle or the end of the CM intervention.

### **Survival Function – *First Positive Urinalysis/Study Dropout***



**Figure 4.** Observed cumulative survival rates in percent among CM participants ( $n = 21$ ). The y-axis (vertical) shows the percentage of participants surviving, i.e. submitting cocaine free urine samples or continuing to attend the CM programme, while the x-axis (horizontal) shows the time in days since the initiation of the CM programme. Please note that the

calculations of survival analysis start at day 0 which is equal to day 1 of the CM programme, i.e. first attended reinforcement session. The status variable is defined as first positive cocaine urinalysis or second consecutive unexcused non-attendance (whichever occurred first). If the event did not occur during the 12 week period, data were censored at the last scheduled reinforcement session (usually at day 84). Horizontal lines with vertical steps correspond to censored cases. The survival curve shows that 43% of the participants submitted their first positive cocaine urine sample at day 1 of the CM programme. At day 5, 67% of the participants had delivered their first positive cocaine urine sample or failed to attend their second consecutive reinforcement session. By day 14 of the intervention period, only 24% of the participants continued to attend the reinforcement sessions and continued to deliver cocaine free urine samples.

To summarise, the survival analyses investigated the period during which abstinence was initiated. Results from the above analyses combined with previous research suggest timeframes for decision making in the event that a client does not respond. If clients were to become abstinent during the intervention period, they most often ceased using during the first 1 to 4 weeks of treatment. Thus, continued application of CM beyond this time period is unlikely to benefit many clients, and alternate treatments may be warranted for this subpopulation (Weinstock et al., 2010).

#### **IV. DISCUSSION**

The purpose of this study was to investigate four research questions. The primary objective was to test the acceptability and feasibility of a voucher based contingency management programme that incentivises the abstinence of crack cocaine in opiate maintenance clients at a community drug service in the UK. The secondary aim was to determine whether the CM programme reduced concurrent crack cocaine use among clients in opiate maintenance treatment when implemented adjacent to standard treatment. The third purpose was to investigate the period during which abstinence from crack cocaine was initiated in the contingency management group. Lastly, the study examined whether the frequency of self-reported crack use differed for the ST and voucher CM groups at timepoint 2 and 3.

This study has illustrated that it is feasible both to apply the CM protocol at a UK community drug treatment service to target abstinence from crack cocaine in opiate maintenance clients and that it was possible to engage a number of participants for the entire 12-weeks of the programme. Furthermore, the present study showed that if clients were to become abstinent during the intervention period, they ceased using crack cocaine during the first two weeks of the intervention.

The preliminary evaluation demonstrated a statistically significant reduction in crack cocaine use over time in the contingency management group. Furthermore, in comparison to the standard treatment group self-reported crack cocaine use was significantly lower in the CM group at 6 months follow-up. From a harm reduction point of view these changes are important.

Clearly, it cannot be concluded that the observed changes were the result of the CM programme given the nature of the CM group (i.e. self-selection) and the allocation of the clients to the standard treatment group. This study however, was the first attempt to test the acceptability and feasibility of the intervention. There are currently large randomised controlled trials underway that investigate contingency management programmes with opiate maintenance clients.

It could be argued that the sample used was not representative of those typically seeking treatment for crack cocaine use. Although we cannot prove that the sample was representative, the types of drug problems and drug taking severity presented by the sample were in many ways typical of the run of clients in the service. In addition, at this stage of evaluation the principal concern was to test the intervention with opiate maintenance clients targeting their concurrent crack cocaine misuse at a community service in order to establish its feasibility.

Besides the presentation and discussion of the empirical findings of the study, there are some other aspects that stipulate further commenting, including a critical appraisal of the ethical and moral issues of the use of contingency management in health care. This will be covered in the section following the discussion.

### ***Baseline Characteristics of the Standard Treatment and Contingency Management Groups***

Demographic and baseline characteristics may be associated with treatment outcome. In our study, two of the investigated baseline characteristics were statistically significant for the ST and CM groups; years of crack cocaine use and the working relationship between the client and the drug worker (measured by the CISS).

There is a lack of studies that have investigated the effects of the duration of crack cocaine use on CM treatment outcome. A related topic of research that may assist the understanding of the present finding is the investigation into the differential responsiveness to CM treatments in clients that misuse crack by comparing individuals with no prior treatment attempts to individuals with 2 or more treatment attempts. Frequently, the number of reported prior treatment attempts are associated with clients that have more extensive and severe cocaine use histories (Hser et al., 1999; Ferri, Gossop, Rabe-Hesketh & Lanrajeira, 2002). Rash and colleagues (2008) noted in their study that clients with multiple prior treatment attempts seemed to show a greater potential benefit of CM with respect to retention and longer durations of abstinence compared to clients with no prior treatment attempts. They hypothesised that multiple treatment opportunities may have provided clients with sufficient exposure and opportunities to practise skills that may eventually lead to treatment engagement and successful abstinence (ibid).

Therefore, it is possible that the clients in the CM group decided to participate in the treatment because they had accumulated sufficient exposure to mechanisms of change in prior treatments and felt ready and motivated to make changes to their crack using behaviour. This hypothesis is further supported by the evidence that treatment for substance misuse is widely considered a long-term and multiple repeated event (McLellan et al., 2000; Scott, Dennis & Foss, 2005). Extraordinary studies that have tracked the individual life histories of heroin dependent people, for example, have shown that patterns of use, abstinence, and relapse repeat over periods as long as 30 to 50 years (Hser et al., 2001; Galai, Safaeian, Vlahov, Bolotin & Celentano, 2003; Vaillant, 1973). Furthermore, many people relapse after treatment is discontinued and they frequently require multiple treatment episodes (Simpson et

al., 1999), and the provision of a variety of different treatment modalities that may eventually lead to successful abstinence. Whether CM results in increased coping skill execution or otherwise contributes to treatment related change processes remains to be seen (Rash et al., 2008). This is a topic likely to receive attention in future CM studies as the field moves toward identifying mechanisms of change within specific treatments.

Regarding the measurement of the working relationship at the three timepoints, it has been mentioned that there was very little statistical variability in the data set. Moreover, the CISS exhibits relatively low sensitivity to change (Burns, MacKeith & Graham, 2010). Sensitivity to change is defined as the ability of a tool to detect meaningful changes over time. It involves two issues; first, the measure must detect clinically meaningful change when it has occurred (sensitivity to change). Second, it must remain stable when no change has occurred (specificity to change). The issues of the little statistical variability in the data, and the low sensitivity to change of the CISS combined, have lead to a narrow spread with respect to the scores of the working relationship, allowing only a cautious interpretation of the between group differences, as provided in the result section. No further interpretation is feasible.

### ***Comparison of the Standard Treatment and Contingency Management Groups***

A comparison of the ST and CM groups showed that the number of days of self-reported crack use differed significantly at 6 months follow up (timepoint 3) but not 1 week after the CM intervention concluded (timepoint 2). Furthermore, the CM group showed a significant trend of an increase in the number of abstinence days over time. A weakness of these findings was that it rests on self-reported data. However, similar studies that recorded self-reports on drug use and objective urinalysis results have shown that these two different measures are significantly correlated (please see for example, Petry & Martin 2002). Furthermore, it is not uncommon to collect self-reported data in CM studies on drug use, particularly at baseline and follow up (Rawson et al., 2002; Epstein et al., 2003). A more detailed discussion on self-reported data is provided in the section outlining the limitations of the study.

The participants that were abstinent during the entire intervention period reported less crack use or abstinence at 6 months follow up compared to baseline. Thus, for some clients, the beneficial effects of the CM procedure persisted beyond the intervention phase. The research evidence regarding the sustainability of CM treatment effects after the discontinuation of the intervention is sparse. Until recently, most studies of CM did not include post-treatment follow ups. However, a number of newer studies have included post-treatment follow ups, usually up to 12 months. The results have been mixed, with some studies showing evidence of sustained voucher effects (Alessi, Hanson, Wieners & Petry, 2007; Epstein et al., 2003; Higgins et al., 2003, 2006; Higgins, Wong, Badger, Ogden, & Dantona, 2000) and other studies showing no sustained effects (Milby et al., 2003; Petry et al., 2005, 2006; Rawson et al., 2002, 2006; Shoptaw et al., 2005).

Petry and Martin (2002) investigating cocaine abstinence rates at 3 months follow up in a prize reinforcement programme found that participants in the standard treatment group reported an average of 21 days (out of 30 days) and the prize reinforcement group an average of 25 days. Similar abstinence rates were found in the CM group in the present study at 6 months follow up; participants reported an average of 23 days (out of 28 days). Yet, the self-reported abstinence rates in the ST group were lower, showing an average of 16 days. The high abstinence rates in the standard treatment group in the Petry and Martin study may have been due to the relatively low rate of baseline cocaine use compared to other studies, including the present. About half of the submitted cocaine samples were negative in the first weeks of the study, regardless of treatment group. On the other hand, Silverman et al. (1998) reported results from a 2 month follow up period which revealed substantial relapse, but also suggested that a subset of participants continued to exhibit reductions in cocaine use and cravings after the incentives were discontinued.

A handful of other studies have examined treatment outcome follow ups at 12 weeks to 52 months (Farronato, Dürsteler-Macfarland & Wiesbeck, 2013). These research efforts frequently compared and combined CM with other psychosocial treatments, in particular cognitive behavioural therapy. Some investigators stipulate that the combination of CM and CBT may produce complementary effects (Rawson et al.,

2002; Epstein et al., 2003; Rawson et al., 2006). The idea is that the onset of CM's effect is rapid (Robles et al., 2000) and the effect of CBT is not always noted during active treatment (Rawson et al., 2006). However, in the follow up period of up to 1 year after the end of treatment, sleeper effects (i.e., effects that occur with a delay after active treatment) begin to manifest, indicating improvement in drug related outcomes in clients assigned to CBT (Carroll et al., 1994). In contrast, the effects of CM tend to diminish after its discontinuation (Rawson et al., 2006). Combining these two treatments might produce complementary effects. Reduction in cocaine use would not only be rapid but also enduring (Farronato et al., 2013).

To examine this hypothesis Farronato et al. (2013), in their systematic review comparing cognitive behavioural therapy and contingency management for cocaine dependence, analysed potential beneficial effects of comparing the combination of CBT plus CM to CM or CBT alone. They concluded that positive, rapid and enduring effects on cocaine use are reliably seen with CM interventions (up to 52 weeks), whereas measurable effects of CBT only emerge after treatment and do not occur as reliably as with CM. However, in the follow up period of up to 1 year after the end of treatment, sleeper effects begin to manifest, indicating improvement in drug related outcomes in clients assigned to CBT. Synergistic effects of the combination of CM plus CBT were demonstrated in 2 trials but another 3 trials found no additive effects (ibid).

Future research could address variables that promote more enduring behavioural changes. Longer durations of contingent reinforcement, booster reinforcement sessions, or gradual reductions in the frequency of reinforcement may improve outcomes over longer timeframes (Farronato et al., 2013). In addition, future studies should try to detect predictors for the responsiveness of CM and CBT, as well as the influences on the effectiveness of the interventions, such as demographics status and other client attributes.

To achieve a more reliable effect of the combination of CM plus CBT, a better integration of CM in CBT could be advantageous. In future studies, reinforcers should be given not only for cocaine abstinence but also for therapy attendance

(McKay et al., 2010) or compliance with treatment plan, such as achieving steps toward treatment goals. Furthermore, to improve the generalisability of the findings, it is important that research groups outside of the United States conduct trials comparing CM to CBT.

Some participants had decreased their crack use or initiated abstinence at follow up, although that they did not fully engage with the CM intervention. One explanation for the improvements noted may be related to the sample electing to participate in the study (as mentioned above). It is possible that these clients had an initial desire to reduce their crack use and although that they only had a brief exposure to the CM intervention, this may have served as a further impetus to move the participants along the continuum of the 'stages of change' (Prochaska & Norcross, 2006). Although that CM is not explicitly concerned with internal change processes that may be occurring during a period of change, it is likely that it promotes reflection on drug use and consequences in the context of the individual's goals and values. Motivational models suggest that individuals initiate change when the perceived costs of the behaviour outweigh the perceived benefits, and when they can anticipate some benefits from behaviour change (Cunningham et al., 1994; Burke, Arkowitz & Menchola, 2003). This is supported by a study that found that a salient trigger that immediately preceded the decision to quit cocaine use was a decisional process, which was described as an explicit re-evaluation of cocaine in the light of the negative consequences associated with its use (Toneatto et al., 1999).

Motivation and treatment readiness should not be viewed as global, undifferentiated constructs (DeLeon, 2000). Other aspects of motivation and treatment readiness, besides the ones defined in the 'stages of change model', may have played a part in the decrease of crack cocaine use. These factors are more complex and include readiness to engage with the treatment programme, and with specific intervention activities. Readiness also includes client attributes, including skills and resources, confidence and self-efficacy related to change (Dansereau et al., 2003), and attitudes toward substance use, substance use expectancies, perceptions of social norms or other factors (Ledgerwood & Petry, 2006).

It is possible that motivation to change substance use is fluid and changing based on treatment processes and other factors, and CM may be an intervention that affects motivation. However, these answers are speculative and additional research is needed to further define the concept of motivation to change substance misuse and to identify factors that lead to changes in motivation during treatment.

### ***Conditional Probabilities of Change and Clinical Improvement***

This study found beneficial effects in reducing crack cocaine use among opiate maintained clients, yet not to the extent as other comparable US studies. In two studies by Silverman (Silverman et al., 1996a; Silverman et al., 1998), 47 – 60% of the participants that received vouchers were able to maintain 1 or more months of continuous cocaine abstinence. Both studies showed that the distribution of clients that achieved continuous abstinence ranged from 0 – 3 weeks for 50% of the participants and the remaining 50% of participants attained 5 – 12 weeks. However, a closer inspection of the results also revealed that only 2 and 3 participants, respectively, achieved continuous abstinence for the 12 week intervention period.

Equally, in another study by Silverman et al. (1996b), 50% of clients assigned to a condition in which they received vouchers for submitting cocaine free samples failed to achieve 3 weeks or more of abstinence. In two other studies (Stitzer et al., 1992; Iguchi et al., 1997), more than 45% of the opiate maintained participants failed to earn a single voucher for the submission of a cocaine free sample. However, most of the studies with opiate methadone maintenance clients have shown abstinence rates ranging from 35% to 65% (Iguchi et al., 1997; Silverman, 2004). This is a moderate to high success rate, particularly considering the fact that these clients were selected (or self-selected) for the studies because they had failed to respond to conventional treatments and considering the very high baseline rates of cocaine use in the study populations. In addition, it is important to highlight that all major types of drug treatment consistently exhibit attrition rates of more than 50% and subsequent relapse (Simpson, Joe, Rowan-Szal & Greener, 1997).

It has long been understood that retention in substance misuse treatment is important in achieving a successful outcome. Consistent attrition rates of more than 50% in all

major types of drug treatment and subsequent relapse (Simpson et al. 1997) have focused research on trying to predict which client and / or programme characteristics might improve client retention in treatment so that clients remain in treatment long enough to gain treatment benefits.

In comparing the abstinence patterns of participants in the US studies and the present results, it is noticeable that a greater number of participants attained short to medium durations of continuous abstinence in the US studies. Examining the abstinence patterns of participants' CM intervention attendance and urinalysis results allows identification of individuals who were and were not engaged by the intervention. Figure 2 shows that the CM intervention appeared effective in engaging 5 of the 21 (24%) CM participants. These participants delivered 21 cocaine free samples in the 12 week intervention period and, hence, were classified as clinically improved. Five other participants engaged with the intervention and exhibited the following patterns: one participant delivered 8 cocaine free urine samples but not consecutively. A further participant attended the CM intervention 15 times but submitted only 3 cocaine free samples. The third participant submitted 5 urine samples and 2 of these urine samples were cocaine free. The fourth and the fifth participants attended 5 times and delivered 3 and 4 cocaine free samples, respectively. Another four participants submitted only one cocaine free sample.

Overall, 7 participants remained within the  $\pm 10\%$  range of statistically significant change and were classified as unchanged as defined by the a priori criteria. Finally, nine participants delivered less cocaine free samples in the intervention than in the baseline period and, hence, were categorised as deteriorated. Although the results may be inflated by assuming the missing urine samples as cocaine positive during the intervention (which is predicated on a widely used approach in CM trials, for instance please see Silverman et al., 1996a and Budney et al., 2000), an important point to consider is that these participants did not fully engage with the CM intervention. For these participants, having had only contact with instructions about the available contingencies and no actual contact with earning or 'consuming' the voucher (not even once), the initial response requirement may have been too large or

stringent, and the reinforcement for abstinence and attendance too weak, to promote initial abstinence and engagement with the CM intervention.

There are many possible solutions to the difficulties encountered in this study. These solutions do not need to involve radical departures from the use of abstinence reinforcement but, rather, need only help participants more readily come into contact with the available reinforcers. It seems probable that any method used to increase contact with the contingencies might also increase the likelihood of success in the treatment programme. Findings from reviews (Silverman, 2004; Stitzer & Petry, 2006) and meta-analyses (Lussier et al., 2006; Prendergast et al., 2006; Dutra et al., 2008) in contingency management seem to suggest that two modifications to the present approach may have beneficial effects.

First, using quantitative urinalysis testing methods to detect and reinforce abstinence (Preston, et al., 1997) may be useful. Most studies, including the present, employed standard qualitative urinalysis testing. Under that testing method, urine samples are considered positive for cocaine if the concentration of the cocaine metabolite, benzoylecgonine, in the urine sample is at or above 300 ng/ml. However, toxicological studies in chronic crack cocaine users suggest that some individuals, many of whom achieve urinary benzoylecgonine concentrations exceeding 100,000 ng/ml during active use, may continue to provide urine samples that exceed the standard 300 ng/ml threshold for 2 – 5 days after initiating abstinence (Preston et al., 2002). As a result, using standard qualitative testing, a participant may have to remain abstinent for several days before earning a voucher for a negative sample and some individuals may not be able to attain this period of abstinence, especially early in treatment. Preston and colleagues (1997) proposed a more sensitive and continuous method of detecting recent cocaine abstinence – a quantitative measure of benzoylecgonine concentrations. Under these procedures, a participant is considered ‘abstinent’ and eligible for reinforcement if the benzoylecgonine concentration in the participant’s urine sample decreases by a specified percentage per day. Using this method, cocaine abstinence might be shaped in participants by reinforcing observed decreases in benzoylecgonine concentration (Preston et al., 2001), and the reinforcement might occur more immediately relative to the behaviour of abstaining.

However, most urine testing systems, especially on-site systems which are better suited for CM procedures (Schwartz et al., 1987), are qualitative. These technical issues must be considered in designing CM procedures to reinforce abstinence (Petry, 2000).

Second, an increase of the magnitude of the voucher value may be beneficial. This study provided low magnitude vouchers, with a maximum earning of £240 (equivalent to ca. \$468 in March 2008) for complete abstinence, compared with around \$1,200 or higher in studies showing stronger beneficial effects with similar sample sizes (Silverman et al., 1996, 1999). Silverman et al. (1999) found that some cocaine using methadone clients who were ‘non-responsive’ at standard voucher amounts achieved abstinence if amounts were increased threefold. Dallery et al. (2001) noted a direct relationship between voucher amounts and abstinence in another study of methadone clients. Accordingly, numerous individual studies have shown that magnitude of voucher reinforcement affects efficacy (Silverman et al., 1999; Dallery et al., 2001; Wong et al., 2003; Petry et al., 2004), and meta-analyses (Lussier et al., 2006; Prendergast et al., 2006; Dutra et al., 2008) have also found that magnitude of reinforcement impacts the effects sizes. However, more research is needed to identify characteristics of clients who can benefit from low magnitude reinforcers versus those that require higher magnitude reinforcers for effective behaviour change. For example, there is currently no evidence to indicate that individuals with lower versus higher income levels differentially benefit from CM interventions (Stitzer & Petry, 2006). However, it may be the case that income status could influence the reinforcer magnitude that is effective with a given individual (ibid).

### ***Survival Analysis***

Results from the survival analysis seem to indicate that if opiate maintenance clients with cocaine use are to become abstinent from crack, the onset of abstinence is proximal, rather than distal, to the start of the CM programme. The examination revealed that, after 14 days of the intervention, 57% of participants had withdrawn from the CM programme. Thus, a positive response (i.e. abstinence) to the CM treatment was likely to occur early in treatment or not at all, and this is consistent

with other clinical trials for crack cocaine use in which a positive response to treatment typically occurs within the first few weeks (2 – 4 weeks) of the intervention (Kampman et al., 2002; Dutra et al., 2008; Plebani, Kampman & Lynch, 2009; Weinstock et al., 2010).

For the second Kaplan Meier model, outcome was defined as either first positive urinalysis or drop out. This model showed that the median time until first crack use was 4 days in the CM group and 43% of the participants submitted their first positive cocaine urine sample at the first contingency session. In fact, six participants never earned a single voucher. Similar results were reported by Iguchi et al. (1997), they found that 10 of the 27 participants in the contingent group never earned a single voucher. They concluded that the reason for the low acceptability of the voucher CM intervention may be due to the low monetary value of the vouchers (total voucher value of \$185 equivalent to ca. £280 in 1997) relative to earlier studies and the insufficiency of this reward as an incentive for abstinence (Iguchi et al., 1988; Iguchi et al., 1996).

A potential practical implication of these results with respect to CM implementation in opiate maintenance services is that clients who do not respond fairly quickly to the CM procedures should not continue to be offered the same CM intervention, as most responders are early responders. Based on the results from this study, 2 weeks seems to be an appropriate timeframe to monitor initial client response to CM interventions. while Weinstock and colleagues (2010) recommended that 4 weeks may be a more appropriate timeframe. Clients demonstrating good treatment response can continue on with the intervention. If a client is unable to initiate abstinence within this timeframe, consideration of alternative treatment options is suggested.

The present results and the results from Weinstock et al. (2010) of the proximal onset for cocaine abstinence are in contrast to Silverman et al. (2004). In their study, a portion of cocaine using opiate maintenance clients were randomised to a yearlong voucher CM intervention. A few clients, 4 of 26, continued to use cocaine and only after extended exposure (i.e., 2–3 months) to the CM procedures did they initiate long periods of sustained cocaine abstinence. However, the CM procedures in their

study differed from the CM procedures use in the current study (e.g., higher magnitude of rewards, contingencies for take home doses).

In this study, clients were on stable opiate substitution doses for at least 1 month prior to starting the trial. The best timing for initiating a CM intervention in an opiate maintenance setting remains unaddressed. Further, the generalisability of these findings beyond the specific CM interventions employed and non-opiate maintenance settings are unclear. Different courses of initiating abstinence occur in non-opiate substitution settings, as the majority of clients in such settings test negative for substances throughout treatment (Petry et al., 2004; Petry et al., 2005).

### ***Psychosocial Functioning***

As in other CM studies in the United States (Petry & Martin, 2002), this study found beneficial effects in reducing crack cocaine use, but not in other areas of psychosocial functioning as assessed by the TOP scores. Achieving drug abstinence may be a necessary first step prior to improving outcomes in other domains. Once drug abstinence is achieved, clients may begin to work on other areas, such as alleviating depression, reducing family conflict, finding employment and improving legal problems. More extended treatment durations and larger sample sizes may be required to show changes in these areas because of the heterogeneous nature of psychosocial problems experienced. Some studies suggest that providing enhanced psychosocial services (McLellan et al., 1993) and reinforcing changes in other behavioural domains, such as employment (Silverman et al., 2001) and housing (Milby et al., 1996), may improve outcomes in other dimensions.

### ***Contingency Management Beyond the United States***

The difficulty of comparing the results of the present study with those obtained in previous North American studies should be stressed. Not only are the CM interventions applied in different cultures and contexts, but the implementation of the opiate substitution treatment nationally and internationally also varies, as outlined in the introduction, (please see section, *1.8. Opiate Substitution Treatment in the United States and United Kingdom*). The function of the present study was not to investigate the delivery of treatment services with respect to structures, procedures and practice.

Hence, it remains unresolved how these treatment aspects impacted on the implementation and outcome of the present research, and whether they played a part in the observed moderate acceptability and abstinence rates. However, there are two further issues that impede the comparability of the results and, thus, they deserve mentioning. The last section provides a brief discussion on the CM research undertakings of a team in Spain.

First, Petry and colleagues (2005) identified an issue regarding the different research conditions in their CM study. They suggested that the lower retention and abstinence rates in their study may be reflective of variations in the nature and context of treatment in community settings relative to research clinics. In fact, the majority of CM trials that targeted crack cocaine use in opiate maintenance clients were conducted at research clinics with efficacy study designs (Petry, 2000). Differences in research conditions (i.e. efficacy and effectiveness studies) are well known confounders that could reveal differences in achieved treatment effects. Efficacy studies often produce larger effects than effectiveness studies which typically take place in a real-world setting (Curtis, Ronan & Borduin, 2004; Petrosino & Soydan, 2005). Efficacy studies are often conducted by the researchers themselves, evaluate a method on a small scale and under optimal conditions, with a high degree of control over treatment adherence and research realisation.

Second, Gossop (2006) highlighted the lack of transparency in published CM studies regarding the offered services. He stated that most studies failed to report whether social support services were provided or made accessible, or the extent to which they were provided, if available.

Lastly, a group of researchers in Spain have published preliminary results regarding the generalisability of a specific CM programme. These studies, which are conducted by Garcia-Rodriguez, Secades-Villa, Higgins and colleagues (2007, 2008, 2009, 2011), focused on the combination of the community reinforcement approach (CRA), plus CM. The manual guided CRA plus vouchers therapy (Budney & Higgins, 1998) focused on three general topics: first, drug avoidance skills where clients were trained in functional analysis to detect antecedents of cocaine use,

problem solving (pros and cons of cocaine use and refusal), and drug refusal training; second, lifestyle change components, where clients were counselled to develop new recreational activities and a healthy social network; and third, other substance misuse, where specific interventions were carried out with all those who reported alcohol problems or cannabis use. Their studies suggest the effectiveness of CRA plus voucher based contingency management for retaining outpatients in treatment and achieving cocaine abstinence in a community setting. They concluded that their studies indeed support the generalisability of a specific CM and psychological programme for cocaine addiction, the CRA plus vouchers approach, beyond the US and with similar levels of efficacy. However, at least two important points need to be considered.

First, the CRA plus voucher CM approach is a specific and manual guided approach. This intervention was initially developed and implemented by Higgins and his colleagues (1991) for the treatment of cocaine addiction in outpatient contexts (mainly University research clinics). Second, Garcia-Rodriguez and colleagues pointed out the difficulty of comparing their results to the results obtained in previous studies with North American participants. They stated that their participants are, at least to some extent, different – especially with regards to the administrations route for the drug, which is preferentially smoked as crack in the US, whereas in Spain intranasal administration is more common. This means that the addiction severity of their clients may be lower than that of clients from other studies, so the outcomes are not fully comparable.

### ***Limitations***

It is worth noting, that the NTA imposed some methodological restrictions (please see Methodology and Result sections, *II.1. Study Setting and Research Design and III.3.3. Changes in the Planned Data Analyses*) and the study design needed to be approved. For instance, random assignment to the study groups was not allowed. Clearly, this sampling method would have evoked ethical issues but it would have increased the internal validity of the study. However, many efficacy studies have been conducted in the US. Therefore, the next step was to determine how well the intervention works in typical clinical practice outside of the US. Thus, the aim was to

examine the research question, “Does CM reduce crack cocaine use in opiate maintenance clients when implemented adjacent to standard treatment in a community service?”

With regard to the comparison group, a natural unplanned comparison group emerged from the clients that initially agreed to participate in the CM group but did not attend the scheduled CM sessions. In the first few weeks of the study the doctorate student observed that there was a group of clients that initially agreed to participate in the CM intervention but did not attend any the scheduled reinforcement sessions. Given that this group of clients had given informed consent and the usual consent to share information, (for more details please see Methodology section, *II.7. Ethical Considerations and Consent*), it was considered that this group of clients could function as a comparison group similar to a TAU group (treatment-as-usual) and thereby potentially increase the validity and reliability of the study. In this way valuable data that had already been collected would not be lost.

This research design could be vaguely compared to a TAU design. Recently, TAU designs have increased in popularity because it is a research design that can face the challenge to assess relative superiority of new treatments over current methods and still balance internal and external validity (Löfholm, Brännstroem, Olsson & Hansson, 2013). In the present study, we implemented a four week baseline period and a comparison group that received standard treatment. In this way, the contingency management group participants served as their own controls by collecting baseline data on the participants prior to the 12-weeks CM intervention period. The additional implementation of the standard treatment group should provide some assurance that history and maturation (both are extraneous variables) should have affected both groups equally.

Although that the creation of the comparison group afforded the comparison between a group that continued to receive treatment-as-usual and a group undergoing the CM intervention, it is necessary to highlight that the clients in the standard treatment group consciously decided not to participate in the CM programme. Thus it must be assumed that these clients are different to the participants in the CM group for

instance in terms of client factors such as; motivation to change crack cocaine use, treatment readiness, personality characteristics. These factors are complex and include readiness to engage with the treatment programme, and with specific intervention activities. Readiness also includes client attributes, such as skills and resources, confidence and self-efficacy related to change (Dansereau et al., 2003), and attitudes toward substance use, substance use expectancies, perceptions of social norms or other factors (Ledgerwood & Petry, 2006). This study did not systematically investigate how these two groups differed with respect to these factors. However efforts were made to compare the participants on relevant factors, as was demonstrated in section, *III.4. Demographics and Baseline Characteristics*.

Next, a particular pertinent point to the present study was the constraint that it was not possible to introduce qualitative methods complementary to the quantitative methods. For instance, the use of individual semi-structured interviews or focus groups to examine how participants experienced the CM intervention; exploring questions regarding participants' motives and reasons to engage or not engage in the intervention, and obstacles participants had to face during the intervention would have aided the understanding of the CM interventions goals and processes. Moreover, qualitative methods seek to understand the phenomenon under study in the context of the culture or the setting in which it has been studied, aiding in the development of new treatment approaches.

There are several further limitations to the present study, which should be considered in interpreting the results. First, clients were self-selected in that they chose whether to participate in the CM programme or continue with the standard treatment. It is possible that those who entered the contract would have done well with any treatment. Thus, participation in CM treatment may simply be a behavioural indicator of high recovery motivation, and it is this high motivation rather than participation in treatment that accounts for the higher rates of abstinence. This cannot be empirically refuted if participation in CM treatment is viewed as measures of motivation. There is an abundance of research evidence demonstrating the importance of motivation and readiness to change amongst drug users in seeking, complying with and remaining in treatment (De Leon, 1993; Simpson et al., 1997).

Likewise, the importance of clients' motivation for the choice of a particular therapeutic intervention has been recognised, and this is reflected in the large body of literature about enhancing treatment motivation (Miller & Rollnick 2002; Walitzer, Dermen & Connors, 1999; De Leon et al., 2000).

Conclusions about the precise nature of motivation and its role in the process of seeking and engaging with treatment, and continuous behaviour change are at times inconsistent (Claus, Kindleberger & Dugan, 2002). The reasons for this may lie in the way that motivation is defined and measured. The variety of factors and influences that impact on change related decisions and behaviours of a diverse group, such as substance misusing populations, present an additional challenge to the endeavour of understanding and explaining motivational dynamics and identifying interventions to improve motivation, treatment retention and, ultimately, sustained recovery (Groshkova, 2010).

Second, the total number of participants was relatively small and one of the outcome measures, 12-weeks of objectively verified abstinence from cocaine, was attained by only a small percentage of participants.

Third, the programme appeared to be unacceptable to some clients. Implications and possible solutions to the second and the third limitations were discussed in section, '*Conditional Probabilities of Change and Clinical Improvement*'.

Fourth, the NTA stipulated the use of the TOP questionnaire to evaluate treatment outcomes. The CISS questionnaire was routinely used at the service until 2009, hence, it was possible to draw on the results of this instrument without burdening the clients. Although that the TOP and CISS demonstrated acceptable levels of validity and reliability, these instruments would not have been the first choice of the doctorate student. Essentially, both questionnaires were developed to assess treatment outcome in routine clinical practice rather than as a research tool. The following will briefly highlight some of the controversial aspects of the TOP and the CISS.

One point concerns the administration of the questionnaires. Interviewer based questionnaires have some disadvantages in comparison to self-completion instruments. For instance, interviewers can introduce bias, which will affect the reliability of responses. Such bias might emerge from the way in which questions are asked, or in the personal characteristics of the interviewer, or in the respondents' wish to give socially desirable responses. Thus, the person who administers the instrument can have a dramatic impact on how participants respond to the measures. Researchers who administer a questionnaire to a particular group of respondents might have certain expectations (sometimes based on social stereotypes) about that group and how it should respond to the measures (Hurtado, 1994; See & Ryan, 1998). An interviewer's expectations of and behaviour toward a study participant can have a significant influence on how that participant responds to items in a questionnaire (Rosenthal, 1966). This may occur via two mechanisms: (1) the researcher might unintentionally treat different groups of participants differently (e.g., might emphasise certain words when reading instructions or smile more at one group than at another) depending on the group's background and characteristics, or (2) if the interviewer is recording the participants' responses, s/he might subtly interpret and then record their responses differently based on prior expectations. Interviewer expectancies can be communicated to participants both through verbal and nonverbal communication, potentially influencing participants' responses to items in a study instrument (Duncan, Rosenberg & Finkelstein, 1969; Jones & Cooper, 1971).

Even if the same interviewer does not inadvertently transmit potentially biasing cues to participants, many times questionnaires are administered to different groups of respondents by several different people (Richter & Johnson, 2001). This inevitably results in subtle (or not so subtle) variations in questionnaire administration that can have substantial effects on how different participants respond to questionnaire items. For example, one study found that social distance between the interviewer and respondent, a variable measured by the number of shared social identities (shared demographic characteristics) that each respondent and interviewer had in common, was a significant predictor of respondents' reports of substance use behaviours (Johnson, Fendrich, Shaligram, Garcy & Gillespie, 2000). Specifically, respondents

in dyads with relatively low social distance (i.e., more shared demographic characteristics) were more likely to report drug use. Using self-completion questionnaires reduces biasing error caused by the characteristics of the interviewer and the variability in interviewers' skills. The absence of an interviewer provides greater anonymity for the respondent. When the topic of the research is sensitive or personal it can increase the reliability of responses.

Another common criticism of structured interviews and by extension interviewer based questionnaires is that their use may damage rapport or the therapeutic relationship (Segal, Maxfield & Coolidge, 2008). Perhaps most importantly, interviewer based questionnaires may impede the connection between client and drug worker because interviews are problem-centered rather than person-centered. There is a danger that interviewers may get so concerned with the questions of the instrument that they fail to demonstrate the warmth, empathy and genuine regard necessary to form or continue a therapeutic relationship. Indeed, the standardisation of the interview may play out as 'routinisation' (Rogers, 2003). In addition, drug workers who are overly focused on the questions that they must 'get through' when they complete the TOP for example may, as a consequence, miss important behavioural cues or other information that could prove essential to the case.

Proponents of interviewer based questionnaires note that the problem of rapport-building during an interview can be overcome with training, experience and flexibility (Rogers, 2003). Therefore, as emphasised by Rogers (2003), "rapid inquiries or monotonous questioning represents clear misuse of structured interviews" (p. 222). If interviewers make an effort to use their basic clinical skills, structured interviews can and should be conducted in such a way that establishes rapport and enhances understanding of the client.

Regarding the subjective health measures (measurement items) 'overall quality of life', 'physical health status' and 'psychological health status' of the TOP. Self-rated health as one-item indicators have long been used in population surveys to measure health status, quality of life (QoL) and health related quality of life (Fayers & Hand, 2002). The classic self-rated health status item consists of asking respondents to rate

their health as “excellent, good, fair, or poor”. Variations of this question have been used in surveys worldwide (Bowling, 2005). While the single item question can provide valuable information, has the advantage of simplicity, and can be reliable and valid, it is at the expense of detail. More information may be required on different dimensions of health or QoL, than a single item can provide. Classic measurement theory holds that single items are at a relative disadvantage to multi-item measures because more items produce replies that are more consistent and less prone to distortion from sociopsychological biases, and this enables the random error of the measure to be cancelled out. Hence they are more stable, reliable, and precise (Bowling, 2005).

Furthermore, variations between surveys and nations in the wording of the item, and in the number of response categories, do limit comparative analyses and interpretations. Analysis of data from the Australian National Health Survey has shown that it does have some response instability when repeated in the same questionnaire (before and after other questions about health), although this might also reflect the biasing effect of question order (Crossley & Kennedy, 2000). And interpretation of the item at an individual level varies, depending on the referent being used by the respondent. Some people refer to specific health problems and others refer to general physical functioning when replying to the question (Meurer, Layde & Guse, 2001).

Hence, interpretation of these measures is complicated by incomparability when different people understand and respond to a given question in different ways. Paradoxical findings have been reported in many analyses of population health surveys, suggesting that single item self-report measures may be misleading without adjustment for these differences (Mathers & Douglas, 1998; Sen, 2002; Sadana, Mathers, Lopez et al., 2002). Distinguishing between differences in self-ratings due to actual health differences and differences due to varying norms or expectations for health is a key challenge in interpreting self reported measures of health (Freedman & Martin, 1998; Carr, Gibson & Robinson, 2001). We may conceptualise different dimensions of health—for example, mobility, cognition, vision—as continuous but unobserved scales. Each available response to a categorical question corresponds to a

range of values on the scale that may vary across individuals. Differing expectations for health can lead to differences in the levels at which people change from using one response category to the next—that is, differences in response category cut points. For example, a 90 year old man who struggles to climb the stairs might characterise himself as having “mild difficulties” in moving around, but a 40 year old man with the same mobility might describe himself as having “moderate difficulties.” These responses are incomparable because the individuals have different response category cut points for questions about mobility (Salomon, Tandon & Murray, 2004).

One method to remedy this problem is to use anchoring vignettes (fixed descriptions of each response choice level, to increase consistency of respondents’ interpretations of them), it has been found that their use provides a powerful tool for adjusting for the influence of varying expectations on self-ratings of health (Salomon, Tandon & Murray, 2004). This can improve comparison of results (for example, older and younger people with the same level of health might rank themselves differently on a health status scale because of varying expectations of health and ability by age).

However, psychometric theory stipulates that when a concept cannot be measured directly (for example, health status, QoL, health related quality of life), a series of questions that tap different aspects of the same concept need to be asked (Rust & Golombok, 2000). Items can then be reduced, using specific statistical methods, to form a scale of the domain of interest, and the resulting scale tested to ensure that it measures the phenomenon of interest consistently (reliability), that it is measuring what it purports to measure (validity), and is responsive to relevant changes over time. The satisfaction of these conditions is most probable when the resulting instrument contains several items to measure the concept of interest to permit testing for internal consistency and to minimise random measurement error (Rust & Golombok, 2000).

Therefore, if future CM research aims to measure and compare, health status and quality of life over time (for e.g. pre- and post-test designs) and to other studies it would be advisable to use psychometrically valid and reliable instruments. Depending on the type of information the researcher is seeking there are two kinds of

measurement scales to choose from. The study could implement a comprehensive scale from the substance misuse field (please see below) and/or a self-rated health assessment measure (for example, Physical Functioning Scale; SPF-36 (Ware, Snow, Kosinski & Gandek, 1993, 2000), Schedule for the Evaluation of Individual Quality-of-Life; SEIQoL (O’Boyle, McGee & Hickey, et al., 1993).

Future research could use the European version of the Addiction Severity Index, the EuropASI (Kokkevi & Hatgers, 1995). The reasons are that the ASI (McLellan, Luborsky, Woody & O’Brien, 1980) is probably the most widely used clinical and research assessment instrument for individuals with substance misuse problems in the US. It is a valid, reliable and standardised diagnostic, and evaluative instrument that is suitable for general use in clinical research and, thus, facilitates greater comparability of research study results (Cacciola, Alterman, Habing & McLellan, 2011). Furthermore, because of its multidimensionality, it is a comprehensive tool to evaluate treatment outcome, and would thereby facilitate the direct comparison of individual, psychosocial and treatment related attributes of the participants in CM studies.

However because no psychometric test is without problems and disadvantages, the scientific community has criticized the ASI and the EuropASI for its limitations in several areas; it has been especially criticised for its composite drug use score (Wells, Hawkins & Catalano 1988). The authors raised the issue that the composite drug use score “would not differentiate between a user of a less serious drug, such as marijuana, and a user of a more serious drug, such as heroin, if the two users are equal in terms of the number of other drugs they use and their perception of a problem or a need for treatment” (p. 866). The authors point to the fact that two drug users with the same drug use frequency would be given different scores based on their own perception of how problematic the frequency of their drug use is to them. The ASI has also been criticized for its American domain specificity in areas of family/social functioning and employment as well as for the composition of the severity ratings (Hendriks, Kaplan, Van Limbeek & Geerlings, 1989). The authors argue that treating current as well as lifetime problems equally in terms of weight may spoil the reliability of the severity ratings. As a remedy they proposed that “the

definition of severity as ‘need for additional treatment’ suggests that current problems should be weighted more than problems in the past” (p. 140). Most recently, the ASI has been criticized for its lengthy interview, failure to address risk-taking behaviours, and omission of drug use intensity, (e.g. Darke, et al., 1992; Marsden et al., 1998).

Another option would be the use of the Maudsley Addiction Profile (MAP; Marsden, Gossop & Stewart et al., 1998), it is a brief multidimensional instrument for the assessment of treatment outcome for people with drug and/or alcohol problems. It is a valid and reliable research tool, and it has been utilised as a core instrument in the National Treatment Outcome Research Study in the UK (NTORS, Gossop, Marsden & Stewart, 1997). The disadvantage is that it has not been used in published US contingency management studies, hence it would not afford comparability of the results to US contingency management studies. The design of the MAP offers a number of advantages as well as a number of limitations. For instance, the inclusion of the intensity factor (amount of substance used in a certain time frame) may be seen as both a strength and as a limitation. There are concerns about self-reported amounts, doses and drug purity. According to the authors, however, “an estimate of the usual quantity of substances consumed is a desirable additional clinical and research measure, not least because at follow-up an individual may have maintained the same frequency of use but achieved a reduced level of consumption” (Marsden et al., 1998, p. 1858).

A further limitation of the MAP, as well as other comprehensive substance use measures, is the possible impact of recent substance use on the severity of psychological problems. As such, problem severity on the psychological health domain of the MAP may either be substance related or purely mental health related (Barbieri, 2003). It is important to define this difference clinically for treatment purposes.

Another limitation may be found in the relationship conflict domain, especially in what constitutes conflict. Conflict is defined by major arguments as well as by violence. What constitutes a major argument needs to be operationalised (Barbieri,

2003). The difference between what constitutes a major argument or a relatively minor argument is rather vague and may result in false positives or false negatives concerning client responses. The MAP has been developed as an outcome measure with a minimum outcome data set. As such, this measure may be used as a screening tool to identify problem areas for which more extensive clinical evaluation is necessary, using more specific and extensive assessment tools.

Generally, multidimensional instruments in the addiction field that were developed in the UK as well as in other countries are limited (Barbieri, 2003). The use of a standardised comprehensive measure that is sensitive to change, is time-limited and quantifiable, using diverse populations and services will increase the certainty that matching client to treatment will actually result in treatment outcome improvement (McLellan & Alterman, 1991). The ability to compare results across treatment programmes and groups of clients across cultures is fundamental in developing some consensus with respect to addiction related assessment, treatment and outcome.

Having outlined the shortcomings of the TOP, it is also important to highlight the advantages of the tool. One obvious advantage was that the TOP was already in use at the service, and hence drug workers and clients were familiar with the tool. Therefore, it was not necessary to burden the clients with the completion of an additional instrument. It also has the benefit of reliably measuring drug use and drug use severity for the presented substances. That is to say, reliable change can be determined by the drug worker based on the individual's progress in reducing their substance use. Further, the measurement items 'injecting risk behaviour' can indicate a key step on a recovery journey and will have a significant impact on reducing wider health harms, including the prevalence of HIV (Barbieri, 2003). The measurement items related to housing problems have been identified as a significant issue in supporting a sustainable recovery. Evidence suggests that sleeping rough or having no fixed abode can have a negative impact on an individual's recovery journey (Marsden et al., 2008). Overall, the problem domains, substance use, health risk behaviours and social functioning are vital when considering treatment outcome.

Fifth, the small sample size precluded the application of more advanced statistical methods such as a logistic regression analysis to examine the usefulness of participants' demographic and baseline characteristics (independent variable) in predicting the likelihood of cocaine abstinence at three months of treatment and at six months follow up. Similarly, using other multivariate analysis techniques, possibly a multiple regression analysis to examine some of the TOP and CISS items, would have potentially contributed valuable knowledge about the influence of individual, psychosocial and treatment related aspects as predictors of outcome. A series of studies suggested that social interactions, behaviour of drug consumption and treatment participation are related (Buchanan & Latkin, 2008; Bohnert et al., 2010) and, with some exceptions (McLellan et al., 1998), several studies have found that clients who are engaged in and satisfied with their treatment experience tend to stay in treatment longer or have better treatment outcomes (Holcomb, Parker & Leong, 1997; Sanders et al., 1998; Kaspro, Frisman & Rosenheck, 1999).

An advantage of this study was that follow up data was collected. Although this data was self-reported (verified by weekly/fortnightly urinalysis results), it provided a measure of crack cocaine use six months after the CM intervention in comparison to the standard treatment group. Thus, beneficial effects of the CM procedure persisted beyond the intervention phase, and future research could address variables that promote more enduring behavioural changes. Longer durations of contingent reinforcement, booster reinforcement sessions, or gradual reductions in the frequency or probabilities of reinforcement may improve outcomes over longer timeframes.

Since self-reported crack use was one of the main dependent variables in the study, it is vital to address the issue of self-reporting among substance users, as there are misconceptions that plague the field. Scales by definition rely upon self-reporting. Concern is often raised about the accuracy of such self-reporting, particularly amongst illicit drug users (Miller, Strang & Miller, 2010). In this field, however, self-reporting is often the only feasible methodology that can address the research questions of interest to the investigators. Investigation of drug use, criminal behaviours, needle sharing, etc., by their very nature, involve a reliance on self-reporting from respondents.

Two major concerns are often raised. First, there is the commonly held view that drug users are ‘pathological liars’ by nature (Miller, Strang & Miller, 2010). Second, the nature of the activities being investigated is frequently illegal and socially undesirable. Respondents may be reluctant to admit to socially undesirable behaviours because of the stigma attached to these behaviours. There is no evidence for either of these assertions (Jackson et al., 2004). This is an area that has been extensively researched, and the self-reporting of drug users in research settings has repeatedly been demonstrated to have high levels of reliability and validity (Drake, 1998; Welp et al., 2003; Jackson et al., 2004). This has been found to be true for substance use, crime, risk-taking, etc. Given accurate instrumentation, the researcher in the drug and alcohol field should have confidence in the data that are produced (Miller, Strang & Miller, 2010).

A further advantage of this study was the use of the clinical significant change method to assess clinical significance at the individual level of analysis. Thomas and Hersen (2011) stipulate that effectiveness research should address not only whether clients have abstained from drug use but whether they have abstained from drug use for a clinically meaningful period, that is, whether clients improve their symptoms to the extent that they are more like non-distressed clients (i.e., ‘normal’ people). This allows individuals to make a more informed decision on their using behaviour, and cognitive functioning improves after a few days of abstinence (Stitzer, Iguchi & Felch, 1992). Natural recovery processes that take place during periods of sustained abstinence, including gradual diminution of response to drug related cues and lifestyle changes that provide alternative competing reinforcers, may then form the mechanisms for longer-term recovery of dependent individuals (Stitzer & Petry, 2006).

In a seminal article, Jacobsen and Revenstorf (1988) outline the problems with aiming for statistically significant change alone. They noted that, even though change may be reliable, it may not be meaningful. The authors noted that unless clients are becoming more like the non-clinical population than the clinical population, they have not made clinically significant change. The original method was developed as

part of a call for a more clinically meaningful way of reporting treatment outcome (Kazdin, 1977; Barlow, 1981; Kendall & Norton-Ford, 1982). Clinical significant change proponents have been advocating its effects for three decades, yet there is still a predominance of conclusions, which are based on small statistical effects of little practical importance. Moreover, there is a tendency toward over-interpreting group differences, which may not satisfy clients, but nonetheless are used by researchers to confirm their a priori hypotheses. The present researcher contends that most clients enter treatment wanting an end to their suffering, not simply a statistically reliable improvement. As Follette and Callaghan (1996) expressed it, until therapists and therapy researchers are willing to tell their clients and society at large that they cannot return people to normal functioning; this seems to be a reasonable criterion to employ (Jacobson, Roberts, Bem & McGlinchey, 1999).

#### **IV.1. Summary and Conclusions**

The contingency management approach investigated in this study illustrates the potential utility of an operant approach to conceptualising and treating crack cocaine use in opiate maintenance clients. Crack cocaine use in opiate maintenance clients has been common, persistent and difficult to treat with conventional approaches (Silverman, 2004). Indeed, participants in the present study were selected because they continued to use crack at high rates despite exposure to conventional treatments. Despite the limited success of the CM intervention to engage sufficient numbers of participants in the present study, the firm scientific foundation on which the CM intervention is based, the prior demonstrated effectiveness of the CM intervention, and the detailed analysis of the data from this study (presented above) all suggest parameters of the CM intervention that could be adjusted to increase its effectiveness and could improve the prospects of success with this difficult to treat population. As Baer, Wolf, and Risley (1987) recognised, technological failure of this type “is an expected and indeed important event in the progress of any applied field, even those whose underlying theory is thoroughly valid” (p. 324). Addressing the technological issues that led to the limited success to engage some of the individuals in this study could lead to considerable improvements in the CM intervention.

A reasonable but tentative conclusion based on this study is that CM programme participation seemed to increase the abstinence rate during treatment and at 6 months follow up, in comparison to the baseline period and the standard treatment group. Furthermore, this study investigated the period during which abstinence was initiated in opiate maintenance clients from crack cocaine use who were beginning a CM treatment. Results from this study combined with previous research suggest timeframes for decision making in the event that a client does not respond. If clients were to become abstinent during the intervention period, they most often ceased using during the first 1 to 4 weeks of treatment (Weinstock et al., 2010). Thus, continued application of CM beyond this time period is unlikely to benefit many clients, and alternate treatments may be warranted for this subpopulation.

It is a well recognised and documented problem that a substantial proportion of clients do not achieve significant drug free periods when abstinence alone is reinforced (Stitzer & Petry, 2006). One explanation for non-response to CM interventions is that the reinforcer (initial £5 voucher) may be too small to compete with the reinforcement associated with continued drug use. Clearly, higher magnitude reinforcers may be needed to change behaviours that themselves induce strong positive effects (drug use) compared with behaviours that induce smaller effects (attendance of a medical appointment or a therapy session). In other words, winning slips with a low probability of winning \$25 may alter treatment engagement but may be unlikely to change drug use. A general rule is to choose a reinforcer that can compete with reinforcement derived from the behaviour targeted for change. The contrived reinforcement may be reduced once a new behaviour pattern has been established (Higgins et al., 1994b).

Another possible explanation is that the response requirement may be too high. Two to five days of crack cocaine abstinence must be achieved for a urine specimen reading to be negative, and some individuals may not be able to attain this period of abstinence, especially early in treatment. Reinforcing successive approximations toward abstinence by providing reinforcers contingent upon quantitative reductions in drug metabolites may be one technique to overcome this obstacle (Elk et al., 1995). However, most urine testing systems, especially on-site systems which are

better suited for CM procedures, are qualitative (Katz et al., 2002; Sigmon et al., 2004). These technical issues must be considered in designing CM procedures to reinforce abstinence.

It is of great interest to corroborate the applicability of this intervention to a different cultural setting by testing one of the most reliable findings from CM literature; the influence of reinforcement magnitude. Further research could evaluate the effects of quantitative urinalysis testing and voucher magnitude on crack cocaine abstinence in a European cultural context and in a community setting. Systematic research to improve the effectiveness of contingency management interventions in general, and CM interventions with opiate maintenance clients with concurrent crack cocaine use in particular, is critical if researchers are going to succeed with the substantial proportion of unresponsive clients who fail to respond to currently available treatment approaches.

Overall, the application of CM principles to the treatment of drug misuse has altered the landscape and conceptualisation of treatment interventions in the US (Petry, 2000). Novel applications have been developed that integrate CM into community treatment: for example, health promoting activities such as hepatitis B vaccinations and employment based models; for example, participation in paid job training or work in a programme operated data entry business, where the persons can only earn salary for the work on days when they have delivered opiate and cocaine free urine samples at the programme. In this novel conceptualisation of CM, earned salary is used as the contingent benefit, with the opportunity to work and earn salary being closely tied to and contingent upon abstinence (Silverman et al., 2001; 2002). These novel CM implementations expand the potential therapeutic application of positive reinforcement.

Additionally, exciting research ventures have examined whether CM may additively and synergistically improve outcomes when combined with psychotherapy, specifically CBT. Although these studies have not yet shown clear benefits of the combined interventions above the voucher intervention alone, researchers in this field suggest that, in order to achieve a more reliable effect of the combination of

CM plus CBT, a better integration of CM in CBT could be advantageous (Farronato et al., 2013). As postulated by Farronato et al. (2013) and McKay et al. (2010), positive, rapid and enduring effects on cocaine use are reliably seen with CM interventions (up to 52 weeks) and measurable effects of CBT seem to emerge after treatment and do not seem to occur as reliably as with CM. However, in the follow up period of up to 1 year after the end of treatment, sleeper effects begin to manifest, indicating improvement in drug related outcomes in clients assigned to CBT.

In future studies, reinforcers should be given not only for crack cocaine abstinence, but also for therapy attendance (McKay et al., 2010) or compliance with treatment plans, such as achieving steps toward treatment goals. This is an important area of investigation for understanding the mechanisms of behaviour change underlying long-term abstinence outcomes when external reinforcers are used during CM interventions to promote periods of sustained abstinence (Farronato et al., 2013). Furthermore, to improve the generalisability of the findings, it is important that research groups outside of the United States conduct trials integrating CM with CBT and other psychotherapy approaches.

In conclusion, although that the applied CM programme was feasible, the execution of the CM programme at our service confirmed that it is a time and labour intensive treatment. The systematic application of the CM programme demands additional labour and funds, which may be difficult to sustain in clinical practice. The present protocol would not fit into existing structures and be delivered by front line staff as part of their day-to-day clinical duties. Accordingly, this study illustrates that it is challenging to strike a balance between clinical acceptability/feasibility considerations and fidelity to research based methods previously shown to be efficacious.

However, it is vital to consider that there was a sub-sample of clients that engaged well with the CM programme and some clients achieved 12-weeks of crack cocaine abstinence. One innovation of the CM programme that could be tested in a larger study at UK community service to address the cost concern was the recently developed *fishbowl* method (Petry, Martin & Simic, 2005) that utilises principles of

intermittent reinforcement to reduce cost of CM interventions (for a more detailed description of the prize CM technique please see section; *1.9.4. Contingency Management in Psychosocial Counselling Programmes and Methadone Maintenance Programmes*). With this method, submission of a drug free urine sample results in the opportunity to draw tokens from a bowl, on which prize winnings are designated. Intermittent reinforcement is accomplished by having only half the tokens in the bowl result in prizes. Usually total earning value is less than half the total earnings possible in previous voucher incentive programmes in the US (Petry, Martin & Simic, 2005). This lower cost method would increase the feasibility and sustainability of abstinence incentive programmes overall.

An alternative is the behavioural strategy of tailoring incentives to individual clients in order to attain various treatment plan goals. This method was adopted at our service after the CM programme concluded. Utilising this behavioural model we incentivised objective treatment plan goals that were in accordance with the harm minimisation approach and therefore reinforced behaviours that were related to rehabilitation, recovery and self-sufficiency. Incentives were offered to all opiate maintenance clients that continued to exhibit problematic behaviours (for example, concurrent drug use) or continued to miss scheduled appointments (for example, appointments with the nurse to screen for blood-borne viruses, the dentist or vocational advice). In collaboration, the client and drug worker identified a target behaviour the client aspired to address. The incentives comprised of the same retail vouchers that were used in the CM programme. It was financed from the remaining NTA funds. Appointments that were not held at our service required evidence of attendance. Many clients commented positively on this intervention and were actively involved in the goal setting of the target behaviour. This allowed focusing on smaller incremental steps of behaviour change that led in some cases to larger more sustained changes. Additionally, it highlighted to clients and drug workers alike that any step in the right direction could be a cause for celebration and that in the face of setbacks drug workers encouraged clients to try harder rather than criticise. Thus, this approach encouraged staff members to focus on the good things that clients did, not on their failings.

We believed it was important to demonstrate to clients and drug workers the value of setting up contingencies that reinforced smaller behaviour changes so that the more troubled and/or more severely dependent clients had the opportunity to benefit. It seems possible that community services could develop their own incentive procedures tailored to the specific needs of their own client population and the unique clinical priorities of their programme. Importantly, this model of dissemination is experiential rather than didactic, with the drug workers and psychologists providing their own monitoring and feedback in group supervision. This process could result in a rich array of insights about what works and what interferes with effective adoption of incentives at each service.

Politics and ideology will clearly impact on the expansion of this technique in practice. However, objections toward ‘paying drug users to do what they should do anyway’ may be somewhat tempered by pragmatic and Machiavellian principles of doing whatever works best for this difficult to treat and often disenfranchised population (Petry, 2006). Evaluation of contingency management approaches in other cultures and societies ultimately may enhance prevention efforts in high risk groups and improve treatment outcomes of drug misusers throughout the world.

The last section in the empirical paper considers some of the moral and ethical concerns about using incentives in health care, and some of the implications for future research and clinical practice.

## **V. INCENTIVES IN HEALTH CARE: RATIONALE, ETHICAL ISSUES AND CLINICIANS’ VIEWS**

Health as an asset is special in at least two ways: first, in a very obvious sense, good health matters in our lives in experiential, if not existential terms. Second, health has a clear impact on one’s civic and economic livelihood and the options one can make use of in a society based on fair equality of opportunity (Daniels, 2007).

The classical homo economicus model holds that people are self-interested rational agents who are generally able to identify the means necessary to achieve goals

worthy of pursuit, and to act accordingly (Schmidt, Asch & Halpern, 2012). The case of health behaviour, along with other situations, such as retirement planning, challenges this assumption. Even though the desire to lose weight, to drink less or to stop smoking is felt strongly by many people, many also fail to act on it, despite being quite clear about the means that are required, such as eating less and exercising more. The reasons can be manifold and are often to do with people's specific circumstances in life. In addition to these and further circumstances, there appear to be powerful psychological constraints that can have a grip on people's ability to change their behaviour (Schmidt, Asch & Halpern, 2012).

This section will first discuss some of the basic motivational processes involved in the acquisition and maintenance of health related risk behaviours, and then focus on some of the moral and ethical concerns about the use of health incentives and contingency management interventions. How these concerns impact on clinicians' views and the adoption of CM into clinical practice is considered. It is suggested that it is important to consider these factors when designing a clinical trial and attempting to implement CM interventions. It is important to clarify at this point that this critical appraisal is a general brief discussion of incentives in health care and not limited to CM in substance misuse.

Contingency management interventions in substance use are typically implemented to retain service users in treatment and to foster drug abstinence. CM interventions involve identification of a target behaviour such as abstinence which is reinforced with an incentive when it occurs, and the incentive is withheld when the target behaviour does not occur (Petty, 2006). Often a monetary voucher such as that used in the present study, detailed in the empirical paper, is used as an incentive.

### ***Motivational Processes and Systems***

There is growing recognition of the need for effective interventions to promote healthy behaviour change among those who already engage in various risk behaviours, as well as to prevent the acquisition of unhealthy behaviours among those who do not yet engage in them but are at risk for so doing (Marteau, Ashcroft & Oliver, 2009). In addressing the question of why look to incentives for this

purpose, some discussion of the basic motivational processes involved in the acquisition and maintenance of health related risk behaviours can be helpful. There is overwhelming scientific evidence that reinforcement and operant conditioning processes play a central role in the acquisition and maintenance of health related risk behaviours (Bickel, Yi, Landes, Hill & Baxter, 2011; Higgins, Heil & Lussier, 2004). The substances that people abuse and the fatty and salty foods that are so often over-consumed, for example, share a common effect of directly stimulating dopamine-based mesolimbic brain reward centres, which directly increases the likelihood that these same activities will be repeated in the future. That is, these risk behaviours are controlled to a considerable extent through the behavioural process of reinforcement (Bickel et al., 2011). Considering that the reinforcement process and associated brain systems evolved to support the survival of the species under conditions of constraint, it should not be surprising that the behavioural effects that it produces can be strikingly robust and resilient. As discussed in the thesis, incentive programmes can be especially helpful if constructed appropriately because they leverage that very same reinforcement process that drives unhealthy risk behaviours to promote healthy behaviour (Higgins, Heil & Lussier, 2004). Indeed, financial incentives activate those very same dopamine-based, mesolimbic brain reward systems that drive repeated drug use, fatty food consumption, and other operant behaviour (Knutson, Fong, Adams, Varner & Hommer, 2001).

Three important and related aspects of existing scientific knowledge about these motivational systems are particularly relevant to understanding health related risk behaviours and why incentives have an important role to play in efforts to change them.

First, there is evidence from preclinical laboratory settings, clinical laboratory settings, treatment outcome research, and epidemiological studies supporting the position that impoverished environments where there are few competing sources of alternative reinforcement render responding that is maintained by drugs and other basic sources of reinforcement more resistant to change (Campbell & Carroll, 2000; Carroll, 1993, Higgins, 1997; Higgins, Heil & Lussier, 2004). There certainly appears to be a substantive factor underpinning the overrepresentation of these risk

behaviours and associated problems among economically disadvantaged populations (Higgins & Chilcoat, 2009).

Second, behavioural economic research has characterised some fundamental biases in the way that humans make choices between different reinforcement options that increase vulnerability to these risk behaviours, with one such bias being what has come to be referred to as the ‘present preference bias’ (Loewenstein, Brennan & Volpp, 2007). What this refers to is a tendency to prefer immediate over delayed reinforcement, even when the amount of reward associated with the more immediate option is smaller, and to also prefer lower over higher initial costs, even when the longer-term gain is greater in the option with a higher initial cost (Bickel & Marsch, 2001). In other words, the pleasure of an extra helping of cake today will often be preferred over the pleasure of being healthier later — even if one's future self would prefer the alternative.

Equally, it is not difficult to envision, for example, how this bias can factor into a pattern of repeatedly choosing the more immediate euphoria of drug use and abuse over the delayed health benefits of a drug free lifestyle, the alluring taste of fatty foods over the blander tasting but healthier longer-term benefits of fruit and vegetable consumption, or the comfort, warmth, and relatively low effort of sedentary activities over the initially more demanding but healthier long-term effects of participating in regular exercise (Higgins, Silverman, Sigmon & Naito, 2012). Indeed, there is a growing literature demonstrating a relatively greater bias for the present among individuals with various addictions, obesity, and low compliance with disease prevention regimens relative to otherwise comparable individuals who are without those problems (e.g., Bickel et al., 2007; Bradford, 2010). Moreover, the degree of this bias is negatively associated with level of income or educational attainment, which likely also contributes to the overrepresentation of these risk behaviours and chronic health problems among disadvantaged populations (Green, Myerson, Lichtman, Rosen & Fry, 1996; Jaroni, Wright, Lerman & Epstein, 2004).

The underlying mechanisms that often lead to inertia and procrastination can, however, be turned around by exploiting the very principles that fuel them; for

example, by providing immediate feedback and rewards for behaviour change. A further important concept established in observational and experimental research relates to loss aversion (Kahneman & Tversky, 1979). What is meant here is that people disproportionately prefer avoiding losses to making gains (of equivalent value). These and other principles of behavioural economics (Loewenstein, Brennan & Volpp, 2007) have been applied successfully in many health care areas and produced measurable, tangible benefits using incentive programmes that included fixed sum discounts, cash rewards, lotteries, or deposit contracts in areas such as medication adherence, smoking cessation, weight loss or substance abuse management (Defulio & Silverman, 2012; Giuffrida & Torgerson, 1997; Higgins et al., 2012; Jeffery, 2012; Lussier et al., 2006; Paul-Ebhohimhen & Avenell, 2008; Volpp et al., 2006; Volpp et al., 2008a; Volpp et al., 2008b; Volpp et al., 2009).

Third, an additional characteristic of human decision-making that merits mention in this context is a greater sensitivity to discrete and salient behavioural consequences over those that are more diffuse or subtle (Loewenstein et al., 2007). To grasp the potential impact of this characteristic on the matters under discussion here, one need only contrast the readily discernible onset and salient tastes associated with the consumption of fatty and salty foods that contribute to hypertension compared to the relatively diffuse and largely imperceptible benefits of exercise related reductions in blood pressure (Loewenstein et al., 2007).

### ***Ethical and Moral Issues of Contingency Management***

Despite the benefits, the use of incentives is controversial. The ethical discussion is closely linked to the broader debate about the role of personal responsibility for health, solidarity, coercion and autonomy, and privacy (Blacksher, Rigby & Espey, 2010; Gollust & Lynch, 2011; Hoffman, 2011; Lynch & Gollust, 2010; Schmidt, 2009a). Such debates have ramifications for the ethics of implementing CM in a health care setting such as the NHS. These arguments may also affect a clinician's attitude to CM and its incorporation into clinical practice.

Those who support the use of incentives in principle generally point to evidence that these programmes often work (Halpern, Madison & Volpp, 2009). They also note

that in addition to improving the health of individuals, programmes may help reduce health disparities at the population level (Oliver & Brown, 2012; Schmidt, 2009b). Opposition to incentive programmes takes several forms. One general objection is that the focus on individual-level behaviour is misguided, and that instead broader population-level approaches should be pursued: for example, free screening programmes, legal limits on fat, salt, and sugar-levels in foods and drinks, restrictions on advertising and availability of tobacco and alcohol, or improved access to safe and affordable exercise facilities. These initiatives are often regarded as more efficient and fair (Blacksher, 2008; Daniels, 2007; Minkler, 1986; Raikka, 1996; Resnik, 2007; Wikler, 2004).

There is also concern that health incentives can unduly penalise people for poor health (Bishop & Brodkey, 2006), and recent experimental work suggests that “financial incentives, whether rewards or penalties, are judged as less acceptable and less fair than medical interventions” (Promberger, Brown, Ashcroft & Marteau, 2011, p. 682). Others note that it can be difficult to treat like cases alike: if we impose penalties on smokers or the obese on the grounds that their behaviours lead to avoidable harm, should we not do the same in other cases, such as poor dental hygiene, excessive sun exposure, unprotected sex, high-risk sports, or stressful careers? Deciding which risks are worthy of intervention can appear arbitrary (Wikler, 1978; Wikler, 2004).

Concerns are also expressed that CM interventions discriminate against the poorest and most vulnerable in society. Interestingly, high rates of taxation on cigarettes, which can be considered as a disincentive and punitive, and arguably disproportionately affect the poorest, have been accepted by society (Kember, 2013). Halpern and colleagues (2009) emphasise that incentive programmes differ from disincentive interventions in that they offer more support to the disadvantaged and promote wellbeing.

### *Personal Responsibility*

The concept of incentives carries an inherent risk of undermining personal responsibility for health and people’s intrinsic motivations to promote their own

health (Oliver, 2009; Schmidt, 2009a). Provision of incentives may diminish people's sense of responsibility to contribute to the common good (Schmidt, 2008) In the conceptual framework of solidarity (Schmidt, 2008) and personal responsibility for health, (Steinbrook, 2006) financial incentives might offend the "First Formulation of Kant's categorical imperative" (Lunze & Paasche-Orlow, 2013, p. 661), where the motivation for healthy behaviour is derived from a duty to maintain our health and should not be motivated by external factors, such as a reward. On the other hand, health promotion aims to encourage people to act responsibly and make healthy choices. If enrolment in incentive programmes is voluntary, people can decide for themselves whether they endorse the aims of the programme. An alternative is to allow participants to donate their rewards, an option offered by some programmes (Barmer, 2012).

A similar charge is that incentives may become the sole reason for action, thereby undermining or crowding out intrinsic motivation (Frey & Oberholzer-Gee, 1997), agency or patient autonomy (Ashcroft, 2011). In a broader sociological perspective, incentives could also be seen as part of the paradigm of 'healthism' in which 'good health has become a new ritual of patriotism, a marketplace for the public display of secular faith in the power of the will' (Levin, 1987; Steinbrook, 2006).

Another risk of undermining personal responsibility for health is that if people become reliant on receiving a reward, then cessation of rewards (e.g., at the completion of a programme) might lead to cessation of the healthy behaviour or even a return to hazardous behaviour. Rewards programmes may also generate the expectation that rewards should be offered for other activities that are not yet incentivized. The fact that a programme provides incentives for, say, physical activity might create the expectation of getting rewarded for unrelated behaviours, such as dental hygiene practices. Indeed, the long-term effects of incentives are not known. Further research is needed to determine whether dependence on rewards is an outcome of such programmes.

### *Solidarity*

On an individual basis, regaining health in the case of sickness can be extremely costly, if not impossible to afford. Admittedly, countries that have made social health insurance mandatory have taken away a degree of liberty in relation to whether or not people should protect themselves against the consequences of poor health. But nonetheless, it is plausible to describe those brought together in social health insurance systems as being in a solidaristic relationship with others, which has the aim of providing mutual protection against the negative implication of diseases (Schmidt, 2008).

Paying people for something they are supposed to do could weaken solidarity among individuals for the common good (Schmidt, 2008). The principal characterization of solidarity and personal responsibility is that the community as a collective, and people individually, are co-‘producers’ of health. The notion of co-responsibility has two important facets in this respect (Schmidt, 2008). First, it states that the ‘mutually supportive community’ has a certain degree of responsibility for the health of each individual. In this sense, individuals are entitled to claims against the community for assistance. Second, it also implies that the community has certain claims against individuals. Leaving prudential benefits aside, the appeal to staying healthy has the aim of containing overall expenditure and opportunity costs, for all care needs to be financed by the solidaristic community, and limiting one’s demands on the health care system reduces expenditure. Using services unnecessarily may also deprive another person in need of resources or medical attention, exacerbating resource allocation dilemmas (Schmidt, 2008).

Consequently, people are entitled to ask the community for assistance, and the community has certain claims on individuals for community-minded behaviour. In this sense, healthy behaviour can be considered at least in part to stem from a form of civic duty (to minimize the collective risk pool) and should not be contingent on financial incentives (Lunze & Paasche-Orlow, 2013). Thus, there is potential to undermine this sense of duty by paying individuals for prevention.

Some argue that incentives negatively affect the risk-pooling principle of solidarity, because paying rewards to those who do not need incentives reduces the funds available to the collective, whereas others contend that offering incentives maintains the health of the risk pool (Schmidt, 2008). People may feel that they have no responsibility for maintaining a healthy population (representing the general risk pool of society); thus, if society wants a certain behaviour, then those people need to be incentivised to fulfil what should be their social duty. Although these arguments hold true in some cases, rewarding certain behaviours such as physical exercise might also lead to an increase in other beneficial behaviours, increasing solidarity within a mutually supportive community by making healthy behaviour the norm (Lunze & Paasche-Orlow, 2013).

#### *Coercion and Autonomy*

One argument against incentives is that they may make people act against their own wishes, (Ashcroft, 2011; London, Borasky & Bhan, 2012; Marteau, Ashcroft & Oliver, 2009; Popay, 2008) essentially undermining personal freedom of choice, because money or in-kind rewards might make people feel forced to participate, or induce them to ignore risks. However, the available evidence does not support this concept (Lunze & Paasche-Orlow, 2013). For coercion to occur, there must be a credible threat of negative ramifications (e.g., loss of health benefits) for not acting, (Halpern, 2011; Madison, Volpp & Halpern, 2011) which is not present in the case of reward based incentives.

An alternative possibility is that incentives have the opposite effect, that of reducing barriers to autonomy. Abolishing cost barriers to behaviour change and health promotion, and making prevention cost-neutral, might have the potential to increase personal autonomy, such as when incentives facilitate a behaviour change to which people are already committed but have not yet implemented (London, Borasky & Bhan, 2012).

#### *Privacy*

The fourth concern with incentives relates to privacy. Because the efficacy of incentives must be monitored (for example, salivary or urinary measurements might

be used to document abstinence from substances), such programmes could increase the health care service (governments') involvement in peoples' private lives (Halpern Madison & Volpp, 2009). However, because the costs of peoples' decisions are at least partly borne by third parties who pay for health care services, governments have legitimate interests in promoting health and reducing absenteeism. Furthermore, because incentive programmes should not be compulsory, people who value privacy more than rewards could avoid such monitoring by simply opting out from incentive programmes (Halpern Madison & Volpp, 2009).

When implementing CM, the programme should aim to minimise intrusion. This is not only of relevance in terms of respect for autonomy but also with regard to the acceptability and sustainability of a programme seeking to promote responsibility. Intrusiveness therefore concerns the extent of interference and, in a wider assessment, whether a particular measure is likely to be the least intrusive, but most effective of a set of available options (Schmidt et al., 2012).

### ***Incentive a Form of Asymmetric Paternalism***

The approach of paying clients for healthy behaviour has been termed 'asymmetric paternalism' (Loewenstein, Brennan & Volpp, 2007) - paternalistic because private and public institutions encourage people to make decisions that will improve their lives (almost protecting them from themselves/'in spite of themselves), and asymmetric because it encourages people to make informed decisions that will improve their lives without restricting freedom of choice. Other promulgated terms include 'optimal paternalism,' 'cautious paternalism,' and 'libertarian paternalism' (Sindelar, 2008).

For some proponents, incentive programmes represent an acceptable 'nudge' (Cookson, 2008), for others, they represent an unacceptable paternalistic 'shove.' (Popay, 2008; Marteau, Oliver & Ashcroft, 2008). Sunstein and Thaler (2003) state that it is inevitable that organisations make decisions and take action that will impact on people's choices. Examples of such decisions range from implementing an opt-out organ donor scheme, to removing unhealthy food and snacks from school cafeterias. The authors suggest that taking actions that impact on

people's choices does not necessarily equate to coercion. Drawing on some well-established findings in behavioural economics and cognitive psychology, it is possible to emphasise that, in some cases, individuals make inferior decisions in terms of their own welfare -decisions that they would change if they had complete information, unlimited cognitive abilities, and no lack of self-control (Sunstein & Thaler, 2003).

Asymmetric paternalism and providing an incentive does not limit the choices or options available to the individual. Incentives merely counter our self-defeating tendencies toward immediate gratification (Kane, Johnson, Town & Butler, 2004). Without constraining our options, it is difficult to argue that they infringe on autonomy (Bloch et al., 2006). In this way, incentive programmes are a good example of asymmetrical paternalism, (Lunze & Paasche-Orlow, 2010; Finkelstein, Linnan, Tate & Birken, 2007) in that they steer people toward making better choices without actually limiting what those choices are.

Furthermore, it helps guide them towards making better choices, as judged as better by themselves (Halpern et al., 2009). Halpern and colleagues (2009) developed this argument further, explaining that people possess varying degrees of ability to change their behaviours that impact on their health. These abilities are affected by environmental, economic and genetic factors, and lifestyle behaviours. For instance, lifestyle behaviours reflect individual choice, but these choices are influenced by social context. People's dietary habits are shaped by advertising, cost, social norms and emotional needs, and their ability to exercise is influenced by their commuting patterns, the safety of the environment and whether the environment feels safe (Schmidt, Asch & Halpern, 2012). Therefore, society has a responsibility to help people who encounter such obstacles.

In other areas where asymmetric paternalism is exercised, involving a change of the 'default' position, for example, changing an organ donation system from opt-in to opt-out, (as will be implemented in Wales in 2015), one could argue that an individual's freedom of choice is being restricted as decisions are not consciously thought through (Rajan, 2012). This critical appraisal suggests that the same

argument is not as applicable in the case of CM for crack cocaine users in the present trial. Participants in the current trial are voluntarily attending an opiate substitution treatment, which has an explicit aim of reducing illicit drug use. Therefore, the accepted goal of reducing crack cocaine use has been consciously considered by the individual, and CM supports them in reaching this goal rather than being coercive.

### ***Clinicians' Ethical Concerns and Views***

Clinicians can hold ethical concerns and negative views about CM which can effect the uptake of CM (Sinclair et al., 2011). Kirby and colleagues (2006) identify a concern amongst clinicians that CM does not address the underlying issues that lead to drug addiction. Rash et al., (2012) conducted a web based study to develop a measure assessing beliefs about CM and to examine the relation of these beliefs to clinician characteristics. The authors identified a number of other commonly held negative beliefs about CM that could affect its uptake. These included the cost of the intervention and a concern about what happens after the withdrawal of the incentive. Rash et al. (2012) also highlight an attitude that the empirical basis of CM is not relevant to everyday clinical populations. Attitudes toward treatment manuals, evidence based practice (Henggeler et al., 2008) and traditional views about treatment can be barriers to the adoption of a new treatment like CM (McCarty et al., 2007). Another concern held by clinicians is that patients will use the incentive gained to obtain more drugs (Petry, 2006), although research suggests that when participants receive incentives during drug misuse research, they are able to use these payments in a responsible and safe manner (Festinger et al., 2005).

Rash et al. (2012) states that the sort of negative beliefs described above reflect a limited understanding of CM. Cameron and Ritter (2007) surveyed drug practitioners and found that their attitudes were based on a cursory understanding of CM. Practitioners often used an over-inclusive definition of CM that involved providing positive reinforcement on an ad hoc basis as opposed to on a structured contractual basis.

Roll and colleagues (2009) identified that a lack of familiarity with CM and its empirical support may affect its uptake. Cameron and Ritter (2007) found that

practitioners in their study changed their ideas about CM over the course of the study as a result of being provided with written information. Similarly, Rash et al. (2012) identified that receiving training in CM was associated with less endorsement of barriers to the uptake of CM. These findings indicate that providing information and training is vital to address clinicians' understanding of CM which can affect their attitudes and perspectives and likelihood of using CM (Kember, 2013).

### ***Conclusions and Recommendations***

In summary, there are sound health and economic rationales for emphasising behaviour change in efforts to improve population health and, more specifically, for including the systematic use of financial incentives in such efforts. Financial and other material incentives can effectively reinforce healthy choices and, in doing so, enlist the same powerful process of reinforcement and associated neurobiological processes that drives unhealthy behaviour to promote health and prevent disease. Financial rewards can serve as healthy alternatives to those residing in relatively deprived environments and they can be delivered relatively immediately following healthy choices, thereby accommodating and leveraging the bias for the present. They can also be readily scheduled and delivered in a manner that underscores their salience and activates important neurobiological self-regulatory systems (Higgins et al., 2012).

There are sound scientific rationales for why incentives are effective in this regard and evidence from controlled clinical trials across a wide range of different applications supports their efficacy. Nevertheless, there are many important questions that remain to be answered regarding the use of incentives for health related behaviour change, including optimal incentive values, appropriate intervention durations for different problems and populations, and cost-effectiveness (Higgins et al., 2012). To minimize the ethical risks, financial incentive programmes for clients should be: a) designed to overcome behavioural biases while maintaining clients' freedom to make informed choices, specifically rewarding desired behaviours and not outcomes, b) designed to minimize current health and health care inequities (Lunze & Paasche-Orlow, 2013), and c) lastly, incentive programmes rest

on specific design features and, hence, require a case-by-case assessment, monitoring and evaluation.

Future research is needed to identify target populations most amenable to incentives and will have to characterize the determinants of effective and efficient incentives. This will also help to better illuminate the ethical implications of incentives, many of which are common to the various types and settings of programmes. When programmes are designed in an ethically responsible manner and with appropriate safeguards, financial incentives can be offered to help improve health behaviours and neutralize opportunity costs associated with prevention and behaviour change (Lunze & Paasche-Orlow, 2013).

Regarding the highlighted concerns from clinicians to implement CM, it is argued in this critical appraisal that the use of CM interventions in substance misuse can be considered asymmetrical paternalism as opposed to coercion. These interventions serve to offer more support to the disadvantaged and to promote their wellbeing, and help people to reach their own goals.

The literature reviewed above identified that clinicians may have concerns regarding CM; for example, what will happen when the incentive is withdrawn, what the incentive may be used for, that it may not address the underlying issues causing drug dependence and that it is coercive. The literature suggests that negative views held by clinicians may be due to a cursory understanding and that providing information and training can affect clinicians' attitudes and their likelihood of using CM (Kember, 2013). This has implications for clinical research investigating the use of incentives. It may be important to survey therapists involved in a clinical trial on their attitudes towards CM. Negative attitudes could have an impact on their adherence to the CM model and could also influence the therapeutic relationship. As the research shows that a cursory understanding of CM can lead to negative views of CM, it is important that therapists (and health workers) receive sufficient training, information and ongoing supervision to address the perceived barriers to using CM. It is likely that participants may also hold negative views about CM. Providing therapists with a comprehensive understanding of the principles of CM may

empower them to communicate this understanding to participants as necessary, and increase participants' motivation to engage with the programme.

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**A Critical Literature Review of  
the Western Philosophical and  
Psychological Roots of the  
Concept of Self and its Use in  
Psychotherapy**

## Part D: Critical Literature Review

### ***I. Introduction***

It is always interesting to speculate why certain ideas emerge at a particular time. It is especially intriguing to review the reasons why attention should be called to the use of *self*<sup>7</sup> in therapy. Indeed, the field of family therapy, which had started in the 1960s as a movement questioning conventional patterns of therapy, initially focused on the development of theories and models in order to make this new form of therapy appear scientific, and thus valid (Baldwin, 2013). With the exception of a few psychologist and psychiatrists, most theorists and clinicians avoided paying attention to the self of the therapist, which did not seem a valid topic of scientific inquiry (Clarkson, 2003). What is somewhat puzzling is that the concern about scientific objectivity was arising at the time when scientists in basic disciplines such as physics, chemistry, and molecular genetics had begun to question the validity of a purely technological approach to life. They stated that pure objectivity is an illusion, that objects are changed by the very process of observation (Heisenberg, 1927), and that not everything that exists is observable (Lynch, 1977).

According to systems theory, therapists are an unavoidable part of the treatment situation, both as therapists (change agents) and as themselves. They do not choose to be in or out, they can only choose to be aware or not. That this role can operate along a continuum from activity to passivity has been alluded to by a number of authors (Hollender & Szasz, 1956). Indeed, a major development of the past several decades has been the increasingly active and participatory role in such transactions accorded to the client. In this particular evolution, the seminal work of Carl Rogers (1987) must be noted, in that he saw the potential for self-direction in patients, whom

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<sup>7</sup> *The intention of the use of self in present review is the following: Self as the totality of personal experience and expression, self as living being. More specifically, the persons subjective realm: thoughts, attitudes, opinions, feelings, emotions, behaviour, therapeutic experience, memories, life histories, level of evolution toward mastery, inner cast of characters, style, personal story, family life, spiritual inclinations, philosophical beliefs, etc. The term is used inclusively and relatively neutrally and other terms like person, individual, organism, etc. are acceptable synonyms.*

he began to refer to as clients, viewing the therapist as assisting rather than promoting the process of self-determination and development.

It is not surprising that the movement toward a more humanistic psychology which emerged after World War II was accepted by many therapists, who found the determinism and reductionism of the Freudian view unsatisfactory from a personal and professional standpoint (Clarkson, 2003). This resulted in an outpouring of interest in the uniqueness and authenticity of human experience. Belief in the self-actualisation ability of people led to the formation of the human potential movement of the 1960s and 1970s (Maslow, 1962). Unfortunately, proponents of this movement often carried the idea of personal growth to the limits of personal license and failed to develop a disciplined and systematic examination of its assumptions and implications. Each person's experience was considered valid in itself and, in the place of the rigidities of traditional psychiatry and psychology, there emerged a plethora of therapeutic systems and approaches, based on individual style, inclination and popularity (Clarkson, 2003). Indeed, the field of therapy appeared to move from an excessive dependence upon rigid theories and formats to an equally excessive emphasis on idiosyncratic techniques and therapeutic stratagems, that often as not, were more artificial and manipulative than the traditional approaches (Baldwin, 2013).

Regarding scientific research, one of the most important factors to emerge is the significance of the therapeutic relationship, which is thought to be common to all psychotherapies (Wampold, 2001). A constant focus has been on what it is that therapists do which leads to client change (Lambert, 2013). As it emerges from the research, it is very difficult if not impossible to establish with anything more than partisan preferences that any one psychotherapy is more effective than any other: "All have won and all must have a prize" (Luborsky et al., 1975, p.1; Wampold, 2001; Cooper & McLeod, 2007). It seems that success in psychotherapy can best be predicted by the properties of the psychotherapist, the client and their particular relationship (Norcross & Goldfried, 2005). Lambert (2013) has found that the client, the psychotherapist and the therapeutic relationship between them, are repeatedly more closely related to outcome than whatever technique has been used. Kahn in his

book, *Between the therapist and the Client: The new Relationship* (1991) proposes that the relationship is a central factor in all psychotherapy, and hence a powerful therapeutic tool, perhaps the most powerful tool. Kahn's teacher said, "The relationship is the therapy" (Kahn, 1991, p. 1). Thus, there appears to be increasing acceptance among therapists of all persuasions that there is something in the unique nature of the therapeutic relationship and the person (self) of the therapist that plays a critical role in the process of therapy (Rogers, 1961, 1987; Truax et al., 1966a, 1966b; Lambert, 2013).

The self of the therapist is an important topic, because the therapeutic technique should not overshadow the fact that the self of the therapist is the funnel through which theories and techniques become manifest (Satir, 2013). In most instances, individuals who enter therapy are in pain and feel isolated, and unless the therapist makes a real contact with the individual, no real therapy can take place, since they will not take the risk of exposing their vulnerabilities (Baldwin, 2013).

Common sense dictates that the therapist and the client must inevitably affect each other as human beings (Satir, 2013). This involvement of the therapist's self or personhood, occurs regardless of, and in addition to, the treatment philosophy or the approach. Techniques and approaches are tools. They come out differently in different hands (Clarkson, 2003). Because the nature of the relationship between therapist and client makes the latter extremely vulnerable, it is incumbent upon the therapist to keep that relationship from being an exercise in the negative use of power, or of developing dependency, both of which ultimately defeat therapeutic ends.

This review is about the inner world of the therapist, the self or person of the therapist, and how s/he relates to another self. The first part of the text is dedicated to the philosophical and psychological roots of the concept of self. Following this, the review emphasises the relevance of the I – Thou (You) relationship in human beings, and thus in the therapist and client relationship, as defined by Martin Buber (1923) in the early part of the last century. Approaches that conceptualise the multifaceted nature of self will be outlined, and finally, to converge the above reviewed topics, the

use of the self in therapy from an existential, dialogical and ethical point of view will be discussed.

### ***1.1. The Concept of the Self***

The concept of the self has intrigued writers and philosophers throughout the ages. Plato believed in the immortality of the soul, which he saw as separate and distinct from the body, from which it was released by death for full expression. Aristotle began as a Platonist, viewing the soul as immaterial, but in *De Anima* (On the Soul, 1957) he later described the soul as the inseparable, substantial form of the living organism, guiding and directing it. He further defined the soul in terms of vegetative, animal, and rational functions, thereby setting the stage for later preoccupation with the mind and body relationship (Lana, 1991).

This view reached its acme in Descartes' famous statement 'cogito, ergo sum' (I think, therefore, I am), and the subsequent dualism of body and mind with which he is identified (Lowry, 1971). This position, of course, served to draw the battle lines between a concern with the external, objective, natural world of objects and the less accessible, subjective, inner world. Despite its limitations and the criticisms currently directed toward Cartesian dualism by bio-behavioural research, this concept enabled the development of critical inquiry in the physical sciences in a way that has made possible much of today's progress in science and technology (Lana, 1976). Because of this emphasis, however, the objective and materialistic side of life achieved a commanding lead over that of the subjective and non-conscious, and it was not until philosophers such as Kierkegaard and Husserl, writers such as Dostoevsky and Tolstoy, and clinicians such as Freud, Jung and Adler, that the subjective world began to be explored in terms more appropriate to its understanding (Baldwin, 2013).

Freud's theories initiated a renewed attack upon the established lines of Cartesian dualism by adding the elusive concept of the unconscious to confuse the comfortable physical terms to which the domain of the mental and conscious had been assigned.

In his 1915 paper 'The Unconscious,' Freud (1953) differentiated between unconscious ideas, which continue to exist as formations after repression, and unconscious affects, which are discharged. He and his followers went on to describe a whole continuum of the unconscious, from lack of awareness of vegetative and neurological processes to fantasy and dreams (Baldwin, 2013). Although his emphasis on psychic determinism confused the philosopher, it served to stimulate a new and fruitful discussion of the concept of self, among, both his followers and those in other disciplines. At the same time, it must be remembered that Freud was basically a scientist and did not, himself, directly challenge the heavy investment which science had in Cartesian dualism. Thus, despite the efforts of William James, John Dewey, and others to examine the self on an empirical basis, the concept of a self, complete with philosophical, social and religious connotations, was largely ignored by an emerging psychology seeking to establish itself as a scientific discipline separate from philosophy (Marková, 1990).

It was the writers and philosophers, primarily from the existential school, who continued to explore the world of subjective phenomenology (Marková, 1990). Still, it remained for George Herbert Mead (1934) to reintroduce the concept of the self as a basic unit of personality into scientific thought, along with the roles that the self learns to take in the course of its socialisation. He saw the self as a process rather than a structure, and maintained the self and the consciousness of self emerged from social interaction – the interaction of the human organism with its social environment (Marková, 1990). He believed that what made human unique was their capacity to be both subject and object at the same time (Mead, 1934). Since they would even be an object of their own thought and action - self-interaction- they stood in a markedly different relationship to their environment than the then-prevailing view of behaviour as resulting from external factors or internal drives (Marková, 1990). Mead's work while not theoretically explicit, laid the groundwork for the later development of symbolic interactionism, a field that has greatly influenced modern sociology and psychological thought. Indeed, the revival of interest in the self has been so widespread that it is difficult to find a modern personality theory that does not place the self in a central position (Arieti, 1967; Kohut, 1971, 1985).

Special note must be made of the contributions of the developmentalists, such as Erikson (1950, 1959) and Greenacre (1958), who described the emerging self in terms of the psychosexual and ego development of the child. They noted the fundamental absence of a distinction between the self and the not-self as a basic characteristic of newborns, who, partly as a result of their perceptions, begin to differentiate various aspects of their body image from objects in the external world. Multiple self-presentations gradually lead to the formation of a concept of the self, which becomes more stable and permanent as a result of the achievement of object constancy (Baldwin, 2013).

Closely related is the concept of identity (Greenacre, 1958; Erikson, 1950, 1959), which constitutes an awareness of separateness and distinction from all others, in which the borders of the self are hypercathected by the early experience of separation from the mother. Thus, the distinction of the I from the not-I is reinforced by a variety of internal and external experiences. Indeed, the mechanism of projection is based on the primal lack of distinction between the self and the not-self. These contributions have allowed Spiegel (1959) to define the “self as a frame of reference or zero point to which representations of specific mental and physical states are referred, and against which they are perceived and judged” (p.96).

It is clear, however, that Cartesian dualism still plays an influential role in modern life and thought (Marková, 1990). As Buber (1955, 1965, 1970) points out, most of our transactions with our fellow human beings and our environment are in the nature of subject-object or I-It relationships. In calling attention to our essential need to participate in reciprocal I-Thou relationships, in which each person fully regards and accepts the subject both in self and others, Buber pleads for a reunification of our subjective and objective parts. Far from being merely the absence of an infantile distinction between the subjective and objective, or the self and not-self, this is the achievement of a new unity which, while existing in both conscious and unconscious spheres, is available and accessible to the dedicated searcher (Baldwin, 2013).

The use of self in therapy, then, as a subject of theoretical and practical psychotherapeutic importance, emerges at this time in history, largely because of the

re-emergence of a concern with the uniqueness of human experience and relationship over the past century (Marková, 1987).

## ***1.2. The Contributions of Existential Philosophy***

Perhaps the most important influence on the twentieth-century view of humanity and on the emerging concept of the use of self in therapy comes from the existential philosophers, who take their lead from the seminal work of Søren Kierkegaard (Lowry, 1971). Writing out of the depths of his own personal concerns, Kierkegaard (1959) objected to Hegel's efforts to unite the ambiguities of life in an abstract fashion through positing of a higher synthesis. He insisted that the dichotomies of life – good and evil, life and death, God and humans - could not be mediated, but that we were called upon to make decisions between the polarities (Perkins, 1997). He asked us to turn from the world of thought to that of existence as it is actually lived, believing that only through an examination of human experience in all its complexity could one approach the basic question: What is the meaning of life?

Kierkegaard believed that meaning is to be found in the decisions between such polarities and that these decisions must be based on one's own closely examined experience, rather than on any authority or abstract concept (Walsh, 2009). Such an act, of course, is fighting, in that one is asked to abandon the usual sources of support and to leap into the unknown. It was his belief that each individual must, of necessity, make fully conscious, responsible choices among the alternatives that life offers. His works, "Sickness Unto Death" (1980) and "The Concept of Dread" (1957), are classics of early depth psychology. The former alludes to the role of the unconscious in depression, while the latter makes a clear distinction between 'Angst' (dread), which he defines as feeling that has no definite object, and the fear and terror that derive from an objective threat (Lowry, 1971).

It was not until some time after his death that the philosophical and psychological implications of Kierkegaard's work began to be fully appreciated. Indeed, existentialism is generally viewed as twentieth-century phenomenon and has profoundly affected the development of philosophy, religion and psychology in this

century (Stewart, 2011). Within this century, seminal thinkers in the development of existentialism have included the religious thinkers Bultmann, Marcel and Tillich, as well as those who have clearly disassociated themselves from the religious view, such as Sartre and Camus. Of note in this development is the work of Edmund Husserl (1965), who introduced the phenomenological method in philosophy, calling upon us to examine our own experience. Of special importance was his insistence on ‘intentionality,’ the idea that every meaningful word must be rooted in the experience of which it is only a name, stating, ‘consciousness is always conscious of something’ (Marková, 1982).

Although he rejected the existential label, Heidegger (1962) is usually regarded as the figurehead of twentieth-century existentialism. He believed that we can learn something about the fundamental nature of human beings – our ‘being-in-the-world’ – through an analysis of our anxieties, particularly, our fear of death. He accepted life as fundamentally contingent, stating that the only way to live authentically is to accept our own finitude and to develop a capacity to care (*Sorge*). This includes, not just ‘solicitude’ for others, as suggested by the later existential psychologists, but also an ontological caring for, or custodianship, of ‘Being’ (Marková, 1982).

Tillich (1961) differed from Heidegger in believing that it is in ‘the boundary situation’ – that situation in which one is denied the supports of authority and intellectualism, and even the traditional concept of God is found wanting – that one finds the unconditional certainty of the ‘Ground of Being,’ the ‘Being – itself,’ which appears when all else has been dissolved in anxiety and doubt. He believed that we are all aware of the contrast between the ideals that we hold and the lives we live, calling this the difference between ‘essence’ and ‘existence.’ He maintained that we can resolve this difference only in the boundary situation, defining authenticity as “the courage to be and, thus, to escape ‘non-being’” (Tillich, 1961, p.20).

Perhaps the most radical of the modern existentialists was Jean-Paul Sartre (1950). He concluded that one is not only ‘en-soi’ (in oneself) – a passive recipient of fate – but also ‘pour-soi’ (for oneself), transcending the present. Thus, we are free from the limitations imposed by the world of experience. Indeed, we are forced to be free. To

live authentically means to accept this dreadful freedom and to see that values are merely projections of our decisions (Baldwin, 2013). Such a position suggests a radical nihilism and individualism that has strongly influenced the development of the field.

### ***1.3. The Influence of Martin Buber***

Although he rejected the label during his lifetime, Buber's thought was profoundly influenced by existentialism (1923, 1955, 1965, 1970). He believed that our access to being comes from the capacity to enter into dialogue or relationship with the existent, or 'the between.' He rejected the reason as the distinctive characteristic of human beings, defining human being as a "creature capable of entering into living relation with the world and things, with men both as individuals and as the many, and with the 'mystery of being' – which is dimly apparent through all this but infinitely transcends it "(Friedman, 1965, p.16). Thus we are unique in our capacity to participate in both finitude and infinity.

Buber's views were elaborated in *Ich und Du* (1923), in which he states that our relation to God, the Great Thou, enables us to participate in I – Thou relationship with other humans. For Buber, I – Thou establishes the world of relation, "into which both parties enter in the fullness of their being, with a sense of and appreciation for the subject and object in each." It is a relationship "characterised by mutuality, directness, presentness, intensity and ineffability" (Friedman, 1965, p.12).

This is contrasted with the I – It, or subject-object relationship in which others are regarded as mere tools or conveniences. I – It is the medium of exchange in the world of things and ideas, dealing with categories and connections, with experiencing and using. Indeed, the scientific method is our most highly perfected development of the I – It, or subject-object, way of knowing (Friedman, 1965).

The I – Thou relationship also involves responsibility in the sense of one's ability to respond to another. "There is reciprocity of giving: you say You to it and give yourself to it; it says You to you and gives itself to you" (Buber, 1970, p.84). It is

through this relation that one becomes known to oneself and to others as a self. “Man becomes an I through a You” (p.80). Self-realisation, thus, is the by-product, rather than the goal, as is often assumed.

For Buber, the highest expression of the I – Thou relationship lies in the act of confirming the other. He sees mutual confirmation as the key element in the definition of the self. One realises one’s uniqueness only in relation to another who reciprocally defines oneself. Each becomes confirmed by the other in her/his true, real, present, authentic self. True confirmation is mutual and involves making the other fully present in all her/his unity and uniqueness (Buber, 1970).

In 1957, the Washington School of Psychiatry invited Buber to give a Memorial Lecture where he spoke of psychotherapy, “I have the impression (that) more and more therapists are not so confident that this or that theory is right and have (developed) a more ‘musical,’ floating relationship to their clients. The deciding reality is the therapist, not the methods” (quoted in Friedman, 1965, p.37). “It is much easier to impose oneself on the patient than it is to use the whole force of one’s soul to leave the patient to himself and not to touch him. The real master responds to uniqueness” (p.38). For Buber, rather than adhering to dogmatic theory or techniques, the therapist must be ready to be surprised and to receive what he will receive.

#### ***1.4. The Postmodern, Dialogical and Ethical Self***

In the last few decades there have been a growing number of therapeutic approaches that conceive of the self as plural, that is, constitutive of a multiplicity of states, positions and functions (Georgaca, 2010). This is due largely to dissatisfaction with psychology's pre-occupation with self-contained individualism that downplays the impact of sociocultural processes (Sampson, 1989).

The dialogical self marries Mead's concept of self with the work of Russian literary scientist Mikhail Bakhtin. Bakhtin's concept of dialogism holds that language is a living body of utterances used in interactions, and that speech is always addressed to

someone, with every utterance having an addressee (Bakhtin, 1986). In light of this, the main proponent of the dialogical self in psychotherapy, Hubert Hermans, conceives of the self as a “dynamic multiplicity of relatively autonomous I-positions in an imaginal landscape” (Hermans, 1997, p. 33). Self is formed and performed through interactions in specific cultural contexts, whereby I-positions move about depending on time, place and situation.

Larner (2008) acknowledges the self as formed discursively, but he draws upon Levinas and Derrida to argue that the self is simultaneously separate and unique. The dialogical view of the self is closely aligned to postmodernity, whilst Larner's thesis is predicated on deconstruction as an ethical movement that challenges the hegemony of a discourse from within (Larner, 2011).

For Levinas (1996), being in relation with another evokes a responsibility that overrides all one's concepts and theorising insofar as “to be face to face is to be unable to kill” (p. 9). Following this, Derrida puts forth an ethic of hospitality where to be a self, one must first take in and speak the language of the other (Derrida, 1998).

For Derrida and Levinas, in the context of ethics and social justice, the self cannot be reduced to a discursive, dialogic or relational account. This is because the root of personal responsibility is a singular corporeal self that is able to exercise agency, “justice would not be possible without the singularity, the unicity of subjectivity” (Levinas, 1979, p. 246). Therefore, the ethical self is a complexity, both relational and autonomous.

### ***1.5. The Influence of Existential Philosophy on Psychotherapy***

Since existential philosophy maintains that the only true absolute is that there are no absolutes, this poses a fundamental question: How does a person who needs meaning find meaning in a universe that has none?

For centuries, of course, this answer has been found in the positing of a God-centred universe in which our purpose was to relate to and, if possible, emulate that God. Since this is patently impossible on an individual basis, most philosophers and theologians have arrived at the point of view, exemplified by the work of Pierre Teilhard de Chardin (1955), that each individual, by recognising and joining in this cosmic union, is provided with a personal sense of meaning. At the same time, Kant's questioning of the existence of any fixed, objective reality calls such a view into question (Lana, 1991). Indeed, Camus and Sartre regard the tension between human aspiration and world indifference as the absurdity of 'la condition humaine.' Satir (Satir et al., 1991) refers to this as the 'cosmic joke,' but maintains that the development of a sense of self-worth enables one to tolerate the irony and to find meaning in the principle of the seed and organic growth.

It is not surprising that many philosophers have disavowed identification as existentialists, because as Tillich (1961) has pointed out, "There is not, and cannot be, an existentialist system of philosophy" (p.9). "Existentialism is an element within a larger frame of essentialism" (p.10). Like most other philosophical concepts, each view achieves definition largely in terms of its opposite, and neither can be totally accepted without inviting rebuttal from the other. Thus, the apparent triumph of existentialism in the twentieth-century must be seen in a historical perspective that considers and balances the opposing views of idealistic or naturalistic essentialism (Tillich, 1961).

Such a philosophical distinction has tremendous implications for psychotherapy. While it is clients' problems that bring them into therapy, it is important to distinguish between those related to their nature and their daily lives and relationships, and those arising from their basic existential anxiety. The former are the appropriate concern and within the usual competence of most therapies and therapists, but psychotherapy cannot cure the existential anxiety that arises from the awful awareness of our own finitude – 'la condition humaine' – although it can attempt to give meaning to life (Baldwin, 2013). It does this in a uniquely human way – through offering to the seeker of help the self of the therapist as a significant symbol of faith and hope in the formers effort to bridge the finite and infinite.

Buber's 'I – Thou' relationship appears to offer precisely this uniquely human act and experience of confirmation.

The existentially oriented psychotherapist, then, does not manifest a particular technique or theory, nor are the valuable contributions of other psychological theories denied (Yalom, 1980). Rather, a selective approach is used, the central process of therapy being perceived as that of experiencing the full awareness takes precedence over cognitive awareness, the 'here and now' is emphasised rather than the past life of the client, and therapy is regarded as a creative, evolving process of self-discovery. In relating to the client, the therapist tries to establish a personal bond of trust and meaningful collaboration, based on a genuine belief in the therapist's own potentialities and those of the client. While remaining observing and objective, the therapist attempts to enter the world of the client, wrestling with the frustrations and limitations of the therapeutic situation, trying to be fully present and subjectively real (Tillich, 1961). So far as possible, s/he attempts to manifest Martin Buber's 'I – Thou' relationship of mutuality, trying to liberate the individual to seek and achieve optimal development. In short, the existential therapist functions as fully available person in a meaningful encounter with another. As Tillich (1961) holds, "a person becomes a person in the encounter with other persons, and in no other way ... This interdependence of man and man in the process of becoming human is a judgment against a psychotherapeutic method in which the patient is a mere object for the analyst as subject" (p.15).

It appears, then, that for the existentially oriented psychotherapist, the use of self is an essential element in therapy, whether it is with individuals, groups or families. Support for this position has come from the growing influence of general systems theory in psychiatry, which posits that the therapist must be viewed as an integral part of the therapeutic system and as having a major effect on the system of the client (Baldwin, 2013). What often is overlooked is that this is a two-way street. In general, this aspect is easier to observe and accept in the group and family therapy, where the very number and complexity of transactions involved make cognitive or technical control of the situation difficult at best. In such situations, it may be more effective for the therapist to 'go with the flow' – Buber's musical or floating relationship – and

to focus on the meta-messages of the system and of her/his own internal state of being. This is not a passive process. An attitude of alert, active attentiveness is required to maintain the essential qualities of contact and receptivity. Nor does this imply having control over the situation or over the client through authority or technique (Satir, 2013). Rather, the central core of being within the therapist – the very sense of self – serves to communicate and maintain a centering and stabilising force or power in the process. While such an approach would appear to abdicate the traditional role of the therapist and encourage chaos to take over, this very act of relinquishment of control is precisely what many clients seem to require in order to rediscover and reassert their own sense of control over their lives. At the same time, this act loses its authenticity if used solely as a technique (Basescu, 1990). It is an intensely real and personal act – that of letting go – putting one's belief in one's self and in the self of the other on the line – exposing one's true deepest self; in a sense, going naked into the encounter – allowing oneself to become truly vulnerable (Basescu, 1990). This 'centred act of the centred self' is truly the source of the creative and life-giving act of self-discovery and transformation (Tillich, 1961). Paradoxically, such a use of self implies a deliberate 'non-use' or suspension of self in its usual sense.

### ***1.6. The Influence of Multiplicity, Dialogism and Deconstruction of the Self in Psychotherapy***

Hermans has formulated a sophisticated framework for therapeutic practise that encompasses the dialogical view of the self whereby the therapist assesses an individual's various I-positions and the way they move from one to another. The extent to which this happens flexibly determines the psychological functionality of an individual (Hermans & DiMaggio, 2004). To this end, the aim of therapeutic practice is the facilitation of a complex subjectivity whereby different positions can be fluently articulated with an overall reflexive frame (Hermans, 2003).

Clinicians from diverse orientations converge on the view of self as a multifaceted entity with internal multiplicity being present. Whilst this view may not be explicitly

acknowledged, it can be found in various therapeutic perspectives. For example, this may be the automatic intrusive thoughts in cognitive-behavioural therapy or internal objects in psychoanalysis (DiMaggio & Stiles, 2007).

Indeed, Larnar (2008) argues it is the very condition of self as relational and at the same time having a sense of unity, coherence and independence, that opens the possibility for many languages to describe the self in therapy. This could be a dialogical self, a systemic self, a cultural self and so on. In this sense, the therapist should acknowledge that the self is constructed through multiple meanings, narratives and dialogues, but at the same time be experienced as unique, autonomous and capable of taking responsibility and agency in life (ibid).

British psychotherapists Cooper and McLeod have developed a methodological and technical framework of pluralistic therapy based on “dissensus’ rather than consensus” (Cooper & McLeod, 2007, p. 6). They maintain that psychological difficulties arise from multiple causes and as such, there is unlikely to be one ‘right’ therapeutic method for all situations. Rather, because different explanations will be true for different people at different points in time, different therapeutic methods will be helpful for different clients at different times (ibid). Whilst pluralistic frameworks are closely aligned with postmodern thought, Cooper and McLeod also draw upon Levinas, emphasising the therapist’s acceptance of the otherness of the Other (Cooper & McLeod, 2011). The therapeutic encounter is respectful, valuing and open to cultural diversity in both the client and therapist. They maintain it is the collaboration between therapist and client that is the driving force behind healing and change (Cooper & McLeod, 2006).

## ***1.7. Conclusion***

To conclude, an attitude of alert, active attentiveness is required to maintain the essential qualities of contact and receptivity. Achieving and maintaining such an attitude is never easy, and it is impossible for some therapists, whose personal needs or belief system require them to maintain untouched or to be ‘in charge.’ Nor is it the province of any one theory or school (Clarkson, 2003). Great therapists of all

persuasions have always manifested the essential elements of this quality (Baldwin, 2013). Nor does it mean that knowledge, skill and experience are not important. It is in this spirit that counselling psychology has created a legacy promoting the importance of personal and professional development through engagement with personal therapy and supervision across one's professional career (Division of Counselling Psychology, 2005). At times, however, counselling psychology courses have disregarded the significant dimensions, of the self of the therapist in training. This resulted in perpetuating a focus on technique and theory that often obscured the deeply personal relationship involved. Such lessons need to be learned experientially through intense encounter with others, who are able to share openly in their own continuing search (Satir, 2013). While the vital learning experience is always deeply personal, it almost always occurs in relation with another person. Ultimately, what therapists have to offer is not a technique, not a theory, but who we are. Buber has said that the greatest thing one human being can do for another is to confirm the deepest thing within her or him. It is this act of confirmation which is ultimately implied in the use of self in therapy.

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