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Impulsivity and addictive behaviours in prisoners

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Thesis submitted in partial fulfilment of the degree of
Doctorate in Clinical Psychology

Main Project and Service Evaluation Project

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May 2014

Acknowledgements

First and foremost I would like to thank my supervisors, Vyv Huddy and Lucia Valmaggia, for their perseverance and commitment in getting this project off the ground and for their subsequent advice, support and guidance over the past two years. Special thanks are also due to Anna Roberts and Manuela Jarrett of OASISp, both for inducting me into the system at HMP Brixton and for their time and incredible efforts over the recruitment period. I hope this thesis does justice to the contributions of you all in ensuring this project was seen through to the end. Thanks too to Daniel Stahl for taking the time to consult on statistics and to the staff at HMP Brixton for accommodating this project. Finally I would also like to express my gratitude to all those who participated for their time and interest in this study.

More broadly there are several others to thank regarding my clinical training. Particularly I would like to pay tribute to the core team at the Institute of Psychiatry for the amount of work they do coordinating our training and to all the teams in SLAM who welcomed me onto various placements over the past three years. To my supervisors over this period, your knowledge, support and expertise has been invaluable for my own development; Hanne Jakobsen, Sam Riches, Grace Wong, Maxine Sinclair, Sue Goode and Tim Meynen. Finally I owe a huge amount to my supervisors/mentors from my time as an assistant psychologist, Neil Smith and Ryan Kemp of CNWL, without whom I often wonder if I'd be in this position today.

To my cohort, the last three years have flown by and I am glad to have shared it with such a talented and cohesive group. I hope to stay in touch and for our careers to overlap in the years to come! To my family, friends and partner; I'm extending my love and thanks to you by asking you to proof read every one of these 55000 words.

Overview

<u>Main project</u>	Page
Impulsivity and addictive behaviours in prisoners	4
Supervised by Dr Lucia Valmaggia and Dr Vyv Huddy	
 <u>Service Evaluation Project</u>	
An evaluation of referrer satisfaction with clinical reports provided by a CAMHS Neuropsychology Clinic	174
Supervised by Dr Maxine Sinclair	

Main Project

Impulsivity and addictive behaviours in prisoners

Supervised by Dr Lucia Valmaggia and Dr Vyv Huddy

ABSTRACT

Background

Addiction presents a significant problem for many in prison, yet this group remains relatively understudied in research exploring associated psychological phenomena. Impulsivity has been established as one important psychological factor associated with addiction in the general population and it is of interest to broaden the scope of such investigation to relevant groups.

Aims and Objectives

The current study primarily aimed to study the relationship between impulsivity and addictive behaviours in a sample of prisoners, including use of a range of substances and problem gambling. A further objective was to support ongoing developments in the field of impulsivity research, which consider the importance of conceptualising impulsivity as a multifaceted construct.

Method

Seventy-two prisoners were recruited from a male prison in south London. Associations between their engagement with addictive behaviours and level of impulsivity were explored both for a trait measure of impulsivity and behavioural measures of two specific facets of impulsivity; all previously associated with addiction in the wider literature.

Results

High rates of engagement with addictive behaviours were found, consistent with previous research of prisoners. However associations between impulsivity and addictive behaviours were highly varied depending on the variables under study. Of note lifetime frequent use of only two substances (crack/cocaine and opiates) were found to strongly associate with either elevated trait or behavioural impulsivity. In particular one subscale of trait impulsivity was found to be significantly predictive of frequent crack/cocaine use in the sample.

Conclusion

The variance in findings suggests a need for more thorough and selective investigation of how different types of impulsivity may or may not relate to different addictive behaviours in the prisoner population. This would help support firmer conclusions being drawn on the nature of these relationships. The current findings should be considered in the context of limited and inconsistent related research of prisoners to date; however do highlight important areas of prisoner need and potential areas of research interest to consider in future large-scale investigations.

TABLE OF CONTENTS

LIST OF FIGURES	12
1. INTRODUCTION	13
1.1 THE MENTAL HEALTH NEEDS OF PRISONERS.....	13
1.2. ADDICTION IN PRISON	14
1.2.1. THE IMPACT OF PRISONER ADDICTION	15
1.3. ADDICTION IN THE GENERAL POPULATION.....	16
1.3.1. FACTORS ASSOCIATED WITH ADDICTION	16
1.3.2. A SYNTHETIC THEORY OF ADDICTION	17
1.3.3. IMPULSIVITY AND ADDICTION	18
1.3.4. CAUSE OR VULNERABILITY?	19
1.3.5. SUMMARY	22
1.4. IMPULSIVITY AS A PSYCHOLOGICAL CONSTRUCT	23
1.4.1. A BIOPSYCHOSOCIAL DEFINITION	24
1.4.2. IMPULSIVITY AND RISK TAKING BEHAVIOUR.....	25
1.4.3. IMPULSIVITY AND OFFENDING.....	26
1.4.4. SUMMARY	27
1.5. IMPULSIVITY RESEARCH IN ADDICTION.....	27
1.5.1. SUBSTANCE USE DISORDERS.....	27
1.5.2. BEHAVIOURAL ADDICTION.....	30
1.5.3. IMPULSIVITY IN PRISONER ADDICTION	31
1.5.4. SUMMARY	33
1.6. IMPULSIVITY AND PSYCHIATRIC DISORDER.....	33
1.6.1. PERSONALITY DISORDERS	33
1.6.2. MOOD DISORDER AND SUICIDALITY	35
1.6.3. BEHAVIOURAL DISORDERS.....	37
1.6.4. TRAUMATIC BRAIN INJURY	37

1.6.5. SUMMARY	38
1.7. A MULTIFACETED CONCEPTUALISATION OF IMPULSIVITY	38
1.7.1. ‘VARIETIES OF IMPULSIVITY’	40
1.7.2. SUMMARY	42
1.8. MULTIFACETED IMPULSIVITY IN ADDICTION	43
1.8.1. REFLECTION IMPULSIVITY	43
1.8.2. DELAYED REWARD DISCOUNTING	44
1.8.3. RESPONSE INHIBITION	46
1.8.4. OTHER FACETS	46
1.8.5. SUMMARY	47
1.9. SUMMARY AND RATIONALE FOR STUDY	47
1.9.1. AIMS OF STUDY	48
1.9.2. PRIMARY RESEARCH QUESTION	50
1.9.3. SECONDARY RESEARCH QUESTIONS	50
2. METHOD	52
2.1. DESIGN	52
2.2. PARTICIPANTS	52
2.2.1. SAMPLE SIZE	52
2.2.2. RECRUITMENT PROCEDURE	52
2.2.3. ETHICAL CONSIDERATIONS	54
2.3. ASSESSMENT PROCEDURE	54
2.4. MEASURES	55
2.4.1. Barratt Impulsiveness Scale Version 11	55
2.4.2. Matching Familiar Figures Test 20	56
2.4.3. Monetary Choice Questionnaire	57
2.4.4. Substance use	58
2.4.5. Problem Gambling Severity Index	59

2.4.6. Standardised Assessment of Personality Abbreviated Scale	60
2.5. DATA HANDLING AND ANALYSES	60
2.5.1. DATA HANDLING.....	60
2.5.2. STATISTICAL ANALYSES	61
3. RESULTS	64
3.1. SAMPLE CHARACTERISTICS	64
3.2. DESCRIPTIVE STATISTICS – IMPULSIVITY MEASURES	64
3.2.1. BIS-11	64
3.2.2. MFFT-20	64
3.2.3. MCQ.....	65
3.3. DESCRIPTIVE STATISTICS – PERSONALITY DISORDER SCREEN	67
3.4. DESCRIPTIVE STATISTICS - SUBSTANCE USE.....	67
3.5. DESCRIPTIVE STATISTICS - PROBLEM GAMBLING	71
3.6. CORRELATIONAL ANALYSES	72
3.6.1. Multifaceted measurement of impulsivity in prisoners.....	72
3.6.2. Associations between impulsivity measures.....	72
3.6.3. Substance use and impulsivity in prisoners	72
3.6.4. Associations between substance use and impulsivity	74
3.6.5. Associations between gambling and impulsivity.....	76
3.6.6. Interacting effects of personality disorder screening	77
3.6.7. Associations between (i) substance use (ii) problem gambling and impulsivity by SAPAS screen	77
3.7. LOGISTIC REGRESSION.....	79
3.7.1. Impulsivity variables as independent predictors of addictive behaviours ...	79
4. DISCUSSION	82
4.1. SUMMARY OF STUDY	82
4.2. MAIN FINDINGS AND THEORETICAL CONSIDERATIONS.....	82

4.2.1. HYPOTHESIS 1: Frequent substance use will be associated with (i) trait impulsivity (ii) reflection impulsivity (iii) delayed reward discounting.....	83
4.2.2. HYPOTHESIS 2: Problem gambling in prisoners will be associated with (i) trait impulsivity (ii) reflection impulsivity and (iii) delayed reward discounting.....	90
4.2.3. HYPOTHESIS 3: In cases where multiple types of impulsivity associate with an addictive behaviour, at least one will emerge as an independent predictor of (i) frequent substance use (ii) problem gambling.	94
4.2.4. HYPOTHESIS 4: Associations between (i) frequent substance use (ii) problem gambling and impulsivity will be significantly different between those who screen positive versus negative for personality disorder.....	96
4.2.5. HYPOTHESIS 5: No significant relationship is expected between two specific behavioural measures of (i) delayed reward discounting and (ii) reflection impulsivity. Significant relationships will be found between these behavioural measures and a trait measure of impulsivity.....	98
5. LIMITATIONS	103
5.1. METHODOLOGICAL ISSUES.....	103
5.2. PRISON FACTORS	104
5.3. STATISTICAL CONSIDERATIONS.....	105
6. CLINICAL IMPLICATIONS.....	107
7. FUTURE IMPLICATIONS FOR RESEARCH	111
8. CONCLUSION	113
9. REFERNCES	114
10. APPENDICES	148
10.1 NHS ETHICAL APPROVAL	148
10.2. NATIONAL OFFENDING MANAGEMENT SERVICE APPROVAL.....	150
10.3. ETHICAL SAFEGUARDS	152
10.4. PARTICIPANT INFORMATION SHEET	154
10.5. PARTICIPANT CONSENT FORM.....	157
10.6. SUBSTANCE USE MEASURE.....	158
10.7. DISTRIBUTION OF DATA.....	167
10.7.1. BIS-11	167

10.7.2. MFFT-20	169
10.7.3. MCQ.....	171
10.7.4. SAPAS	172
10.7.5. PGSI.....	173

LIST OF FIGURES

Table 1: Comparing rates of mental health problems in the general and prisoner populations (SEU, 2002).....	13
Table 2: Descriptive statistics for impulsivity measures across the sample	66
Table 3: Prevalence of lifetime and current substance use and lifetime frequent use	68
Table 4: Prevalence of polysubstance use.....	69
Table 5: Age, onset and duration of substance use	70
Table 6: Spearman rho coefficients for trait and facet measures of impulsivity	72
Table 7: Spearman's rho coefficients of associations between addiction and impulsivity variables	73
Table 8: Mean BIS scores for frequent and non-frequent crack/cocaine users.....	74
Table 9: Mean MCQ discount rates for frequent and non-frequent opiate users.....	76
Table 10: Spearman's rho coefficients of associations between addiction and impulsivity variables by SAPAS screen	78
Table 11: Regression output predicting frequent crack/cocaine use from trait impulsivity	80
Table 12: Regression output predicting frequent opiate use from delayed reward discounting and trait impulsivity.....	81
Table 13: Regression output predicting problem gambling from trait impulsivity ...	81

1. INTRODUCTION

The following introductory chapter aims to summarise the existing literature concerning impulsivity and its relationship to both substance and non-substance addiction. This is considered with reference to the broader presenting needs of prisoner populations.

1.1 THE MENTAL HEALTH NEEDS OF PRISONERS

In reviewing the mental health needs of offenders in the criminal justice system, the Bradley Report (Bradley, 2009) outlined an increasing consensus that prison environments for many contribute towards an enhanced risk of mental health difficulties. Such consensus is supported by past research undertaken at governmental level suggesting the majority of prisoners in the UK suffer from at least one form of mental disorder (HM Government and the Department of Health, 1998). Subsequent statistics provided by the Social Exclusion Unit (SEU, 2002) also make for sombre comparisons between the needs of prisoners and those of the general population (see Table 1).

	General population	Prisoner population
Two or more mental disorders	5% men 2% women	72% male 70% female
Three or more mental disorders	1% men <1% women	44% male 62% female
Affective disorders (e.g. depression, anxiety)	12% men 18% women	40% male 63% female
Psychosis (e.g. schizophrenia-spectrum disorders)	<1% men <1% women	7% male 14% female
Personality disorders	5.4% men 3.4% women	64% male 50% female

Table 1: Comparing rates of mental health problems in the general and prisoner populations (SEU, 2002)

For many these needs will be contributory to the development of further difficulties. Rates of substance abuse and dependence are consistently higher in prison than in the community (Home Affairs Committee, 2012). Incidents of self-harm in UK prisons

typically number tens of thousands per year, with a stable rate of 0.7 per 1000 prisoner deaths reported to be self-inflicted (Ministry of Justice, 2013) and suicide prevention policies now commonplace in the system. Yet the reported lack of equivalence in provision of mental health services for prisoners relative to the wider population (Bradley, 2009) suggests a need for increased emphasis on understanding the difficulties faced by this vulnerable section of society and investment in the resources required to address their needs. Research offers one means of extending such understanding.

1.2. ADDICTION IN PRISON

In a systematic review conducted by Fazel et al (2006), the authors report the prevalence of substance addiction amongst prisoners across four countries to be grossly higher than the general population. Whilst estimates vary across studies, prevalence rates based on the several thousand prisoners reviewed suggest rates of alcohol abuse and dependence in this population to range from 10-30% and for drugs from 10-60% (Fazel et al, 2006). Considering the population of prisoners in the United Kingdom (UK) alone, a recent report for parliament suggests “almost half of the prison population have an addiction to drugs” (Home Affairs Committee, 2012). For many these issues are long-standing, with estimates of prisoner lifetime hard drug use as high as 79% and up to one-third using in the year prior to beginning a sentence (Stewart, 2009). For others the issue of addiction begins in prison. In a relatively recent inspectorate report from HMP Durham 13% of addicted prisoners considered their drug problem to have started following the commencement of their sentence (HM Chief Inspector of Prisons, 2011).

Research of non-substance addiction in prisoners is more limited, though invites similar conclusions. Problem gambling represents the best researched area and has been increasingly accepted in the wider literature under the novel terminology of *behavioural addiction*. A meta-analysis reviewing studies of problem gambling from several countries demonstrates that prisoners have significantly higher rates of lifetime and current problem gambling compared with the general population (Williams et al, 2005). Findings included that on average across samples one third of offender samples met criteria for problem or pathological gambling, with 15-30%

presenting with a comorbid substance abuse problem. Recent developments in the UK have supported these findings. For instance a pilot study found that nearly 11% of male and 6% of female inmates can be defined as problem gamblers (May-Chahal et al, 2012), well above estimates for the general population of 0.9% (The Gambling Commission, 2010), with even more considered to be at risk of developing a problem.

1.2.1. THE IMPACT OF PRISONER ADDICTION

Drug addiction is for many prisoners the main underlying reason for their incarceration and will contribute to the near 47% general rate of recidivism seen within a year after offenders are released from custody (Prison Reform Trust, 2013). This rate increases further amongst those serving only brief sentences. It is therefore unsurprising to consider that Home Office estimates (2006) put the cost of drug-related offending at several billion pounds per year.

The association between behavioural addiction and criminality is also strong, particularly for problem gambling. Research suggests a significant number of problem gamblers commit crime directly because of their gambling problem (Blaszczynski et al, 1989). This includes reports from some studies that around 50% of crime by prisoners with gambling problems to be directly related to their addiction (Williams et al, 2005). From UK samples estimates have been lower, with 7% of current and 13% of past offences being directly linked to a gambling problem (May-Chahal et al, 2012), though nonetheless detail the significantly adverse impact of gambling problems both on the individual and wider society.

A detailed understanding of the factors contributing to both substance and behavioural addiction in this population would facilitate development and provision of increasingly effective, evidence-based medical and psychosocial interventions for those identified as having problems and screening tools for those at risk. This is particularly important when considering that for many these problems will have a direct impact on their offending behaviour.

1.3. ADDICTION IN THE GENERAL POPULATION

Prevalence estimates suggest rates of substance misuse and dependence in the wider UK population to instead have been falling in recent years (National Treatment Agency for Substance Misuse, 2013). Possible factors suggested include both improvements in the resources available to support those in need and better prevention of younger people falling into problems in the first place, with older generations making up a higher proportion of those still struggling. Conversely most recent estimates of problem gambling prevalence report a slight rise from a stable rate of 0.6% over previous years to 0.9% (The Gambling Commission, 2010), though whether this reflects true increased prevalence in problems or other factors, such as improved detection, remains unclear.

For various reasons both substance and behavioural addictions will continue to present challenges for many individuals, often in spite of clinical intervention. The common description of addictions as ‘chronic relapsing conditions’, often comorbid with a range of mental health difficulties (Grant et al, 2004), points to their complexity.

1.3.1. FACTORS ASSOCIATED WITH ADDICTION

Numerous factors have been identified as associating with addiction in the general population and form the basis for a broad collection of theories purporting to explain its development. Summarising the vast range of areas explored, spanning the breadth of observations from the fields of psychology and neuroscience, biology, genetics and the social sciences, is beyond the scope for the current investigation; though West & Brown (2013) provide a comprehensive review of theory in the area.

From the perspective of clinical psychology however, strong associations have been reported between addiction and experience of mental health problems, such as depression and anxiety (e.g. Kessler et al, 1994; Grant et al, 2004), issues relating to experience of trauma, particularly in childhood (e.g. Brems et al, 2004), and diagnosis of more enduring mental illness, including schizophrenia-spectrum and bipolar disorders (e.g. Barnes et al, 2006; Merikangas et al, 2008). Such observations form the basis for popular theory of addiction as a choice in how to

cope with intensely unpleasant experiences and affective states (e.g. Self-medication theory – Khantzian, 1997).

Other research has instead focussed more on the general implications for addiction of classic psychological theories of behaviour. Relevant issues explored have included the impact of environmental and conditioning processes proposed by learning theory (e.g. Baker et al, 2004; Blaszczynski & Nower, 2002) and social learning theory (e.g. Rollnick & Heather, 1982), in addition to the role for motivation (e.g. Miller & Rollnick, 1991) and other higher-level processes involved in decision-making and cognition (e.g. Beck et al. 1993; McCusker, 2001). Historically much emphasis has also been placed on understanding the role for personality in addiction, such that particular characterological traits are considered to associate more with addictive behaviours than others (e.g. Cloninger, 1987; Sher et al, 2000).

1.3.2. A SYNTHETIC THEORY OF ADDICTION

West & Brown (2013) describe the plethora of theories and factors associated with addiction over years of research as all being limited by their inability to fully explain all the processes underlying an addict's behaviour. For the authors each theory may present a viable means of understanding some aspect of addiction from its own perspective, yet each is also often unable to account for many other aspects described by other theories. In a sense, the development of an addiction is a complex and varied process that will change from person to person, both in terms of its aetiology and clinical presentation. As such one theory will inevitably struggle to assert itself alone.

The 'synthetic theory of addiction' (West & Brown, 2013) is an attempt to bring together these individual parts that each provide some explanation of the mechanisms underlying the addictive process. Central to the theory is the role for motivation in guiding an individual towards engagement in an addictive activity, with the various factors implicated in addiction able to influence motivation; whether this be particular social contexts, personality traits, some form of physiological experience, a mood state, or an individual's ability to plan and regulate their own behaviour.

1.3.3. IMPULSIVITY AND ADDICTION

Exploring the role for deficits in impulse-control forms the basis for one cluster of theories contributing to the synthetic theory. These propose explanations for the loss of control often seen clinically, where addictive behaviours are engaged in despite conscious efforts being made to refrain from doing so. Strong consideration is given to the potential role for failure in the inhibition systems responsible for governing behaviour and how this relates to the development of impulsive patterns of decision-making and action.

One example includes Lubman et al's (2004) inhibition dysregulation theory, developed to explore how poor ability to inhibit behaviour in the face of drug rewards may facilitate poor decision making; for instance through a lack of consideration for the potential negative future consequences of behaviour. Others have made similar claims to support the idea of addiction in some cases relating to an association between having particular personality traits, characterised by problems in impulse-control, and a tendency towards engagement in addictive behaviours (e.g. Conway et al, 2003).

The continuation of behaviour despite awareness of potentially adverse consequences represents a hallmark feature of addictive disorders. Diagnostic criteria for substance use disorders (American Psychiatric Association, 2013) describe issues that reflect a loss of impulse-control as relevant in understanding these difficulties. For example criteria for substance abuse refer to recurrent use of substances in spite of social, legal and interpersonal difficulties, in situations that could be considered risky and hazardous. Similarly features of dependence include repeated failed attempts to inhibit behaviour, loss of control over substance use over a period of time and continued use, despite awareness of its resulting psychological and physical problems.

Likewise considering behavioural addiction, prior to the current rethink in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V; American Psychiatric Association, 2013) of classifying pathological gambling under 'addiction', criteria had historically been considered under the umbrella term of Impulse-Control Disorders (DSM-IV; American Psychiatric Association, 1994). A

crucial aspect of theory and research in this area therefore involves trying to identify the processes that may underlie impulsive patterns of addictive behaviour.

1.3.4. CAUSE OR VULNERABILITY?

Few would dispute the observation, as outlined in diagnostic criteria, that many individuals presenting clinically with an addiction report and exhibit highly impulsive patterns of behaviour. For many the development of such behaviour involves a transition from being goal-directed and intentional, where decisions and behaviours are driven largely by an expectation of what will be obtained (e.g. pursuit of enjoyment and other incentives commonly seen in initial, recreational use of certain substances), to behaviour being more involuntary and habitual (Robbins & Everitt, 1999; Everitt et al, 2001). This habitual behaviour often illustrates impulsivity in action.

Yet debate persists surrounding the nature of this relationship, as to whether the observed tendency to behave impulsively precedes or results from the addiction. Is it the presence of an existing vulnerability, for instance conferred through personality traits, that puts an individual at heightened risk of engagement with problematic addictive behaviour? Or is it the individual's behavioural experience that takes them down an impulsive path, due to prolonged use of substances adversely effecting neurocognitive function or repeated engagement with the same rewarding behaviour promoting learned habits from which the individual struggles to break free? The literature offers support to both views, which are briefly summarised below.

Addiction as causal

It seems plausible to assume that extensive use of some substances has potential to render an individual more vulnerable to damaging regions of the brain responsible for controlling behaviour, creating the risk of transition to addiction. Studies have reported on how prolonged exposure to various substances can cause neural changes in both the nucleus accumbens and prefrontal cortex (Robinson & Kolb, 2004). These brain regions are respectively involved in the processing of reward value and control of behaviour, with control of behaviour seen to shift following repeated drug-

exposure, for example to dorsal regions of the brain considered to be involved in habit development (Berke & Hyman, 2000; Everitt & Robbins, 2005).

Bechara and colleagues have given particular attention to prefrontal cortical structures in relation to addiction, for instance with observations of the tendency for some substance dependent individuals, including alcohol, cocaine and methamphetamine users, to express similar deficits in decision-making to victims of neurological insult to the ventro-medial prefrontal cortex (Bechara, et al, 2001; Bechara & Damasio, 2002). Behavioural patterns observed include their tendency to prefer choices on behavioural tasks that yield immediate reward in spite of high risk for future negative outcomes (Bechara, 2003), a common clinical observation in addiction populations.

Other prefrontal regions, including the orbitofrontal, anterior cingulate and dorsolateral prefrontal cortices, have also been implicated in drug addiction. Substance dependent subjects are shown to perform poorly compared with controls on various behavioural tasks associated with functioning in each of these areas (Goldstein & Volkow, 2002; Verdejo-Garcia et al, 2006). Evidence from adolescent samples too have concluded on the negative impact of early substance use on neocortical development, with substance-induced synaptic changes in adolescence promoting impulsive behaviour and creating vulnerability for later addiction (Crews et al, 2007).

Imaging studies of the mechanism underlying these differences have considered both the role of substances in directly effecting cell death in relevant areas of the brain and more indirectly reducing general brain tissue volume and density over time (Thompson et al, 2004; Lyoo et al, 2006). Evidence from the field of ecstasy research particular has evidenced the neurotoxic effects of this drug on cognitive function, including reduced gray matter density (Cowen et al, 2003) and deficient memory function (Daumann et al, 2005; Jager et al, 2006). Similarly Lawrence et al (2009) report alcohol dependent subjects to show poorer impulse-control on behavioural measures; a pattern positively correlated with severity and chronicity of alcohol problems, which was not observed in controls or a comparison addiction sample of problem gamblers, who had not been exposed to the damaging effects of

chronic alcohol abuse. It therefore seems credible to relate chronic use of some substances with a variety of organic, cognitive and behavioural changes that may inevitably underlie a transition to the impulsive behaviour exhibited by many in addiction.

The vulnerability hypothesis

An alternative perspective suggests the potential role for a pre-existing vulnerability that may underlie the expression of impulsive behaviour in addiction. Such vulnerability would predate the impact of substances on cognitive function and any resultant changes in behaviour, implicating impulsivity as a risk factor for addiction.

In reviewing the evidence for impulsivity in addiction, Verdejo-Garcia et al (2008) summarise their view that there exists a lack of both consistent association between impulsivity and chronicity of drug use and differences in impulsivity between current and abstinent drug users; each of which may be expected if continued and prolonged use of substances had a reliable effect of making the user more impulsive. A viable alternative explanation may therefore be that impulsivity represents a “vulnerability marker” for substance-use disorders (Verdejo-Garcia et al, 2008). The authors also report on common findings that high levels of impulsivity are additionally seen in problem gamblers, where the neurocognitive effects of substances are nullified, suggesting impulsivity in addiction cannot solely be explained by the chronic ingestion of potentially damaging substances.

In support of this, some have highlighted commonality across human and various non-human mammal species for adolescence to be a period of increased engagement with risk-taking (Spear, 2000). Casey et al (2008) provide a review of developmental research of adolescent risk-taking, implying that younger people have biological vulnerability for impulsive risk-taking due to being at an earlier, less matured stage of neocortical development. In this sense earlier development of reward-related limbic structures, including the nucleus accumbens, predispose and drive rewarding and risk-taking during the transition through childhood and adolescence (Ernst et al, 2005; Ernst et al, 2006; Steinberg, 2008). It is only during transition to adulthood that maturation of executive systems occurs (Yurgelun-Todd,

2007), particularly in prefrontal cortical brain regions (Galvan et al, 2006; Steinberg, 2008), which supports improved impulse-control and more appropriate regulation of behaviour.

Such vulnerability has been implicated in the initial development of addictive patterns of behaviour (Chambers et al, 2003). For instance some research has reported high levels of impulsivity to negatively associate with age of onset of drug-use (Moeller et al, 2002). Others have reported predisposed deficits in impulse-control, associated with childhood behavioural disorders (e.g. attention deficit hyperactivity disorder (ADHD)) to be significant predictors of initial engagement with substances in these groups (Elkins et al, 2007). In other words the association is one of an individual's engagement with an addictive behaviour being specifically related to their pre-existing impulsivity and associated neurodevelopmental difficulties, rather than prior experience of substances.

Acton (2003) has instead drawn upon long-standing theories of the biological basis for personality, particularly those proposed by Eysenck (1947; 1977), to argue for impulsivity to represent a temperamental risk for substance abuse problems; a risk that exerts its influence over the individual during personality development and often long before their initial engagement with a particular addictive behaviour.

1.3.5. SUMMARY

Critically in considering impulsivity as one key factor associated with the development and maintenance of addiction, it would be important not to place too much emphasis on a singular account of causality. The breadth of support for both accounts evidenced in the literature merely works to highlight how elusive an answer to causality remains. Important to consider would also be the possibility that both factors are operating; that an individual possesses both premorbid deficits in impulse-control that creates vulnerability to engage in addictive behaviour, including an impulsive personality, and for this to be exacerbated by continued involvement with a particular behaviour.

1.4. IMPULSIVITY AS A PSYCHOLOGICAL CONSTRUCT

The concept of impulsivity has received much attention theoretically and clinically over many years, though agreed description of what constitutes impulsivity and consensus over how it should be studied is still lacking (International Society for Research on Impulsivity, 2014). Historically self-report questionnaires have been the mainstay for research of trait impulsivity, assessing the extent to which an individual can be described as impulsive on the basis of their self-reported character, personality style and tendency to behave in particular ways across various scenarios. Yet discrepancy in means of measurement, for instance with the development of new and innovative ways of studying impulsivity behaviourally, poses challenges to our understanding of impulsivity and how best it can be considered in psychological research.

In support of this Reynolds et al (2006) investigated the relationships between the various existing self-report and behavioural measures of impulsivity, finding that whilst there was some evidence of overlap between questionnaires, participant self-reports poorly correlated with their behavioural performances. The authors' conclusions suggest this discrepancy may reflect differences in the underlying constructs of impulsivity being assessed by different measures.

These views have been echoed by others who suggest that whilst trait-based measures have been well established across populations and broadly there is agreement about what constitutes personality characteristics of impulsivity, such consensus is lacking regarding what constitutes behavioural aspects of impulsivity (Enticott et al, 2006). As such it is difficult to assess how well trait and behavioural measures correlate, until consensus exists on what objective measures of impulsivity look like.

In keeping with the inconclusive nature of such research to date, further studies have since reported on better evidence to support an overlap between psychometric and behavioural means of studying impulsivity (e.g. Meda et al, 2009) and the lack of clarity persists.

1.4.1. A BIOPSYCHOSOCIAL DEFINITION

Attempting to bridge the gap between definitions, Moeller et al (2001) have defined impulsivity as reflecting “predisposition toward rapid, unplanned reactions” to events “without regard to the negative consequences of these reactions to the impulsive individual or others”. In this definition the authors draw on evidence from across biological, psychological and social models of human behaviour. This includes consensus that impulsivity comprises both lack of measured forethought and adequate planning for the future prior to actions being undertaken and reduced sensitivity to potentially adverse consequences of actions (Moeller et al, 2001).

For instance psychological research has consistently found impulsive individuals to show preference for immediately gratifying small rewards over larger rewards where some form of delay is incurred prior to the reward being obtained (Ainslie, 1975). Impulsive individuals are also reported to exhibit perseverative behaviour in the face of outcomes where potential for reward is limited or involves punishment (Matthys et al, 1998). Matthys et al (1998) hypothesise this to relate to Gray’s biopsychological theory of personality and behaviour regulation (Gray, 1970; Gray, 1981). In this context impulsivity is considered the product of a highly dominant behavioural activation system (BAS), sensitive and responsive to potential rewards, superseding control of the individual’s behaviour from the behavioural inhibition systems (BIS), whose sensitivity to punishment usually ensures appropriate regulation of behaviour and inhibition of rash decisions.

From a biological perspective evidence exists for distinct neural differences between people that suggest innately some people are more impulsive than others. For instance Potts et al (2006) have reported on evidence of reduced punishment sensitivity in relevant regions in the brains of impulsive individuals when compared with non-impulsive individuals. Measurement of event-related potentials has also demonstrated discrepant activity in frontal-cortical regions of the brain responsible for regulating risk-related decision making (Martin & Potts, 2009), which has been implicated in the increased rate of poor, high-risk decision making observed in impulsive individuals (Bechara & Van Der Linden, 2005).

Finally from a social perspective Moeller (2001) have emphasised the social cost of impulsivity, in that impulsive individuals struggle to weigh up the consequences of their actions for others as well as themselves. Family theory has highlighted the importance of attending to the impact of learned behaviour and an early rearing environment in understanding these observations. For instance it has been argued that families with highly reactive parenting styles, particularly where immediate parental responses to the child are abusive, may support the development of impulsive behaviour in the child, which become generalised outside of the family (L'Abate, 1993). Testament to this could be considered the effectiveness of particular parenting interventions in addressing the difficult and often impulsive behaviour of oppositional children (Furlong et al, 2013), including in the treatment of conduct disorders.

Similarly research of youth offending offers some evidence to suggest social factors to be important in the expression of impulsive behaviour. For instance Lynam et al (2000) reported impulsivity to predict offending in juveniles from poorer areas, but not for juveniles in more affluent areas. One hypothesis explored by the authors was for the potentially mediating role for factors such as high levels of social disorganisation, which allows for the expression of impulsive offending behaviour that in more organised settings is contained.

1.4.2. IMPULSIVITY AND RISK TAKING BEHAVIOUR

Impulsivity has been strongly associated in the literature to engagement with risk-taking behaviour. This association can be traced back to early theories of personality, including proposals of Eysenck & Eysenck (1977) that risk-taking constitutes an aspect of personality they describe as 'impulsiveness'. The types of behaviour implicated in this conceptualisation of impulsivity are numerous, including high scores on measures of trait impulsivity associating with more frequent engagement in recreational drug use, reckless driving activity and acts of aggression (Stanford et al, 1996).

Related theory proposes an overlapping relationship between impulsivity and tendency to seek out intensely rewarding experiences through risk-taking activities (Zuckerman, 1979b; Horvath & Zuckerman, 1993). In this context being impulsive

is discussed as having reduced capacity for inhibiting reward-seeking behaviour despite potential for dangerous and problematic outcomes for the individual and others (Zuckerman & Kuhlman, 2000). In a review of the literature Zuckerman & Kuhlman (2000) summarise the implications for such *impulsive sensation-seeking* in terms of risk behaviour associated with driving (Vavrik, 1997; Zimbardo et al, 1997), use of substances (Arnett, 1996), anti-social behaviours (Horvath & Zuckerman, 1993), and sexual activity amongst people positive for HIV (Wulfert et al, 1999).

1.4.3. IMPULSIVITY AND OFFENDING

The literature concerning antisocial behaviour provides some context to begin considering impulsivity in offending groups. Some have argued that high levels of impulsivity help shape stable engagement with problem behaviours across the lifetime (Gorenstein & Newman, 1980; Farrington, 1995; Moffitt, 1993). For instance longitudinal findings have reported impulsivity to increase the risk of more severe and repeated offending in adolescence (White et al, 1994; Vitacco et al, 2002) and continued offending into adulthood (Luengo et al, 1994); though the strengths of these associations are thought to differ between offences.

Comparisons between adult offenders and non-offenders have also reported on differences between subjects on behavioural measures of impulsivity. For example Hanoch et al (2013) reported offenders to have particularly short ‘time horizons’, where their focus was more on obtaining immediate rewards rather than waiting to obtain more rewarding but delayed outcomes. Such observations have supported historical theories of crime purporting a key factor in offending behaviour to be a lack of self-control (Gottfredson & Hirschi, 1990).

Moffitt (1993) argues impulsivity exerts its influence in early life both directly, through deficits impairing self-control and the regulation of behaviour, and indirectly by reducing opportunities for activities known to reduce the risk of delinquency, such as education. Taking this further Carroll et al (2006) explored the importance of age of onset of delinquency, finding offenders to be differentiated from non-offenders by high levels of impulsivity on various measures, particularly if onset of offending occurred before the age of 12.

1.4.4. SUMMARY

Despite inconsistency in the way impulsivity has been defined and operationalised, there does appear to be consensus on its association to an enhanced risk for engagement with a range of rewarding and risk-taking behaviour, including problem behaviours related to offending. For some this risk is thought to be conferred during adolescence, prior to the optimal development of executive systems responsible for the regulation of behaviour and impulse-control. This poses interesting areas to consider, for instance in exploring why not all adolescents engage in risky behaviours to the same degree, despite broadly being at a similar stage of executive development.

In exploring this idea, Galvan et al (2007) conclude that whilst adolescence may be a period characterised by risky and impulsive behaviour, some may be more prone than others to behave this way. This does relate to the development of the brain but also individual differences that predispose someone to be more likely to engage in risky activities, including in personality. Such individual differences may be particularly important to recognise when exploring the risk-taking behaviour of adults, whose regulatory systems are presumably more matured and better equipped to exert control over behaviour than adolescents, yet for many highly impulsive behaviours are still seen. This includes in those presenting with an addiction

1.5. IMPULSIVITY RESEARCH IN ADDICTION

Much interest in the field of addiction research involves the investigation of impulsivity as one such area of individual difference, lending support to aspects of the ‘synthetic theory’ (West & Brown, 2013) concerning deficits in impulse-control.

1.5.1. SUBSTANCE USE DISORDERS

In a review of the literature Verdejo-Garcia et al (2008) summarise evidence from across substances to illustrate a consistent pattern for individuals who abuse or are dependent on substances to perform with significant deficits on measures of impulsivity than controls. This includes both performance on behavioural measures and higher rates of impulsivity on self-report questionnaires, typically assessed as

scores on the Barratt Impulsivity Scale (BIS-11; Patton et al, 1995). The BIS is a self-report measure of impulsiveness as a trait of personality, providing informants with a range of statements about characteristics in personality and asking for a rating of its relevance to them.

Elevated scores on the BIS have been reported in adults who abuse cocaine and amphetamine (Coffey et al, 2003; Moeller et al, 2004), including higher scores to correlate with risky decision making in young adult stimulant users compared with non-using controls (Leland & Paulus, 2005; Leland et al, 2006). Further studies have reported on an association between increased impulsivity on self-report measures and use of another stimulant, 3,4-methylenedioxy-N-methylamphetamine (MDMA, otherwise known as 'ecstasy'). These studies have been undertaken using self-reports on the Impulsiveness, Venturesomeness and Empathy Scale (IVE; Eysenck & Eysenck, 1978) to study impulsivity in relation to both recreational and heavier ecstasy use.

For instance Butler & Montgomery (2004) demonstrated higher IVE impulsiveness in ecstasy users relative to non-using controls, with heaviest ecstasy users also shown to engage in more risk-taking behaviour on a behavioural task than comparison samples. However the using group did also report significantly more polydrug use than comparisons, including use of other stimulants, which may confound their conclusions. Similarly in a comparison of non-drug users, light and heavy ecstasy users, Parrott et al (2000) found a positive association between IVE impulsiveness scores and severity of ecstasy use; though again both ecstasy groups evidenced significantly more polydrug use than controls that makes interpretation challenging.

One further study (Morgan, 1998) appears to have overcome the caveats of polydrug use by comparing drug naive controls with two groups of polydrug users who only differ in drug history in terms of ecstasy use. All three groups were also matched on personal characteristics. In summary ecstasy users were shown to have elevated IVE impulsiveness scores and poorer performance on behavioural measures of impulsivity relative to non-ecstasy polydrug and non-drug users, with the heaviest ecstasy users expressing the highest trait impulsivity.

Similar differences in self-reported impulsivity have been discussed between users and non-users of non-stimulant substances. This has included individuals dependent on heroin, who have demonstrated elevated impulsivity on both BIS and IVE measures, in addition to behavioural measures of impulsivity (Kirby et al, 1999). The authors also note importantly that controls scored similarly on non-impulsivity related subscales of the IVE to drug users, indicating heroin use was not associated more generally with differences on all dimensions but rather greatest differences were seen with respect to impulsivity. Similar differences have been reported in heroin users using the impulsivity domain of the Eysenck Personality Questionnaire (EPQ), which also correlated with more impulsive performance on behavioural tasks (Madden et al, 1997).

When considering impulsivity and non-illicit substances, Mitchell's (1999; 2004) work with cigarette smokers has found smokers to show elevated impulsivity compared with non smokers on most of 28 scales of trait impulsivity, including scales derived from the BIS and EPQ. The authors also suggest smokers to be more impulsive on behavioural measures, though research is limited. Elevated self-reported impulsivity on the BIS has also been reported in those who abuse alcohol relative to controls (Mitchell et al, 2005), with these differences seen to sustain even in detoxified alcohol dependent individuals on the BIS and self-reported measures of sensation-seeking (Bjork et al, 2004).

Interestingly Bjork et al (2004) report on their post-hoc analysis, which suggested only a sub-sample of alcoholics evidenced significantly more impulsivity on tasks than controls; these having an earlier onset of problem drinking behaviour and a problem-drinking parent. As such whilst overall alcohol abuse was associated with elevated trait impulsivity, only a selection of drinkers with a more complex psychosocial background expressed this impulsivity behaviourally. Similarly in a study undertaken by Whiteside & Lynam (2003) only alcohol abusers with additional antisocial personality traits evidenced significantly higher impulsivity than controls across all domains of the UPPS (Urgency, Premeditation, Perseverance, Sensation-seeking) Impulsive Behaviour Scale (Whiteside & Lynam, 2001), whereas non-antisocial alcoholics only differed from controls on one of four domains. This raises an important consideration as to the extent to which impulsivity as expressed in

addiction is dependent on the impact of any additional psychopathology and psychosocial circumstances.

1.5.2. BEHAVIOURAL ADDICTION

Patterns of elevated self-reported impulsivity have also been reported in research of non-substance, or so-called *behavioural addiction*. Most notably this has been supported in research of gambling problems. When pathological, gambling problems have been considered both past and present under diagnostic criteria suggesting the key feature to be persistent failure to withhold impulses to gamble in spite of major life disruption (American Psychiatric Association, 1994; 2013). Evidence has suggested higher impulsivity on the BIS reliably distinguishes problem gamblers from non-problem gamblers (Fuentes et al, 2006). For instance, a study undertaken by Rodriguez-Jimenez et al (2006a) compared problem gamblers with and without ADHD to control subjects, finding ADHD subjects to evidence highest impulsivity scores on the BIS and behavioural tasks, but non-ADHD gamblers to also express more impulsivity than controls.

Theory around the development and maintenance of gambling problems has also proposed increased severity of problem gambling to associate with high impulsivity (Blaszczynski et al, 1997). For example in the pathways model of pathological gambling (Blaszczynski & Nower, 2002), the authors discuss an ‘antisocial-impulsivist’ subtype of gambler, which represents the most problematic of gamblers. Their defining features include high rates of impulsivity associated with pathological personality traits, particularly antisocial personality disorder, and comorbid psychiatric difficulties, including substance use disorders. This subtype is considered distinct from others, whose behaviour is more amenable to change in being driven by processes relating to classical conditioning, operant reinforcement and low mood.

The notion of impulsivity in problem gambling has been supported in a longitudinal study undertaken by Vitaro et al (1999). The authors reported higher impulsivity on both the Eysenck Impulsiveness Scale and a behavioural task to predict problem gambling in adolescent males at five year follow up, even after controlling for early gambling behaviour, various demographic and other personality variables. These

results were discussed as evidence for impulsive individuals having difficulty foreseeing the negative consequence of their behaviour and so in failing to inhibit themselves are placed at enhanced risk of developing a gambling problem.

A similar but smaller literature appears to be emerging surrounding other forms of behavioural problems, increasingly considered in terms of ‘addiction’; though research is in its infancy. For instance Cao et al (2007) reported on Chinese adolescents with ‘internet addiction’ to be more impulsive than controls on both BIS-11 and behavioural measures, though in the context of also evidencing higher rates of comorbid ADHD and other psychiatric disorders. In a recent comparison between internet addicts, problem gamblers and controls, Lee et al (2012) also reported similarities in rates of impulsivity between internet addicts and problem gamblers, with severity of internet use positively correlated with level of impulsivity. Researchers in the area have therefore begun suggesting features of an impulsive personality may enhance vulnerability to problematic internet use (Meerkerk et al, 2010).

Extending research to other behaviours too, Di Nicola (2010) investigated the development of behavioural addictions in bipolar disorder patients. They reported higher self-reported impulsivity and prevalence of problems with gambling, compulsive shopping behaviour, sexual and work ‘addictions’ compared with controls, which may be expected given the evidence base for high rates of impulsivity in this group (Swann, 2009). Yet in comparing within bipolar subjects, it appeared that patients with a history of behavioural addiction evidenced significantly elevated scores on the BIS than patients without, suggesting impulsivity to perhaps be a key factor in the development of some addictive behaviours in bipolar disorder.

1.5.3. IMPULSIVITY IN PRISONER ADDICTION

A printed body of research has been undertaken looking at the role for impulsivity in prisoner addiction, though studies are small in number and limited to substance-related problems. Furthermore both variance in outcomes and discrepancy in the focus of studies, including how impulsivity is defined and measured, have meant it is difficult to draw firm conclusions from existing findings.

Fishbein & Reuland (1994) investigated the psychological correlates of drug abuse in prisoners, finding impulsivity as measured by the BIS to be most associated with the frequency and severity of alcohol use, though not for other substances. Findings also suggested several other variables to be worth considering in understanding substance problems more broadly in this group. In contrast a recent investigation by Ireland & Higgins (2013) reported high BIS impulsivity correlated strongly with various types of drug and alcohol dependency in prisoners, including polydrug dependency. Using a different measure of impulsivity, Mooney et al (2008) have similarly reported high scores on the Eysenck Impulsivity Questionnaire to correlate strongly with drug-use severity in female prisoners, whilst also considering the role for drug-related beliefs (e.g. “drugs are effective in relieving stress”) in the development of more problematic use.

One comparison between prisoners with and without drug problems explored psychological differences between these groups, finding drug-abusing prisoners to be more impulsive on the BIS (Cuomo et al, 2008). Interestingly the authors related these differences not just to drug use but also the higher number of violent incidents committed by drug-abusing offenders in detention, suggesting impulsivity relates both to drug use in prisoners and other problem behaviours. Similar conclusions have been made by Devieux et al (2002), who found imprisoned adolescents scoring as highly impulsive to report both higher rates of recent cannabis and alcohol use than low impulsive comparisons, in addition to higher rates of unprotected sex during the drug-using period. These adolescents also reported lower perceived sexual self-efficacy and higher perceived susceptibility and anxiety about getting infection; implicating impulsivity not only in terms of engagement with problem behaviours but also for impulsive prisoners to have concerns about their vulnerability to harm resulting from a perceived lack of control over their own behaviour.

To our knowledge there is a gap in the prisoner literature regarding the role for impulsivity in behavioural addiction; though one recent study has investigated the general correlates of problem gambling in offenders, of which impulsivity constituted one factor of interest (Preston et al, 2012). The authors suggested correlates of gambling problems in offenders largely mirrored that of non-offenders,

though impulsiveness was one of several factors to be significantly associated; others including substance abuse, mood disorder and ADHD.

1.5.4. SUMMARY

Despite the high rate of addiction amongst prisoners, research of the psychological factors contributing to addictive behaviour in this population is limited. Research exploring the specific role for impulsivity in prisoner addiction, particularly behavioural addiction, is even more limited. Given large differences in addiction prevalence and associated difficulties, an understanding of whether prisoner addiction presents as similar or different from what is known about the general population is an important step to take in being able to adequately address the needs of this population.

1.6. IMPULSIVITY AND PSYCHIATRIC DISORDER

It is important to note that the association between impulsivity and a range of mental health difficulties poses challenges to the exploration of its relationship to addictive behaviour. For instance impulsivity is considered relevant in understanding patterns of behaviour contributing to diagnostic criteria for a range of different psychiatric disorders in DSM-V, which often present alongside addiction. Interpreting the direction of any relationship between impulsivity and addictive behaviour in the context of another existing variable can therefore be difficult. Investigation of these associations may be particularly confounded in research of prisoners, given the known high rates of mental disorder in this population; consistently found to be well above the average for the general population (Fazel & Danesh, 2002). It is therefore worth briefly noting some key areas of psychopathology where impulsivity has been implicated and may be to relevant in the study of addiction in prisoners.

1.6.1. PERSONALITY DISORDERS

Impulsivity is considered a defining feature for some personality disorders, broadly characterised by pervasive interpersonal difficulties and negative internal states. Personality disorders are reported to be common in the general population (Coid et al, 2006), associated with a wide range of mental health problems and earlier contact

with criminal justice services. Within offending and prisoner populations, prevalence rates are particularly high (Fazel & Danesh, 2002), whilst similarly high prevalence has been reported in addiction populations (Bowden-Jones et al, 2004).

Impulsivity has been discussed as a common factor underlying the frequent comorbidity between borderline personality disorder and substance use disorders (Trull et al, 2000), a stance supported by others (Bornovalova et al, 2005) and supported by empirical findings of similarities in frontal cortical structures associated with both disorders (Dom et al, 2005; Berlin et al, 2005). DSM-V criteria for borderline personality disorder reference ‘impulsivity in at least two areas that are potentially self-damaging’, with impulsive personality traits shown to be highly predictive of borderline psychopathology (Links et al, 1999), particularly risk of self-harm (Brodsky et al, 1997).

The role for emotion regulation

Whilst not the focus for the current investigation, a related observation concerns findings from a body of research implicating impulsivity as an important factor contributing to poor emotion regulation. Dysregulated emotion presents as a core feature of some mental health conditions, including borderline personality disorder, though is a broader issue that can present irrespective of a diagnosis of personality disorder. For example impulsivity has been suggested to account for individuals abusing substances as a means of regulating negative affective states (Verdejo-Garcia et al, 2007). Other research has focussed more on the role for impulsivity in promoting self-harming behaviour, as another common strategy employed by individuals struggling to regulate intense emotion. For instance Herpertz et al (1997) found impulsivity traits on different measures, including the BIS, to be significant factors in participant self-harming. Others have suggested the important role for impulsivity to be emphasised particularly by individuals who repeatedly engage in such strategies for regulating emotion (Evans et al, 1996).

In addition to borderline personality disorder, criteria for antisocial personality disorder includes reference to “impulsivity or failure to plan ahead”, with some evidence suggestive of biologically distinct differences between individuals with antisocial personality disorder who have a history of impulsive behaviour versus

those who do not (Moeller et al, 2001). Impulsive antisocial traits are reported to relate to severity of addictive behaviours, including increased impairment in decision-making that gives rise to heavier alcohol use (Mazas et al, 2000) and more problematic gambling behaviour (Blaszczynski et al, 1997; Steel & Blaszczynski, 1998). A recent study by Sargeant et al (2012) has also reported an association between diagnosis of antisocial personality disorder and poorer abstinence from substances, mediated specifically by a facet of impulsivity they termed ‘control’; an individual’s capacity for being organised, reflective and restrained in behaviour.

Addiction research has reported common comorbidity with personality disorders (Nace et al, 1991; Bowden-Jones et al, 2004; Compton et al, 2007), with addictions qualitatively reported to change in the context of co-occurring pathology in personality (Steel & Blaszczynski, 1998; Blaszczynski & Nower, 2002). Research of substance abuse in particular suggests that whilst individuals who abuse substances shown high levels of impulsivity, the presence of a comorbid personality disorder can exacerbate impulsive behaviour on tasks (Petry, 2002; Dom et al, 2006; Rubio et al, 2007).

However this inference has been found to depend on the behaviour being studied. For instance Dom et al (2006) found more impaired responding on a measure of response inhibition to distinguish alcoholics with cluster-B personality disorder from those without. However such discrepancy was not found on a task looking at ability to delay gratification when offered a choice of different rewards. Other findings have also been inconsistent with general conclusions about the additive effect of personality disorder, for example Moeller et al (2002) finding similar rates of cocaine abuse in subjects with and without antisocial personality disorder and addictive behaviour solely predicted by responses on the BIS.

1.6.2. MOOD DISORDER AND SUICIDALITY

Consistent evidence has shown impulsivity to be a persistent feature of mood disorder. Extensive research in the area undertaken by Alan Swann and colleagues has found bipolar patients to demonstrate significantly higher scores on questionnaire and behavioural measures of impulsivity compared with healthy controls (Swann et al, 2001; Swann et al, 2003), with impulsivity reported to increase with severity of

bipolar illnesses, especially during manic phases (Swann, 2009). These differences in impulsivity have been associated with the enhanced risk for suicide attempts in bipolar groups, including during both manic and depressed phases, independent of other factors (Swann et al, 2005; Swann et al, 2008). Bipolar disorder has also previously been linked in the literature to engagement with a range of addictive behaviours (Regier et al, 1990; Brown et al, 2001; Di Nicola, 2010).

Impulsivity has also been associated with features of unipolar depression, particularly relating to risk of suicide attempts, perhaps due to reduced capacity for inhibiting behaviour when distressed. For instance suicide attempters have been shown to evidence much higher levels of trait impulsivity than those who have not attempted suicide (Corruble et al, 1999; 2003), independent of sample characteristics, antidepressant treatment, depression severity and general psychopathology.

The prevalence of psychiatric disorder in UK prisons, including mood disorder and suicidal behaviour, has previously reported as being much higher compared with the general population (Lloyd, 1990; Shaw et al, 2004; Fazel, Cartwright et al, 2008; Fazel et al, 2013). Despite attempts to improve prisoner safety, suicidality appears to remain a concern both in the UK (Safety in Custody Statistics; Ministry of Justice, 2013) and internationally (Matschnig et al, 2006). The high prevalence of mood and other mental health problems in prisoners therefore presents another potential confound to the study of impulsivity and addiction in this population.

The role of impulsivity specifically in prisoner mood disturbance has only been given limited consideration and requires more research. Carli et al (2010) compared lifetime rates of suicidal thoughts and behaviours between prisoners who scored high versus low on the BIS, notably finding associations between impulsivity and suicidality dissipated when controlling for other personality variables. In contrast Putnins (2005) studied various factors known to associate with suicide attempts in imprisoned young offenders, including depressed mood, and proposed impulsivity to be an underlying link between these correlates that contributes to the heightened overall risk of suicide in this group. Others instead have reported some aspects of impulsivity (e.g. sensation-seeking) to actually be protective against suicidal ideation in prisoners (Sarchiapone et al, 2009), or for impulsivity to better associate with

suicidal tendencies in prisoners where there exists another co-occurring problem linked with impulsivity, particularly substance abuse (Cuomo et al, 2008; Sarchiapone et al, 2009).

1.6.3. BEHAVIOURAL DISORDERS

A broad literature exists on impulsivity being a defining feature of ADHD (Winstanley et al, 2006), particularly impulsive-hyperactive subtypes, and is also considered relevant to our understanding of other behavioural disorders often comorbid with ADHD (Willcutt et al, 1999). Conduct disorders represent one area of interest, for some considered a childhood precursor for later diagnosis of antisocial personality disorder in adulthood. For example Vitacco et al (2001) reported on work with adolescent males being held in secure facilities, finding impulsivity to be highly predictive of levels of psychopathy and behavioural problems, and to account for most variance in symptoms of conduct disorder in this group.

Estimates suggest a high prevalence of ADHD and comorbid conduct disorders in the prisoner population. One study undertaken by Rosler et al (2004) suggested a DSM-diagnosable ADHD applied to 45% of their sample, with nearly 22% also meeting criteria for conduct disorder, though prevalence rates are known to vary between studies. In a review of studies across young prisoners Fazel et al (2008) estimate average rates of ADHD to be 11.7% in male and 18.5% in female offenders, and for conduct disorders to average at 52.8% across both genders, with general ranges between 4-28% for ADHD and 32-73% for conduct disorder depending on the study. These difficulties are also known to present as comorbid with substance abuse in both general (Schubiner, 2005; Wilens & Biederman, 2006) and prisoner populations (Retz et al, 2007), and associate with more severe problem gambling (Grall-Bonnec et al, 2011).

1.6.4. TRAUMATIC BRAIN INJURY

The incidence of traumatic brain injury in offender populations has been shown in a recent meta-analysis to be high at slightly over 60% (Shiroma et al, 2010). Comparable with rates of lifetime injury in the general population, which themselves can be quite high, estimates suggest experience of any form of traumatic brain injury to be significantly more common in prisoners (Farrer & Hedges, 2011). This may

represent an important factor for many in their likelihood of imprisonment and engagement with problem behaviours. For instance Williams et al (2010) has reported those who self-report past traumatic brain injury to evidence earlier initial experience of prison, increased rates of reoffending and longer time spent in prison over a five year period. Traumatic brain injury in prisoners has also been associated with increased risk of severe mental health problems, substance abuse and poorer neuropsychological functioning, including poorer performance on standardised tests (Slaughter et al, 2003; Schofield et al, 2006).

Given the known impact of brain injury on cognitive ability, including more impulsive decision-making (Tate, 1999; Salmond et al, 2005), particularly following damage to the frontal lobe (Bechara & Van Der Linden, 2005), the high rate of injury reported in prisoners represents another potential confound in the study of impulsivity and addiction in this population.

1.6.5. SUMMARY

Empirical reviews and official reports document significantly higher rates of mental illness amongst prisoners when compared with the general population. As such whilst prisoner populations present a relevant and relatively understudied group to explore further the factors and processes underlying addiction, challenges are posed by the breadth of overlapping difficulties many in prison present with. This includes acknowledgement of impulsivity being implicated as a common factor shared across many disorders, which may complicate investigation of its relationship to one area.

1.7. A MULTIFACETED CONCEPTUALISATION OF IMPULSIVITY

“The literature indicates that ‘impulsivity’ is generally regarded as a unitary sort of behavior, similar in all instances in which it appears.”

Twain (1957)

The above quote illustrates a common conceptualisation held in early psychological research. In investigating whether this view accurately described the construct

known as ‘impulsivity’, Twain (1957) went on to outline their hypothesis that under analysis, performance on various tests would perhaps reveal impulsivity to be much more than a singular factor underlying behaviour.

“The hypothesis of this study was confirmed in that the factor analysis revealed the operation of more than one factor underlying the variables under study”.

As research has progressed over time there has developed an increasing appreciation that impulsivity can and perhaps should be considered multidimensional. One example of this comes in the form of the Barratt Impulsiveness Scale, now currently in its 11th version (BIS-11; Patton et al, 1995), which has been regularly cited in the literature and widely used to explore the association between impulsivity and clinical phenomena in different populations. The BIS is first and foremost a self-report measure examining trait impulsivity. Additionally it has been considered to comprise three underlying factors, each reflecting different ways in which trait impulsivity can be thought of; though this factor structure has been disputed in more recent literature (Ireland & Archer, 2008; Vasconcelos et al, 2012). The areas considered include (i) motor impulsiveness, the immediacy with which an individual will tend to act in a given situation without thinking; (ii) non-planning impulsiveness, the tendency to act without forethought or consideration of the future; and (iii) attentional impulsiveness, representing the degree of attentional control an individual typically retains when undertaking tasks.

The BIS is one of many available options for measuring impulsivity, each ranging in its focus and having its own perspective on how impulsivity should be understood. To name but a few, notable measures have included the Impulsiveness-Venturesomeness-empathy scale (IVE; Eysenck & Eysenck, 1978) and Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975), both means of describing impulsive personalities in keeping with Eysenckian theory on the biological basis for personality and temperament (Eysenck, 1947). The Sensation-Seeking Scale (SSS; Zuckerman et al, 1964), instead conceptualises impulsivity as related to drives for novel experiences and activities that provide reward and gratification.

Other researchers have favoured less the use of broad personality inventories and argue more for the clinical utility of briefer questionnaires that ask about actual behaviour during specific real-life events to provide a more relevant overview of impulsive behaviour in context (e.g. Impulsivity Rating Scale; Lecrubier et al, 1995). A plethora of behavioural measures also exist that try to capture different aspects of impulsivity that may underlie particular behaviours.

Increasingly efforts have been made to promote definition, measurement and interpretation of impulsivity towards a multifaceted understanding of the concept (Evenden, 1999). In this sense simply describing something as categorically impulsive, based on a representation of impulsivity as a singular trait or global characteristic of behaviour that you have or do not have (i.e. impulsive versus not impulsive), becomes less meaningful. It could also be argued to allow only a superficial understanding of its relationship to behaviour; defining behaviour as impulsive but without describing what “impulsive behaviour” actually looks like; information that may be particularly valuable to work with clinically.

Instead conceptualising impulsivity as a multifaceted concept, including various types qualitatively different from each other, invites more thorough investigation and interpretation of the different ways in which impulsivity may and may not present behaviourally and neurocognitively. Within this framework the presentation of impulsivity may change depending on context, as may its relationship with different behaviours, risk-taking activities, psychiatric disorders and their sequelae.

1.7.1. ‘VARIETIES OF IMPULSIVITY’

Evenden (1999) proposes that ‘impulsivity’ be considered an overarching term for various related but separate phenomena. The term ‘varieties of impulsivity’ is termed by Evenden (1999) to reference the discrepancy in descriptions of impulsivity given by researchers over the years, which he argues provides evidence for the existence of multiple types. This view echoes conclusions drawn from earlier theorists. For instance Buss & Plomin (1975) claimed impulsivity can include several different aspects that affect behaviour in their own way; from impulsivity reflecting poor inhibitory control over behaviour or time taken to make decisions to impulsivity as a tendency for sensation-seeking or perseverance on tasks. All

represent individual ways in which behaviour can be deemed impulsive, rather than impulsivity being defined solely by one of these ideas.

Drawing on animal research Evenden (1999) describes various forms of impulsivity that could be considered relevant to the study of human behaviour, which he speculates may associate with separate biological substrates. Whilst specific research has been limited, it could be considered that these different types may well relate differently to different behaviours, including those associated with risk-taking, addiction and psychiatric disorder. Types of impulsivity described by Evenden with reference to the wider literature include:

- *Difficulty with delayed reinforcement*, also known as delayed reward discounting. This refers to a tendency for individuals who would typically respond for larger over smaller rewards showing a reverse of this when delay is introduced prior to receipt of the larger reward. Inability to delay gratification leads to an impulsive preference for immediate smaller rewards when presented with a choice between this and a larger delayed reward. Research has grown implicating dysfunction in neural reward systems in this response style, particularly the role of dopamine (Schultz, 1998) and structures associated with the nucleus accumbens (Robins & Everitt, 1998; Cardinal et al, 2001; Cardinal, 2006)
- *Reflection impulsivity*, the tendency for individuals to engage in behaviour without appropriate reflection on behaviour and planning or deliberation over potential consequences. A term coined by Kagan (1966), the process of adequate reflection can include collecting information about different responses in the face of uncertainty (Messer, 1976) and using outcome feedback to guide behaviour. Cognitive failure to learn from negative feedback is key in reflection impulsivity (Patterson & Newman, 1993).
- *Poor response inhibition*, representing poor exertion of control over behaviour, for instance through inability to refrain from a response that has been cued or facilitated (Fillmore & Rush, 2006). Research has previously associated serotonin function to the instigation of effective behavioural

inhibition (Soubrie, 1986), suggesting dysregulation of neural serotonin to be implicated in disinhibited responding.

- *Premature responding*, referring to initiation of inaccurate responses before all information relevant to determining an appropriate response has been received. Initiation of premature responses is considered to reflect problems in the execution of behaviour (Evenden, 1998c), rather than resulting from the cognitive failure seen in reflection impulsivity.
- *Behavioural timing*, where impulsivity presents as poor time perception and inability to accurately judge or evaluate the passage of time (Wittmann & Paulus, 2008), contributing to further deficits in behaviour including difficulty with delayed reinforcement. For instance, the impulsive individual experiencing time to pass much more slowly than is reality and being late or disorganised as a result, a common feature of and relating to impulsiveness in attention-deficit hyperactivity disorder (Smith et al, 2002).
- *Behavioural switching*, relating more to poor attentional control such that the impulsive individual may demonstrate increased frequency of switching between alternative response choices when faced with a decision (Evenden & Robbins, 1983; Ho et al, 1998).

1.7.2. SUMMARY

The development of research over years has broadened the scope of what may be considered ‘impulsivity’. The current consensus in understanding impulsivity as a multifaceted construct, comprising various types qualitatively different from one-another, opens up more meaningful investigation of the relationships between impulsivity and different behaviours. It could also be argued that this broader conceptualisation should consider impulsivity as a continuous factor; something which is not present or absent but rather may present as higher or lower in different contexts for different individuals.

1.8. MULTIFACETED IMPULSIVITY IN ADDICTION

One area where increasing focus has been given to understanding impulsivity as a multifaceted concept has been the field of addiction. Evidence has accumulated and been reviewed to suggest different facets of impulsivity may have an important role in both substance and behavioural addiction (Verdejo-Garcia et al, 2008).

1.8.1. REFLECTION IMPULSIVITY

A developing evidence base suggests higher reflection impulsivity to associate strongly with use of multiple substances, with some concluding it to represent a predictive cognitive marker for substance dependence (Clark et al, 2006). Impaired reflection as measured by increased impulsivity on the Information Sampling Task (Clark et al, 2006) has been reported in the study of amphetamine and opiate users (Clark et al, 2006), with deficits in amphetamine users not seen to reverse after prolonged abstinence. On the Information Sampling Task participants are shown an array of grey boxes and told to open as many as they want to decide which of two colours is hidden behind the majority. Impulsivity is measured as a function of how quickly and accurately participants make decisions based on the amount of information they choose to sample.

Reduced reflection has also been reported in studies with alcoholics (Weijers et al, 2001; Lawrence et al, 2009), cannabis users (Clark et al, 2009; Solowij et al, 2012; Huddy et al, 2013) and cigarette smokers (Yakir et al, 2007), using the Information Sampling Task and other measures of reflection impulsivity. Another common measure is the Matching Familiar Figures Test (MFFT; Kagan et al, 1964). In the MFFT participants need to decide which from an array of six similar pictures matches a target picture exactly, using feedback about incorrect choices to guide subsequent decisions.

Deficits in reflection on the MFFT have been reported in both recreational (Morgan, 1998; Morgan et al, 2006) and heavy users of ecstasy (Quednow et al, 2007), deficits in the latter again shown to persist despite abstinence (Morgan et al, 2002); though as previously discussed inconsistencies do exist in the impulsivity-ecstasy literature, which extends to specific research of reflection impulsivity. For example Clark et al

(2009) failed to find support for reduced reflection in either current or former users of ecstasy, despite evidence to support these deficits in cannabis users.

Research of reflection impulsivity in non-substance addictions has also been reported, predominantly in the area of problem gambling. Evidence of reflection impulsivity has been recently investigated by Kertzman et al (2010), who reported on deficits in the ability of problem gamblers to gather and evaluate information before making a decision on the MFFT. Relative to non-gamblers, poorer reflection was considered to explain the frequently impulsive decisions made by gamblers, which were not accounted for by differences in the speed of responses between the two groups. These findings provide supporting evidence to an earlier study by Lawrence et al (2009) using the Information Sampling Task. They reported problem gamblers to show similarly high levels of reflection impulsivity to a sample of alcohol dependents, relative to controls.

1.8.2. DELAYED REWARD DISCOUNTING

Measures of delayed reward discounting have been widely used in the substance abuse literature as a method to study impulsivity as difficulty with delayed reinforcement. Bickel & Marsch (2001) describe discounting as the tendency for reduced value to be attributed to delayed rewards compared with the perceived value of immediate rewards. Substance abusers have been consistently observed to show choice preference for smaller but immediate rewards over larger delayed rewards on both questionnaire measures and experiential tasks (e.g. Allen et al, 1998; Petry & Casarella, 1999), when compared to non-using controls.

The Monetary Choice Questionnaire (MCQ; Kirby et al, 1999) is one example of a discounting measure widely used in the literature. The MCQ assesses for reward preferences by presenting individuals with hypothetical questions asking whether they would prefer the choice of one reward now or another larger reward at a specified time in the future. Bickel & Marsch relate observations of behaviour on such tasks to the day to day behaviour of addicts, for instance in their use of substances for an immediate high or removal of negative affective and physiological states, despite knowledge of the potential longer-term benefits of abstinence.

A recent meta-analysis undertaken by MacKillop et al (2011) reported strong evidence for increased discounting in substance users compared with controls across 46 studies, particularly so for those meeting criteria for substance use disorders. Higher rates of discounting have been reported in current and abstinent cocaine abusers (Moeller et al, 2002; Heil et al, 2006), for both monetary and hypothetical drug rewards (Coffey et al, 2003), and for amphetamine (Hoffman et al, 2006) and heroin users (Kirby et al, 1999), with discounting shown to positively associate with length of delay and trait measures of impulsivity.

Steeper rates of discounting have also been reported in individuals dependent on non-illicit substances. For instance discounting in alcohol abusers has been reported by Petry (2001), who found both abstinent and currently using alcoholics to discount significantly more than controls, with rates highest for current users. This pattern has also been reported in heavy social drinkers compared with lighter drinkers (Vuchinich & Simpson, 1998). In a review of discounting findings across substances, Reynolds et al (2006) also summarise similar findings for cigarette smokers who show higher rates of discounting compared to non-smoking controls, with discounting in smokers shown to be particularly pronounced in trials using drug-related reinforcement (Mitchell, 2004a).

It should be noted though that some research has reported inconsistencies in the discounting rates between users of different substances. For example, Kirby & Petry (2004) reported on steep rates of discounting in cocaine and heroin addicts, but not for alcoholics, whose discounting was no different to controls. Furthermore in considering the former groups, discounting was shown to reduce in heroin, but not cocaine, users after a period of abstinence, suggesting differential recovery in performance between users of different substances.

Comparison studies between gamblers and healthy controls suggest problem gambling to also be associated with higher rates of impulsive discounting of delayed rewards (Dixon et al, 2003), with discounting increasing relative to the severity of gambling disorder (Alessi & Petry, 2003). Similarities between problem gamblers and substance abusers in their preference for immediate reinforcement have previously been discussed as evidence of a key shared feature of addictive disorders.

For example Petry & Casarella (1999) reported the discounting of delayed rewards seen in substance abusers to be further enhanced by a comorbid gambling problem. Similarly gamblers who present with comorbid substance problems have been shown to be more impulsive on discounting tasks than non-substance using gamblers (Petry, 2001).

1.8.3. RESPONSE INHIBITION

Limited research has been undertaken in the area of response inhibition, amongst other facets. Poorer response inhibition has been associated with alcohol (Kamarajan et al, 2005a) and stimulant dependence, both for users of cocaine (Moeller et al, 2004; Verdejo-Garcia et al, 2007) and amphetamine (Monterosso et al, 2005), using 'Go-No Go' computer tasks (Fillmore et al, 2003). This measure tests an individual's ability to withhold responses that have earlier been cued, in order to facilitate a correct alternative response choice.

Study of response inhibition in problem gambling has to date only been reported in case control studies. Evidence of impaired performance on 'Go-No Go' tests (Fuentes et al, 2006) has been found, which may generate further research to come in this area. Similarly research outside of problem gamblers to other compulsive patterns of behaviour has been limited and needs expanding, though recent findings have been emerging to suggest discounting to potentially be relevant to other so-called behavioural addictions, which needs more investigation. For example Saville et al (2010) reported on increased rates of discounting in college students with problematic internet use relative to a controlled peer comparison group, subsequently proposing internet addiction to possibly share overlaps with other forms of addiction in this area.

1.8.4. OTHER FACETS

Research of other facets remains very limited to date. One relatively recent study of stimulant users screening high on trait measures of impulsivity also found evidence of poor ability to judge time, including overestimating the duration of longer intervals of time (Wittmann et al, 2007). However more research is needed in this and other areas of impulsivity, such as those described by Evenden (1999).

1.8.5. SUMMARY

Through years of study impulsivity has been well-established as an important construct associated with addiction, both substance and behavioural. Debate and investigation remains ongoing regarding the direction and nature of this complex relationship, with the field of addiction representing one area with an increasingly broad consideration of the various dimensions through which impulsivity may present. This includes consideration for the concept of multifaceted impulsivity, which has been applied in attempts to further our understanding of the specific factors and processes underlying addictive behaviours.

Findings from across substances and problem behaviours present a relatively small but developing evidence-base suggestive of the important role different facets of impulsivity may have in the development and maintenance of a range of addictive disorders. Reflection impulsivity, delayed reward discounting and response inhibition represent areas that have received most attention in contributing to the literature, whilst research of other facets remains more limited. In support of these developments it would be of interest to broaden the scope of investigation, for instance to different contexts where the issue addiction is highly relevant.

One area for consideration includes the study of prisoner populations, who present with high rates of addiction yet study of associated psychological phenomena, including impulsivity, is limited. Particularly a gap exists to explore further the potential role for specific, well-defined facets of impulsivity in the substance and behavioural addictions many prisoners experience.

1.9. SUMMARY AND RATIONALE FOR STUDY

Research has extended early awareness of impulsivity as a general psychological construct, associated with a wide range of risk-related and problem behaviours, to being complex and multidimensional. This construct has been related to psychopathology across a range of psychiatric disorders, including the spectrum of addictive disorders and their comorbidities and is increasingly considered to comprise several facets. These are thought to associate with limitations in executive

function, behavioural control and cognitive capacity for appropriate and measured decision-making in different areas.

The addiction literature has begun to develop towards a more thorough understanding of the role for impulsivity as one area relevant to the development and maintenance of addictive behaviours. Relevant findings include associations between substance and behavioural addictions and both elevated trait impulsivity and behavioural aspects of impulsivity qualitatively different from each other, as measured by a multitude of behavioural tasks.

In particular a relatively robust evidence-base has developed to suggest a tendency to discount delayed rewards may represent a common area of impulsivity shared across different types of addiction. Research of other facets, particularly in the area of reflection impulsivity, have received more limited but increasing attention over the past decade, offering inconsistent findings that invite further investigation.

The prisoner population represents a subset of the population with significantly high prevalence of addiction. Development in our understanding of whether the factors that relate to addiction in the general population are similar or different to that of the prisoner population is necessary to ensure the needs of this vulnerable group are appropriately met.

1.9.1. AIMS OF STUDY

Addiction presents a significant problem for many people in prison (Fazel et al, 2006), yet this group remains relatively understudied in research exploring associated psychological phenomena. The current study primarily aimed to address gaps in the field by extending research of the relationship between addictive behaviours and impulsivity, one psychological factor strongly associated with addiction in the wider population, to a sample of prisoners.

Specifically the primary objective of the study was to explore whether impulsivity is associated with addictive behaviours in prisoners. The addictive behaviours chosen for study were selected on the basis of reported associations with one or several types of impulsivity in the wider literature, as previously referenced. These included use

of a range of substances, namely alcohol, tobacco, cannabis, cocaine, opiates and amphetamines, and engagement in problem gambling behaviour.

A related but secondary objective of the study was to explore, if impulsivity is associated with addictive behaviours in prisoners, whether different types of impulsivity are better able to account for this relationship than others. Three types of impulsivity were therefore considered, in support of developments in impulsivity research that emphasise the importance of studying how different facets may have potentially differing relationships to aspects of human behaviour. The areas considered include trait impulsivity, as measured by a well-validated questionnaire and specific behavioural measures of delayed reward discounting and reflection impulsivity. The focus on these areas reflects the main types of impulsivity associated with addictive behaviours in the broader literature. They also represent areas with administrative procedures suitable for the prison setting and time-frame for the current study.

Two further secondary objectives of the study were identified. Firstly we aimed to study whether associations between impulsivity and addictive behaviour differed between participants screening positive versus negative on a screen for personality disorder. This exploration was based on previous research suggesting comorbid personality disorder can potentially influence the relationship between impulsivity and addiction.

Secondly it was considered of conceptual interest to explore the relationships between different measures of impulsivity when used with prisoners; something not explored before. The purpose of this was to see if such measures were seen to be measuring different constructs, which could provide evidence for multifaceted impulsivity in prisoners. For instance it may be expected that if impulsivity is multifaceted, different behavioural measures would not associate with each other given their focus in assessing different aspects of impulsive behaviour. It may instead be more expected for each behavioural measure to associate with underlying trait impulsivity; though as previously discussed the relationship between trait and behavioural measures remains unclear (Enticott et al, 2006).

1.9.2. PRIMARY RESEARCH QUESTION

Is there an association between impulsivity and addictive behaviours in prisoners?

HYPOTHESIS 1:

Frequent substance use will be associated with (i) trait impulsivity (ii) reflection impulsivity (iii) delayed reward discounting.

HYPOTHESIS 2:

Problem gambling will be associated with (i) trait impulsivity (ii) reflection impulsivity (iii) delayed reward discounting.

1.9.3. SECONDARY RESEARCH QUESTIONS

Are particular domains of impulsivity independently predictive of engagement with addictive behaviours?

HYPOTHESIS 3:

In cases where multiple types of impulsivity associate with an addictive behaviour, at least one will emerge as an independent predictor of (i) frequent substance use (ii) problem gambling.

Are associations between (i) frequent substance use (ii) problem gambling and impulsivity different between those screening positive versus negative for personality disorder?

HYPOTHESIS 4:

Associations between (i) frequent substance use (ii) problem gambling and impulsivity will be significantly different between those who screen positive versus negative for personality disorder.

Is there evidence that impulsivity is multifaceted in a prisoner population?

HYPOTHESIS 5:

No significant relationship is expected between two specific behavioural measures of (i) delayed reward discounting and (ii) reflection impulsivity. Significant relationships will be found between these behavioural measures and a trait measure of impulsivity.

2. METHOD

2.1. DESIGN

A cross-sectional design was used for the investigation. Semi-structured interviews were undertaken with all participants to collect information on current and lifetime history of substance use for a range of substances. A questionnaire battery was administered screening for both problem gambling behaviour and personality disorder, in addition to trait impulsivity. Two further facet-specific measures of impulsivity were also included in administration, one behavioural assessment of reflection impulsivity and another measure of delayed reward discounting.

2.2. PARTICIPANTS

2.2.1. SAMPLE SIZE

The minimum number of participants required was calculated on the basis of a power analysis, where power was defined as 80% and significance as 5% ($p = .05$) one sided. An effect size was derived from Fishbein & Reuland (1994), who explored associations between psychological correlates of substance use in prisoners, finding a small but significant positive correlation between BIS impulsivity and frequency of alcohol use ($r = .33$). On the basis of these figures it was estimated that a minimum of 55 participants was required for the study to have power to find similar associations.

2.2.2. RECRUITMENT PROCEDURE

Participants were recruited from the population of HMP Brixton, a Category C adult male prison holding sentenced offenders over the age of 21 years. Prisoner categories are determined based on a combination of crime committed, length of sentence, likelihood of escape and level of danger to the public should escape occur. Category C refers to prisoners who can not be trusted in an open prison but who would be unlikely to attempt escape and pose a more limited risk to the public than high category offenders should escape occur.

Within HMP Brixton numerous clinical services exist, one of which is the OASIS in Prison team (OASISp), within which the current study was based. OASISp provide mental health screening of prisoners in HMP Brixton aged between 21 and 35 to assist in early detection of those at risk of developing mental health problems, particularly psychosis. The screening assessment includes collection of demographic information, a brief history of substance use and experience of traumatic events, subjective measures of current mood disturbance and a questionnaire relating to attenuated psychotic symptoms (Jarrett et al, 2012).

Prisoners are screened by OASISp typically within the first week of their arrival to HMP Brixton. Those screening positive for possible mental health problems undertake a further, more detailed assessment of their mental state using the Comprehensive Assessment of the At Risk Mental State (CAARMS) (Yung et al, 2005), which assesses emerging and established mental health problems. Those identified as having an at-risk mental state for psychosis are referred on for relevant psychological treatment within OASISp; those with an established mental health problem are referred on to other prison mental health services. Both the author and two research workers employed in the OASISp team were involved in the initial screening of prisoners during recruitment for the study.

Recruitment for study

Participants were recruited from the pool of prisoners screened by OASISp. Prisoners meeting inclusion criteria for study were provided with an information sheet (see Appendix 10.4) and asked whether they would like to participate. Prisoners who expressed interest were given at least 24 hours to consider the information and their decision further, after which point they were approached again to confirm their consent for participation (see Appendix 10.5) and undertake assessment. If prisoners declined participation at either point they were thanked for their time considering the study and not approached again. Demographic information of those who refused was recorded to control between prisoners who participated and those who declined to take part.

Specifically inclusion criteria included prisoners screened by OASISp, namely those aged between 21 and 35 years who completed the initial screen. Given the status of HMP Brixton as an all-male prison, all participants for this study were male. Exclusion criteria included those who were not screened by OASISp, namely prisoners above the age of 35 and those under 35 years who refused screening, and those prisoners who could not speak English. Exclusion was also made for those identified as experiencing a current psychotic and/or severe depressive episode through screening or the subsequent CAARMS assessment, given evidence suggesting the potential interference of such difficulties on neuropsychological function, relevant to the study of impulsivity (Heerey et al, 2007; Lempert & Pizzagalli, 2010). Those reporting a history of trauma relating to significant head injury were excluded for similar reasons (Slaughter et al, 2003; Schofield et al, 2006).

2.2.3. ETHICAL CONSIDERATIONS

The study was approved (see Appendix 10.1) by the NHS Health Research Authority, NRES Committee London - South East (Ref: 13/LO/1035). Further ethical approval (see Appendix 10.2) was sought from the National Offender Management Service (NOMS), which reviews research projects proposing to be undertaken in the prison system (Ref: 2013-217). Safeguards put in place to manage specific concerns about conducting research with prisoners are discussed in the appendices (see Appendix 10.3).

2.3. ASSESSMENT PROCEDURE

Administration of assessments was undertaken by both the author and two research workers working in OASISp, all of whom were directly involved in recruitment for the study through screening assessments. The research workers were trained in the use of each measure by the author. Participants were seen for assessment in accordance with local prison policies governing the times during which prisoners are allowed out of their cells, usually for approximately two to three hours during the morning and for a similar period in the afternoon.

Attempts were made to minimise variability in performance on the basis of assessor characteristics or other extraneous factors, such as setting. Where possible all participants were seen in the same location and given restrictions around the movement of prisoners at different times of day, it was deemed most feasible for participants to be assessed in classrooms located near to their cells on the prison wings. However due to participants being housed across the various wings of HMP Brixton, variability in the classroom in which administration took place could not be prevented. To ensure consistency in administration, assessors adhered to the standardised instructions given for each measure. During training on administration, the two research workers observed the author's administration of the battery prior to undertaking assessments independently. Each battery of measures was organised to ensure consistent administration of tasks in the same order across assessors.

2.4. MEASURES

2.4.1. Barratt Impulsiveness Scale Version 11

The Barratt Impulsiveness Scale is a 30-item self-report questionnaire designed as a general measure assessing impulsiveness as a trait of personality (Patton et al, 1995). It is the 11th revision of the original BIS scale (Barratt, 1959). Each item provides informants with a statement relating to a personality characteristic (e.g. "I plan tasks carefully.") and asks for a rating on a 4-point scale (Rarely/Never, Occasionally, Often, Almost Always/Always) as to how relevant this characteristic is to them. Items are scored 1, 2, 3 or 4, where 4 represents the most impulsive response.

Results from the BIS-11 are reported as an overall score out of 120. Historically scores have been broken down further into subscale scores for three second-order factors, namely (i) attentional, (ii) motor and (iii) non-planning impulsiveness. The motor and non-planning subscales are comprised of eleven items each, with the attentional subscale made up of eight items. No cut offs exist within the BIS-11 to define impulsiveness. As such the current analysis used the total BIS score as a measure of trait impulsivity, with scores treated as continuous.

Analyses have reported the BIS-11 to be an internally consistent measure of impulsiveness with Cronbach's alpha coefficients shown to range from 0.79 to 0.83 across various populations (Stanford et al, 2009), including prisoner and substance abusing groups (Patton et al, 1995). To ensure consistency with the majority of previous research using the BIS-11 in the area, associations between addictive behaviours and BIS subscale scores were reported for the current sample.

2.4.2. Matching Familiar Figures Test 20

The Matching Familiar Figures Test-20 (MFFT-20) is a 20-item behavioural measure of reflection impulsivity (Cairns & Cammock, 1978). It is derived from the original MFFT developed as a measure of reflection impulsivity in preadolescent children (Kagan et al, 1964), though extended to use with adults, including adult prisoners (e.g. Heckel et al, 1989). Under analyses the original version was considered to only demonstrate low to moderate test-retest and internal consistency reliabilities (Ault et al, 1976; Egeland & Weinberg, 1976), leading to the MFFT-20, which has received more favourable results in studies of reliability and ecological validity (Cairns & Cammock, 1978; Miyakawa, 2001). The MFFT-20 has since been extended for use in the study of reflection impulsivity in older adolescents (Barkley et al, 1991) and adult substance users (Morgan et al, 1998; Morgan et al, 2006; Quednow et al, 2007).

The format for administration of the MFFT-20 involves the presentation of a familiar figure, such as a leaf or a house, alongside six similar figures where only one of these six matches the familiar figure exactly. Participants are asked to choose which of the six options matches the presented figure exactly. If their initial selection is incorrect, they are told so and asked to continue choosing one option at a time until receiving feedback they have chosen the correct option. Once the correct option has been selected, the next familiar figure is presented. The MFFT20 comprises two practice examples followed by 20 test items. For each item the participant's response time for their initial selection is recorded, in addition to the first option selected and the number of errors taken to achieve the correct response.

Due to restrictions on the use of electronic equipment in prison, the MFFT-20 provided a viable means of measuring reflection impulsivity due to it being available in pencil and paper version containing line drawings of figures, unlike other

measures such as the Information Sampling Task (IST). A hand-held stopwatch was used to measure reaction time.

Individual performance is determined by calculating a participant's mean latency to first response and their total number of errors, each of which is computed into a standardised Z-score. An index of impulsivity is then created (i-score), by subtracting Z-latency from Z-error (Salkind and Wright, 1977; Messer and Brodzinsky, 1981). I-scores can be considered as continuous or be dichotomised for analysis, with positive i-scores considered indicative of more impulsive performance and negative i-scores indicative of a more reflective response style (Salkind and Wright, 1977). I-scores were treated as continuous for the purpose of analysis to ensure consistency with other measures of impulsivity used in the study.

2.4.3. Monetary Choice Questionnaire

The Monetary Choice Questionnaire (MCQ) is a 27-item questionnaire used in the assessment of impulsivity as delayed reward discounting (Kirby & Marakovic, 1996; Kirby et al, 1999). It has been widely used in addiction research over many years to evidence how individuals who engage with addictive behaviour tend to discount the value of rewards when faced with increasing temporal delays before receipt of said reward (MacKillop et al, 2011). In simpler terms this refers to an individual's preference for either a small immediate reward or larger delayed reward. Both actual and hypothetical rewards can be used in the task, with evidence suggesting use of hypothetical rewards on the MCQ produces similar results to when real rewards are used (Lawyer et al, 2011).

For the current study, each item of the MCQ consists of a hypothetical question presented to the participant, where they are given the choice of one reward now (e.g. "Would you prefer £54 today...") or another larger reward at a specified time in the future (e.g. "...or £55 in 117 days?"). Trials differ both in terms of temporal delay to receipt of larger reward and in size of delayed reward, either being small (£25-35), medium (£50-60) or large (£75-85).

Analysis provides a quantitative index of how quickly participants tend to discount delayed rewards in favour of immediate rewards, known as a discounting rate (k).

According to guidance from Kirby (2000), discount rates are inferred by comparing responses for each item to the responses that would be expected if there was indifference to immediate and delayed rewards (i.e. if reward values were equivalent) and calculating the level at which participants shift responding in favour of immediate reward. Three discount rates can be inferred from these comparisons, one for each reward magnitude (i.e. a rate of how quickly a participant discounts each of small, medium and large delayed rewards) and the geometric mean of these has been reported as an overall measure of discounting previously (e.g. Kirby et al, 1999). The higher the discount rate, the more quickly delayed rewards are presumed to have been discounted and the more impulsive performance can be considered (Kirby et al, 1999). As such discount rates were treated as continuous for the analysis.

2.4.4. Substance use

A modified version of the Cannabis Experience Questionnaire (Barkus et al, 2006), currently used in OASISp, was devised by the author and senior OASISp clinicians to obtain through semi-structured interview information about current and lifetime use of a range of substances (see Appendix 10.6). These included alcohol, tobacco (cigarettes), cannabis, inhalants (e.g. glue, petrol), cocaine, crack cocaine, amphetamines (e.g. amphetamine, ecstasy, 3,4-methylenedioxymethamphetamine (MDMA)), opiates (e.g. heroin, methadone), sedatives (e.g. valium, ketamine) and hallucinogens (e.g. lysergic acid diethylamide (LSD), mushrooms). Participants were first asked if they had ever used each of the substance groups listed and if use was reported, further information was collected.

Information was collected about the duration and onset of use and defined with reference to previous research undertaken in the same or similar study settings. Long-term use was defined as use of substances for five years or more and short-term use less than five years (Di Forti et al, 2009; Valmaggia et al, 2014), whilst early-onset use was defined as use of substances before the age of 15 and later-onset use as use at or after 15 years of age (Arseneault et al, 2002; Valmaggia et al, 2014).

Information was also collected relating to frequency of current and lifetime use. Current use was defined as use of a substance within the past month, whilst lifetime use was defined as any use before the past month. However given the majority of

participants had been detained for over one month prior to their participation, information on current use was not considered to be a reliable estimation of frequency, as their access to and use of substances was largely restricted by their circumstances over this period.

As such frequency was instead defined on the basis of information about lifetime use, obtained by asking participants for an estimation of the frequency of their past peak use of each substance (e.g. “In the past when you used X most regularly, how often did you use?”) on a 5-point scale (Everyday, More than once a week, About once or twice a month, A few times a year, Only once or twice a year). For each substance group frequency of use was dichotomised based on definitions used in earlier research (Phillips et al, 2002; Valmaggia et al, 2014) to support meaningful statistical analysis. Frequent use was defined as use of substances once per week or more (i.e. responses suggesting use ‘everyday’ or ‘more than once a week’) and non-frequent use as less than once per week (i.e. all other responses).

2.4.5. Problem Gambling Severity Index

The Problem Gambling Severity Index (PGSI) is a 9-item self-report questionnaire designed as a screening measure of problem gambling severity within the general population (Ferris & Wynne, 2001). It is taken from the longer validated Canadian Problem Gambling Inventory (CPGI; Ferris & Wynne, 2001), as a means of assessing population risk of developing gambling problems. Each item on the PGSI asks informants a question relating to some aspect of any gambling behaviour over the previous 12 months (e.g. “Have you felt you might have a problem with gambling?”), with response options given on a 4-point scale (Never, Sometimes, Most of the time, Almost Always). The PGSI has demonstrated good internal consistency when used with problem gamblers and concurrent validity with other measures of gambling involvement (Mcmillen & Wenzel, 2006; Holtgraves, 2009).

Items are scored 0, 1, 2 and 3, where 3 represents most frequent engagement with problem gambling behaviour. Total scores are calculated by adding up all items, with the highest possible total being 27. A score of 8 or more is defined as a cut-off for severe problem gambling, including negative consequences and loss of control. Scores under 8 are considered to reflect less severe or no problematic gambling.

Some cut-offs do exist for mild-moderate levels of problems, though recent factor analysis has suggested the PGSI to be most effective in detecting moderate to severe levels of gambling problems, whilst being less effective in the assessment of milder problems (Miller et al, 2013). As such for the purpose of the current analysis the cut-off of 8 was used to define engagement with problem gambling.

2.4.6. Standardised Assessment of Personality Abbreviated Scale

The Standardised Assessment of Personality Abbreviated Scale (SAPAS) is a brief 8-item structured interview developed for use as a clinical screen for personality disorder (Moran et al, 2003). It is derived from the broader Standardised Assessment of Personality (SAP; Mann et al, 1981), developed as an informant measure to assist in the clinical diagnosis of different personality disorders. The SAPAS itself does not distinguish between types of disorder, rather screening for personality disorder more generally. Each item asks about one general aspect of personality (e.g. “In general, do you trust other people?”), requiring a ‘Yes/No’ response from participants; each ‘Yes’ response contributes one point towards the total. Initial validation of the SAPAS as a screening measure for personality disorder suggested sensitivity and specificity to be 0.94 and 0.85 respectively (Moran et al, 2003). Further studies have since supported its validity as a brief screening tool, including when used with offender populations (Hesse & Moran, 2010; Pluck et al, 2012). The highest possible total score is 8, with a score of 3 or above defined as the cut-off for a positive screen for personality disorder.

2.5. DATA HANDLING AND ANALYSES

2.5.1. DATA HANDLING

Data was stored in accordance with the Data Protection Act. A database was created on a statistical computer package, IBM SPSS Statistics Package 20 (IBM Corp., 2011), securely saved to a computer drive at the Institute of Psychiatry, King’s College London. Participant data was entered onto this database, each represented by a participant number to preserve anonymity. Paper copies of measures were stored in a locked filing cabinet.

2.5.2. STATISTICAL ANALYSES

Analyses were conducted using IBM SPSS Statistics Package 20. Preliminary data screening was conducted to check for normality in how data was distributed (see Appendix 10.7), for outliers in the dataset prior to analysis and for missing values. Normality was inspected through use of histograms and Q-Q plots. Where data was found to violate assumptions of normality, assessed through a significant Kolmogorov-Smirnov statistic, equivalent non-parametric techniques were employed for analysis.

Correlational analyses

Given data regarding (i) frequency of substance use and (ii) problem gambling was dichotomised and thus presented as categorical variables, biserial correlation coefficients were necessary to test hypotheses regarding the association between these categorical variables and each continuous measure of impulsivity. Biserial coefficients are used as a standardised measure of association where the categorical variable has an underlying continuum between the two categories (Field, 2009). They can not be calculated using SPSS but instead can be obtained from conversion tables provided by Terrell (1982a; 1982b). However biserial coefficients are limited in being unable to provide a direction as to the relationship between two sets of variables (i.e. whether it is positive or negative). In cases of significant association, mean impulsivity scores were therefore compared between groups (e.g. between frequent and non-frequent users) to infer the direction of association.

To test the secondary hypothesis further biserial correlation coefficients were used to assess whether a positive screen for personality disorder had an effect on the relationships between addiction and impulsivity variables. As such correlations between addiction and impulsivity variables were explored and compared between those screening positive and negative on the SAPAS.

Correlation coefficients were used to explore associations between the different measures of impulsivity in the sample.

Data screening

Initial screening of impulsivity data suggested differences in normality of data depending on the measure being considered. For instance data on the BIS-11 and its subscales appeared broadly normally distributed (see Appendix 10.7.1). Likewise with the exception of one particularly reflective outlier, data on the MFFT-20 also appeared well distributed (see Appendix 10.7.2). Conversely data on the MCQ was found to be wholly non-normally distributed, skewing towards a less impulsive response style and those performing most impulsively appearing as outliers (see Appendix 10.7.3). Screening also revealed substantial proportional differences between those in the sample who did and did not engage in frequent substance use (see Table 3) and those who did and did not have a gambling problem (see Appendix 10.7.5).

As such whilst parametric techniques were possible for analysis of some data, non-parametric alternatives needed for others were considered for all correlational analyses, both for analytic consistency and to support meaningful comparisons between findings. To this end Spearman's rho correlation coefficients were used. The effects of outliers on the MFFT-20 and MCQ were also accounted for in this decision, given that Spearman's rho creates an ordinal rank of the data; as such extreme values instead become end points in a consistent order of the data points.

Given the number of comparisons between the data points, it was important to take steps to reduce the chance of a Type I error (Shaffer, 1995) and ensure interpretations of the data were meaningful. As such a more stringent alpha level to the traditional $p < .05$ was adopted to test for the significance of associations between the variables. Only those correlations found to be significant below $p < .01$ were considered to be truly significant, with significance found at $p < .05$ remaining of interest but interpreted with caution.

Logistic regression analyses

Following correlations, binary logistic regression was used to assess whether particular forms of impulsivity were independently predictive of engagement with addictive behaviours. Regressions were considered for addiction variables where

there was evidence of multiple significant associations with different forms of impulsivity. The purpose for this was to see which type of impulsivity was best able to differentiate (i) frequent users of particular substances from non-frequent users and (ii) problem from non-problem gamblers. Only those impulsivity variables found to significantly relate to addiction variables were entered as independent predictors; rather than entering all forms of impulsivity regardless of degree of association.

Missing data

Missing data was only found for responses to the BIS-11. Eleven participants provided a missing value for one out of thirty items, whilst two participants did not respond to three items; each missing one item for one subscale and two for another. For all participants missing items were inspected to see which subscale of the measure they corresponded to. To obtain values for the missing items, the subscale mean was derived from items for which responses had been given.

3. RESULTS

3.1. SAMPLE CHARACTERISTICS

A total of 73 prisoners screened by OASISp were approached for participation in the study. None of those approached refused participation; however one participant withdrew during administration of the first measure. As such complete data was collected from 72 participants. All participants (100%) were male on account of recruitment having taken place in a male prison. The mean age of the sample was 28.0 years (s.d. 3.8), ranging from 21 to 35 years.

3.2. DESCRIPTIVE STATISTICS – IMPULSIVITY MEASURES

Descriptive data regarding the continuous measures of impulsivity are presented in Table 2.

3.2.1. BIS-11

Responses on the BIS are totalled to provide an overall score of trait impulsivity (the total score), including three subscale scores for non-planning, motor and attentional impulsivity derived from a selection of items. For the current sample total BIS scores ranged from 39 to 101 out of 120, with a mean score of 64.7 (s.d. 13.7). Descriptive analysis showed data for the BIS was normally distributed across both the total measure and its subscales, with only slight positive or negative skew depending on the variable. There were no outlying data points observed. Analysis also found all subscales of this measure to have high reliabilities and to correlate well with each another (all $r = .56$ or above, at $p < .001$).

3.2.2. MFFT-20

Performance on the MFFT-20 is assessed through an i-score, an index of reflection impulsivity calculated as a function of a participant's response time and total errors across all items. The mean response time over the sample was 12.7 seconds, with a range of 4.2 to 33.9 seconds. Total errors were on average 14.3, ranging from 0 to 30. Descriptive analysis suggested i-score data was normally distributed across the sample, showing only slight negative skew and positive kurtosis. 58% ($n=42$) of the

sample had a positive i-score reflecting more impulsive performance, with 42% (n=30) demonstrating more reflective performance and a negative i-score. There was one outlier in the data, representing one participant who was particularly reflective in their responding and achieved zero errors.

3.2.3. MCQ

Impulsive performance on the MCQ is inferred by a mathematical function calculating a discount rate (k). Higher discount rates are suggestive of increased preference for immediate over delayed reward. The mean discount rate for the sample was $k=0.06$ (s.d. 0.06), ranging from 0.00016 to 0.25, which was largely consistent across different reward sizes. Descriptive analysis suggested MCQ data was non-normally distributed (Kolmogorov-Smirnov = 1.90, $p < 0.001$), skewing towards lower values and a less impulsive response style. Several outliers were found in the dataset, which upon inspection represented those participants who fitted with a particularly impulsive response style (i.e. consistently responding for immediate rewards) and thus had discount rates much higher than the mean of the sample (all $k=0.25$).

	Mean (s.d.)	Minimum	Maximum	Skewness	Kurtosis	Kolmogorov-Smirnov	Cronbach's α^{**}
BIS total	64.7 (13.7)	39	101	0.06	-0.37	0.2	0.89
BIS non-planning	25.7 (6.5)	11	42	-0.02	-0.36	0.2	0.81
BIS motor	22.8 (5.3)	13	36	0.21	-0.61	0.2	0.76
BIS attentional	16.2 (4.2)	9	27	0.3	-0.37	0.2	0.72
iScore	-0.00002 (1.76)	-5.16	3.67	-0.69	0.36	0.09	0.91
K	0.06 (0.06)	0.00016	0.25	1.64	2.98	0.19*	0.93

Note: *significance level for non-normality. ** $\alpha > 0.7$ = cut-off for reliability

Table 2: Descriptive statistics for impulsivity measures across the sample

3. 3. DESCRIPTIVE STATISTICS – PERSONALITY DISORDER SCREEN

Screening on the SAPAS derives a total score by tallying up ‘yes’ responses to each of eight items, with a score of three or above a positive screen for personality disorder. 51% (n=37) of the sample screened positive on the SAPAS, whilst the remaining 49% (n=35) screened negative. The sample mean was a score of 2.7 (s.d. 1.4), with a range from 0 to 7. The mean score amongst those screening positive was 3.8 (s.d. 0.9), whilst for those screening negative it was 1.6 (s.d. 0.6).

Frequencies analysis suggests there were discrepancies in the items endorsed by participants (see Appendix 10.7.4), with a lack of trust in others, being a worrier and being perfectionistic most endorsed over the sample. Few participants endorsed having relationship problems, being dependent on others or being a loner. Similarly only a minority endorsed being an angry or impulsive person. Analysis revealed a lack of internal consistency within the measure (Cronbach’s $\alpha = 0.23$), which may reflect the fact that whilst the SAPAS is used as a screen for personality disorder more generally, its specific questions relate to core traits underlying different disorders.

3.4. DESCRIPTIVE STATISTICS - SUBSTANCE USE

Rates of lifetime substance use in the sample are detailed in Table 3. Lifetime use of at least one substance was reported by 96% of the sample, with frequent use of alcohol, tobacco and cannabis being particularly high, all with prevalence of 74% or higher. Over half the sample reported lifetime use of cocaine, with frequent use nearing 50%. A smaller but significant proportion of the sample were found to have a lifetime history of amphetamine and crack cocaine use, in both cases frequent use reported by over one quarter of the sample. Lifetime use of other substances was reported by a smaller minority of the sample, with an even smaller proportion having used frequently.

	<u>Lifetime % (n)</u>		<u>Current % (n)</u>		<u>Frequent % (n)</u>	
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>
Alcohol	94 (68)	6 (4)	3 (2)	97 (70)	74 (53)	26 (19)
Tobacco	86 (62)	14 (10)	79 (57)	21 (15)	85 (61)	15 (11)
Cannabis	85 (61)	15 (11)	19 (14)	81 (58)	78 (56)	22 (16)
Inhalants	10 (7)	90 (65)	0 (0)	100 (72)	3 (2)	97 (70)
Cocaine	56 (40)	44 (32)	0 (0)	100 (72)	43 (31)	57 (41)
Crack cocaine	26 (19)	73 (53)	0 (0)	100 (72)	25 (18)	75 (54)
Opiates	17 (12)	83 (60)	10 (7)	90 (65)	15 (11)	85 (61)
Amphetamine	39 (28)	61 (44)	0 (0)	100 (72)	32 (23)	68 (49)
Sedatives	18 (13)	82 (59)	0 (0)	100 (72)	10 (7)	90 (65)
Hallucinogens	21 (15)	79 (57)	0 (0)	100 (72)	3 (2)	97 (70)

Note: Lifetime = use before the past month; Current = use within the past month; Frequent = use for once per week or more

Table 3: Prevalence of lifetime and current substance use and lifetime frequent use

As discussed the absence of current substance use for several substances was considered to reflect the majority of prisoners having been detained for longer than one month prior to participation, meaning their access to substances they may have previously used was restricted. The exception was for tobacco use, where prevalence remained high presumably on account of participants still being able to purchase tobacco for personal use in prison.

Rates of polysubstance use in the sample are detailed in Table 4. Over 90% of the sample reported use of at least two substances or more in their lifetime. This figure reduced when controlling for use of legal substances (i.e. alcohol and tobacco), though 58% of the sample still reported lifetime use of two or more illicit substances.

	%	n
Lifetime use of at least one substance	96	69
Lifetime polysubstance use	92	66
Substance naïve	4	3
Lifetime use of at least one illicit substance	90	65
Illicit polydrug use	58	42
Illicit substance naïve	10	7

Note: Polysubstance use = use of two or more substances

Table 4: Prevalence of polysubstance use

As shown in Table 5 of those with a history of using substances, rates of long-term use were reported at 50% or more for nearly all substances, with the exception of hallucinogens and inhalants, which were used in the minority and tended to be fleeting experiences. Early-onset use was over 50% for use of tobacco, cannabis and inhalants, with a smaller proportion reporting early-onset of alcohol use on average around the age of 15.

	<u>Mean age at first use (s.d.)</u>	<u>Mean age at last use (s.d.)</u>	<u>Early onset % (n)</u>	<u>Long-term use % (n)</u>
Alcohol	15.3 (3.4)	27.0 (3.8)	38 (26)	89 (64)
Tobacco	13.9 (3.1)	27.7 (4.0)	61 (38)	97 (60)
Cannabis	14.7 (3.0)	25.6 (4.8)	50 (29)	85 (45)
Inhalants	14.9 (4.7)	15.9 (4.5)	71 (5)	14 (1)
Crack	19.5 (4.6)	27.6 (4.6)	11 (2)	74 (14)
Cocaine	19.3 (3.8)	26.9 (3.4)	13 (5)	68 (27)
Opiates	22.2 (5.4)	29.7 (3.8)	8 (1)	58 (7)
Amphetamine	18.3 (3.5)	24.1 (4.4)	14 (4)	50 (14)
Sedatives	22.8 (4.4)	27.9 (2.9)	0 (0)	50 (6)
Hallucinogens	19.4 (3.8)	21.9 (4.1)	0 (0)	21 (3)

Note: Early onset = before the age of 15; Long-term use = duration of 5 or more years

Table 5: Age, onset and duration of substance use

3.5. DESCRIPTIVE STATISTICS - PROBLEM GAMBLING

Participants were split based on whether they reached cut off for severe problem gambling, determined as a score of 8 or above on the PGSI. The proportion of the sample scoring above cut-off was in the minority at 14% (n=10); though still this is much larger than prevalence estimates of 0.9% for the general population (The Gambling Commission, 2010). 68% (n=49) of participants did not endorse any items on the PGSI whilst 18% (n=13) endorsed a few items suggestive of some problems but did not reach the threshold for severe problems. The sample mean was a score of 2.1 out of 27 ranging from scores of 0 to 24. Within groups the mean for those scoring above cut-off for severe problem gambling was a score of 12.7 and for the non-problem gambling group a score of 0.4.

Scores on the PGSI were found to be non-normally distributed over the sample, skewing consistent with the above descriptives. Several observed outliers represent all the participants who scored above cut-off for severe problem gambling and a few participants who scored in the mild-moderate range (i.e. scores between 3-7). These data points are presumably outlying due to the high prevalence of non-problem gamblers in the sample scoring zero relative to those reporting any degree of problem. Reliability analysis found high reliability for this measure in the sample (Cronbach's $\alpha = 0.93$), including reasonably high inter-item correlations (0.67).

3.6. CORRELATIONAL ANALYSES

3.6.1. Multifaceted measurement of impulsivity in prisoners

Correlational analysis was undertaken to explore the associations between general trait and facet-specific behavioural measures of impulsivity in the prisoner sample.

3.6.2. Associations between impulsivity measures

Correlation coefficients for the analysis are presented in Table 6. A small but significant positive association was found between trait (BIS) impulsivity and delayed reward discounting as measured by the MCQ ($r = .26$, $p = .03$). Further analysis revealed this association to be strongest and marginally larger for the BIS non-planning subscale ($r = .27$, $p = .02$). Reflection impulsivity as measured by the MFFT-20 however had no significant association with the BIS. There was no significant relationship found between the specific behavioural measures of reflection impulsivity and delayed reward discounting.

	BIS-11	MCQ	MFFT-20
BIS-11			
MCQ	.26*		
MFFT-20	.20	-.05	

Note: * $p < .05$ (two-tailed)

Table 6: Spearman rho coefficients for trait and facet measures of impulsivity

3.6.3. Substance use and impulsivity in prisoners

Associations were considered between each measure of impulsivity and frequency of substance use for those substances with reported associations to impulsivity in the wider literature. This included use of alcohol, tobacco, cannabis, amphetamine, opiates and cocaine. For the current analysis frequent use of crack cocaine and cocaine were considered together as one variable (crack/cocaine), as has been reported in related research (e.g. Coffey et al, 2003). Participants who reported frequent use of either crack cocaine or cocaine, or both, were therefore considered together as frequent users of crack/cocaine. A summary of associations between the variables can be found in Table 7.

	MCQ	MFFT-20	BIS total	BIS non-planning	BIS motor	BIS attentional
Alcohol	$r_b = .11$	$r_b = .04$	$r_b = .04$	$r_b = .16$	$r_b = .03$	$r_b = .10$
Cigarettes	$r_b = .36^*$	$r_b = .11$	$r_b = .36^*$	$r_b = .46^*$	$r_b = .25$	$r_b = .16$
Cannabis	$r_b = .06$	$r_b = .06$	$r_b = .27$	$r_b = .22$	$r_b = .21$	$r_b = .24$
Crack/cocaine	$r_b = .06$	$r_b = .30^*$	$r_b = .59^{***}$	$r_b = .45^{**}$	$r_b = .58^{***}$	$r_b = .34^*$
Amphetamine	$r_b = .13$	$r_b = .002$	$r_b = .47^*$	$r_b = .35$	$r_b = .37$	$r_b = .40^*$
Opiates	$r_b = .45^{***}$	$r_b = .08$	$r_b = .26^*$	$r_b = .34^{**}$	$r_b = .09$	$r_b = .05$
Gambling	$r_b = .16$	$r_b = .03$	$r_b = .33^*$	$r_b = .19$	$r_b = .44^{**}$	$r_b = .39^*$

Note: Ns = not significant, $^*p < .05$ (one-tailed), $^{**}p < .01$ (one-tailed), $^{***}p < .001$ (one-tailed). Coefficients highlighted in bold reflect safeguards against multiple testing, such that only correlations found significant at the level of $p < .01$ or lower were considered truly significant.

Table 7: Spearman's rho coefficients of associations between addiction and impulsivity variables

3.6.4. Associations between substance use and impulsivity

(i) Trait impulsivity

In investigating the relationship between trait impulsivity (as measured by the BIS-11 total score) and frequency of substance use, frequency of crack/cocaine use was found to be significantly related to trait impulsivity ($r_b = .59$, $p = .0002$). Further analysis suggested associations with subscales of non-planning impulsivity ($r_b = .45$, $p = .001$) and motor impulsivity ($r_b = .58$, $p = .0002$) largely accounted for this relationship. Subscale associations with attentional impulsivity instead only trended towards significance ($r_b = .34$, $p = .01$).

In exploring the mean differences in scores between frequent and non-frequent users of crack/cocaine on the BIS, frequent users were seen to score higher across the measure (see Table 8).

	Mean BIS scores			
	Total	Motor	Non-planning	Attentional
Frequent crack/cocaine use	70.0 (12.3)	25.3 (5.0)	28.2 (6.0)	17.5 (4.5)
Non-frequent crack/cocaine use	58.3 (12.2)	20.3 (4.5)	23.1 (6.0)	14.9 (3.5)

Table 8: Mean BIS scores for frequent and non-frequent crack/cocaine users

Independent samples t-tests revealed these differences to be significant. Compared with non-frequent users, frequent users demonstrated higher trait impulsivity in terms of the BIS total score, $t(70) = -4.38$, $p < .001$. Specifically they also had higher scores on the impulsivity subscales of motor, $t(70) = -4.49$, $p < .001$; non-planning, $t(70) = -3.64$, $p = .001$; and attentional, $t(70) = -2.70$, $p = .009$.

Further associations between trait impulsivity and frequency of using various other substances did not remain significant at a more stringent alpha level. These included significant correlations between BIS total scores and frequency of tobacco use ($r_b = .36$, $p < .05$), particularly non-planning impulsivity which independently did show significant correlation ($r_b = .46$, $p = .005$); frequency of amphetamine use ($r_b = .47$, $p < .05$), particularly attentional impulsivity ($r_b = .40$, $p < .05$); and frequency of opiate use ($r_b = .26$, $p < .05$), though the independent relationship between opiate use and subscale non-planning impulsivity did show significant correlation ($r_b = .34$, $p = .002$).

(ii) Reflection impulsivity

There were no significant associations found between frequent use of any substance and reflection impulsivity (as measured by the MFFT-20); though frequency of cocaine/crack use was found to be trending towards significance and would be significant at a less conservative alpha ($r_b = .30$, $p = .02$).

(iii) Delayed reward discounting

A significant moderate relationship was found between frequency of opiate use and discounting as measured by the MCQ ($r_b = .45$, $p = .0002$). A smaller association between discounting and frequency of cigarette use only approached significance ($r_b = .36$, $p = .02$). There were no significant relationships found between delayed reward discounting and frequency of using other substances.

In exploring the difference in mean discount rates between frequent and non-frequent users of opiates, frequent users were seen to have a higher mean rate (see Table 9). An independent samples Mann-Whitney U test revealed this difference to be statistically significant ($p = .02$). Whilst frequent tobacco users demonstrated a higher mean discount rate than non-frequent users, this level of difference only approached significance ($p = .06$).

	Frequent use		Non-frequent use	
	Opiates	Tobacco	Opiates	Tobacco
Mean discount rate (s.d.)	0.091 (0.05)	0.071 (0.06)	0.061 (0.06)	0.038 (0.04)

Table 9: Mean MCQ discount rates for frequent and non-frequent opiate users

3.6.5. Associations between gambling and impulsivity

Again problem gambling was considered a factor of interest given previous reports of association between problem gambling and impulsivity in non-prisoner samples. A summary of associations between the variables can be found in Table 7.

(i) Trait impulsivity

Correlations between problem gambling (as defined by a cut off score of 8) and trait impulsivity as measured by the BIS-11 were varied. Associations to subscale motor impulsivity did reach significance at a more stringent alpha ($r_b = .44$, $p = .008$), however this was not so for the total BIS and subscale attentional impulsivity (both $ps < .05$). Furthermore exploratory analysis of the difference in BIS motor scores between problem and non-problem gamblers revealed that, whilst problem gamblers evidenced slightly higher mean scores, this difference was not statistically significant ($p = .07$).

No significant association was found between problem gambling and BIS non-planning impulsivity.

(ii) Reflection impulsivity

There was no significant association found between problem gambling and reflection impulsivity.

(iii) Delayed reward discounting

There was no significant relationship found between delayed reward discounting and problem gambling

3.6.6. Interacting effects of personality disorder screening

The above correlations were also compared between those prisoners screening positive versus negative on the SAPAS to assess whether associations between impulsivity and addictive behaviours differed between those with and without a positive screen for personality disorder. Coefficients are tabulated in Table 10.

3.6.7. Associations between (i) substance use (ii) problem gambling and impulsivity by SAPAS screen

Very few findings were found to be significant. Those that were included BIS non-planning impulsivity being significantly associated with frequency of tobacco use in the SAPAS negative group ($r_b = .41$, $p = .007$) but not the SAPAS positive group.

Furthermore frequency of crack/cocaine use was also significantly related to trait impulsivity in the SAPAS negative group but not the SAPAS positive group. This included the BIS total ($r_b = .51$, $p = .001$) and both subscales of non-planning ($r_b = .42$, $p = .006$) and motor impulsivity ($r_b = .55$, $p = .0001$).

On inspection correlations between impulsivity and addiction variables appear broadly similar between those screening positive versus negative on the SAPAS. Even in cases of significant association, there were no large differences between SAPAS groups on any variables that would be suggestive of a meaningful effect of a positive screen for personality disorder. As such no further analysis of an interaction was considered necessary.

For the above coefficients that were found to be significant in the SAPAS negative group, precautionary statistical comparisons were made with corresponding coefficients in the SAPAS positive group to check if any differences reached statistical significance. As expected analyses revealed no significant differences between the group coefficients (all $ps > .05$).

	MCQ		MFFT-20		BIS total		BIS non-planning		BIS motor		BIS attentional	
	<i>PD +ve</i>	<i>PD -ve</i>	<i>PD +ve</i>	<i>PD -ve</i>	<i>PD +ve</i>	<i>PD -ve</i>	<i>PD +ve</i>	<i>PD -ve</i>	<i>PD +ve</i>	<i>PD -ve</i>	<i>PD +ve</i>	<i>PD -ve</i>
Alcohol	$r_b = .17$	$r_b = .02$	$r_b = .03$	$r_b = .07$	$r_b = .09$	$r_b = .0001$	$r_b = .13$	$r_b = .13$	$r_b = .0001$	$r_b = .03$	$r_b = .01$	$r_b = .12$
Tobacco	$r_b = .09$	$r_b = .28$	$r_b = .08$	$r_b = .18$	$r_b = .04$	$r_b = .35^*$	$r_b = .09$	$r_b = .41^{**}$	$r_b = .15$	$r_b = .32^*$	$r_b = .04$	$r_b = .10$
Cannabis	$r_b = .20$	$r_b = .16$	$r_b = .18$	$r_b = .18$	$r_b = .14$	$r_b = .10$	$r_b = .12$	$r_b = .11$	$r_b = .11$	$r_b = .03$	$r_b = .25$	$r_b = .23$
Crack/Cocaine	$r_b = .04$	$r_b = .05$	$r_b = .27$	$r_b = .20$	$r_b = .35^*$	$r_b = .51^{**}$	$r_b = .28^*$	$r_b = .42^{**}$	$r_b = .36^*$	$r_b = .55^{***}$	$r_b = .20$	$r_b = .27$
Opiates	$r_b = .25$	$r_b = .23$	$r_b = .06$	$r_b = .12$	$r_b = .03$	$r_b = .29$	$r_b = .13$	$r_b = .25$	$r_b = .09$	$r_b = .28$	$r_b = .07$	$r_b = .10$
Amphetamine	$r_b = .12$	$r_b = .10$	$r_b = .06$	$r_b = .08$	$r_b = .26$	$r_b = .32^*$	$r_b = .17$	$r_b = .26$	$r_b = .10$	$r_b = .36^*$	$r_b = .32^*$	$r_b = .15$
PG	$r_b = .05$	$r_b = .12$	$r_b = .05$	$r_b = .04$	$r_b = .28^*$	$r_b = .045$	$r_b = .17$	$r_b = .0001$	$r_b = .29^*$	$r_b = .05$	$r_b = .30^*$	$r_b = .07$

Note: Ns = not significant, * $p < .05$ (one-tailed), ** $p < .01$ (one-tailed), *** $p < .001$ (one-tailed). Coefficients highlighted in bold reflect safeguards against multiple testing, such that only correlations found significant at the level of $p < .01$ or lower were considered truly significant.

Table 10: Spearman's rho coefficients of associations between addiction and impulsivity variables by SAPAS screen

3.7. LOGISTIC REGRESSION

3.7.1. Impulsivity variables as independent predictors of addictive behaviours

Where there was evidence of significant association between an addiction variable and multiple forms of impulsivity, binary logistic regression was used to assess whether particular domains of impulsivity were independently predictive of engagement with the addictive behaviours. In other words, regression was assessing the independent contributions of different forms of impulsivity to differentiating (i) frequent users of particular substances from non-frequent users and (ii) problem from non-problem gamblers.

For regression models, only those impulsivity variables found to significantly correlate with addiction variables were entered as independent predictors. In some cases this did include predictors only found to correlate with addiction variables at the level of $p < .05$, if they were considered factors of potential interest to explore.

Binary logistic regression models were constructed for only three sets of variables. All regressions used a forced entry method.

- (i) One model was created to test whether particular subscales of trait impulsivity emerged as independent predictors of crack/cocaine use. In this model the BIS subscales of motor and non-planning impulsivity, which significantly correlated with crack/cocaine use, were entered as independent predictors. Additionally BIS subscale attentional impulsivity was considered a factor of potential interest, given its association with crack/cocaine use closely approached significance ($p = .01$). Whether participants were found to be a frequent or non-frequent crack/cocaine user was entered as the categorical dependent variable.
- (ii) A second model was created to test whether delayed reward discounting or a subscale of trait impulsivity emerged as independent predictors of opiate use. Both the MCQ discount rate and the BIS subscale of non-planning, which were significantly correlated with

opiate use, were therefore entered as independent predictors. Whether participants were found to be a frequent or non-frequent opiate user entered as the categorical dependent variable.

- (iii) A third model was created to test whether particular subscales of trait impulsivity emerged as independent predictors of problem gambling. In this model the BIS subscale of motor impulsivity, which significantly correlated with problem gambling, was entered as an independent predictor. Additionally BIS subscale attentional impulsivity was considered a factor of potential interest, given its association with problem gambling closely approached significance ($p = .017$). Whether participants were found to be a problem or non-problem gambler was entered as the categorical dependent variable.

Outcomes from the regressions are reported in Tables 11, 12 and 13.

- (i) For the predictive model of crack/cocaine use, BIS motor impulsivity emerged as an independent significant predictor of whether prisoners were frequent or non-frequent users of crack/cocaine ($p = .018$). This was not found for either trait non-planning or attentional impulsivity. The findings suggest that elevated scores for trait motor impulsivity increase the odds of frequent crack/cocaine use in the sample by 19% (CI = 3-37%).

		95% CI for Odds Ratio			
	B (SE)	Lower	Odds Ratio	Upper	Significance
BIS motor	0.17 (0.07)	1.03	1.19	1.37	$p < .05$
BIS non-planning	0.07 (0.06)	0.95	1.07	1.21	$p = .248$
BIS attentional	-0.003 (0.09)	0.84	1.00	1.18	$p = .969$
Constant	-5.64 (1.57)				$p < .0001$

Note: $R^2 = .71$ (Hosmer & Lemeshow), $.24$ (Cox & Snell), $.31$ (Nagelkerke).

Model X^2 (i) = 19.32, $p < .0001$ (sig)

Table 11: Regression output predicting frequent crack/cocaine use from trait impulsivity

- (ii) For the predictive model of opiate use, neither delayed reward discounting as measured by the MCQ nor BIS non-planning impulsivity were found to be independent significant predictors of whether prisoners were frequent or non-frequent users of opiates.

		95% CI for Odds Ratio			
	B (SE)	Lower	Odds Ratio	Upper	Significance
MCQ discount	5.80 (5.24)	0.01	328.99	9481182.78	p = .27
BIS non-planning	0.08 (0.06)	0.97	1.08	1.21	p = .17
Constant	-4.24 (1.61)				p < .01

Note: $R^2 = .26$ (Hosmer & Lemeshow), .06 (Cox & Snell), .099 (Nagelkerke).

Model X^2 (ii) = 4.20, p = .122 (ns)

Table 12: Regression output predicting frequent opiate use from delayed reward discounting and trait impulsivity

- (iii) For the predictive model of problem gambling, neither BIS motor nor BIS attentional impulsivity were found to be independent significant predictors of whether prisoners were problem or non-problem gamblers.

		95% CI for Odds Ratio			
	B (SE)	Lower	Odds Ratio	Upper	Significance
BIS motor	0.12 (0.08)	0.97	1.13	1.13	p = .11
BIS attentional	0.05 (0.10)	0.87	1.05	1.27	p = .60
Constant	-5.71 (2.04)				p < .01

Note: $R^2 = .37$ (Hosmer & Lemeshow), .07 (Cox & Snell), .12 (Nagelkerke).

Model X^2 (iii) = 4.89, p = .09 (ns)

Table 13: Regression output predicting problem gambling from trait impulsivity

4. DISCUSSION

A summary of the study and discussion of the results relevant to each hypothesis are detailed below.

4.1. SUMMARY OF STUDY

Addiction presents a significant problem for many people in prison (Fazel et al, 2006), yet this group remains relatively understudied in research exploring associated psychological phenomena.

The current study primarily aimed to address gaps in the field by extending research of the relationship between addictive behaviours and impulsivity, one psychological factor associated with addiction in the wider population, to a sample of prisoners. Specifically the primary objective of the study was to explore whether impulsivity is associated with addictive behaviours in prisoners, including use of a range of substances and engagement in problem gambling behaviour; both of which have previously been reported to associate with impulsivity in non-prisoner samples.

Secondary research questions were also considered. These included whether particular types of impulsivity were better able to account for this relationship than others; whether associations between impulsivity and addictive behaviour differed between participants screening positive versus negative on a screen for personality disorder; and whether the general concept of multifaceted impulsivity is measurable and relevant to a prisoner population.

4.2. MAIN FINDINGS AND THEORETICAL CONSIDERATIONS

A summary of the main results obtained will now be detailed, including findings supportive and non-supportive per hypothesis. Potential explanations of the current findings are also considered with reference to the relevant existing literature.

4.2.1. HYPOTHESIS 1: Frequent substance use will be associated with (i) trait impulsivity (ii) reflection impulsivity (iii) delayed reward discounting.

Supportive evidence:

Only those substances where there exists a reported relationship between their use and impulsivity in the wider literature were considered for the analysis. Of these, two main findings emerged. A large significant association was found between frequency of crack/cocaine use and prisoner trait impulsivity, as measured by the BIS-11. This was particularly so for the BIS motor and non-planning subscales. A moderate relationship was also found between frequency of opiate use and delayed reward discounting. These were found to be significant at a small alpha level, used as a correction for multiple testing of the data, suggesting valid and meaningful associations exist between these variables in this sample of prisoners.

Because of the use of biserial correlations it is difficult to determine the direction of the observed relationships (e.g. whether these associations can be considered positive or negative). This is because the direction of biserial coefficients is entirely dependent on the order in which variables are inputted for analysis. As such all that can be suggested is the presence or absence of a statistical relationship between the variables. One means of gaining more clarity may be to consider further any differences in the descriptive data between prisoners who report frequent use of these substances and those who do not report frequent use.

In doing so frequent users of crack/cocaine are seen to self-report higher levels of trait impulsivity than non-frequent users across all domains, particularly subscale motor impulsivity. This was evidenced by higher mean scores for all subscales and the total score. Statistical comparisons between these scores also suggested this mean difference to be significant. As such it could be concluded that the relationship between frequency of crack/cocaine use and trait impulsivity is such that increases in trait impulsivity, particularly trait motor impulsivity and to a lesser extent non-planning and attentional impulsivity, is associated with an increased frequency of lifetime crack/cocaine use; the more frequently prisoners have used crack/cocaine, the more impulsive their self-reported personality style appears to be. These findings

have previously been reported in studies of cocaine dependence, where elevated trait impulsivity has been found in cocaine dependent individuals when compared with healthy controls (e.g. Coffey et al, 2003; Moeller et al, 2004). The current findings extend this association between use of cocaine and elevated trait impulsivity to a prisoner population.

Frequent users of opiates also exhibited higher rates of delayed reward discounting than non-frequent users, shown by a higher mean discount rate. Statistical comparisons suggested this difference in mean scores also to be significant. As such it could be concluded that the relationship between frequency of opiate use and discounting is such that increased responding for immediate over larger delayed reward is associated with an increased frequency of lifetime opiate use; the more frequently prisoners have used opiates, the more impulsive their pursuit of reward was seen to be. These findings appear to support those of previous research of opiate users in non-prisoner samples (Kirby et al, 1999; Kirby & Petry, 2004).

Non-supportive evidence:

Several other relationships between substance use and BIS impulsivity variables were less robust and did not remain significant at a more conservative alpha. The exception was for a moderate relationship between frequency of opiate use and the BIS subscale of non-planning impulsivity. These findings are somewhat inconsistent with the wider literature, where studies of non-prisoners have frequently established trait impulsivity as associated with use of several different substances. Similarly the findings appear inconsistent with a limited number of studies exploring similar relationships in prisoners, which have reported significant associations between elevated impulsivity and use of alcohol (Fishbein & Rheuland, 1994), amongst other substances (Cuomo et al, 2008; Ireland & Higgins, 2013).

Discrepancy in findings between frequency of opiate use and the three BIS subscales was unusual, in that non-planning impulsivity was found to evidence a significant association whereas for motor and attentional impulsivity associations were very low and non-significant. This may suggest association between frequency of opiate use and trait impulsivity to be specific to one domain. However exploratory analysis

reveals only a small difference in mean scores between frequent and non-frequent opiate users on this domain. This difference is also not found to be statistically significant. Given the complete absence of a relationship to other trait domains, it may therefore be more appropriate to consider the independent association to BIS non-planning impulsivity in this sample as a possible chance finding.

Considering delayed reward discounting, associations between MCQ discount rates and substances other than opiates were not found to be significant at the corrected alpha. This included a trend towards a relationship for frequency of tobacco use, which has been associated in previous research of non-prisoner groups (Mitchell, 2004a; Reynolds et al, 2006); though differences between frequent and non-frequent users in this sample were small and non-significant.

Notably there were also no significant associations found between frequency of using any substance and reflection impulsivity as measured by the MFFT-20. This included for substances where this is a developing evidence-base for reflection impulsivity, such as use of cannabis (Clark et al, 2009; Solowij et al, 2012; Huddy et al, 2013), opiates (Clark et al, 2006), alcohol (Weijers et al, 2001; Lawrence et al, 2009), tobacco (Yakir et al, 2007) and different amphetamines (Morgan, 1998; Morgan et al, 2002; Quednow et al, 2007). Interestingly the only relationship with a small trend to significance in the current study was for crack/cocaine use, which has not been reported as associated with reflection impulsivity previously.

Several factors are worth considering in hypothesising about the limited number of current significant across all areas, relative to past research findings. One consideration is for the numerous comparisons that were undertaken in the current study, which meant significant findings were only considered at a more conservative alpha level to control for multiple testing (Schaffer, 1995). For example initial findings did show small to moderate associations between BIS impulsivity and frequency of using of tobacco and amphetamine, in addition to crack/cocaine. It could be argued that with a larger sample perhaps such findings would have remained significant in the face of these safeguards. Nevertheless this line of argument does not account for the lack of any degree of significant association for alcohol and cannabis use, the former particularly absent despite previous findings in

both non-prisoner (Bjork et al, 2004; Mitchell et al, 2005) and prisoner samples (Fishbein & Rheuland, 1994).

Another consideration is for the chosen study population. From our knowledge the current study is novel in its exploration of the associations between different types of impulsivity and addictive behaviour in prisoners. The prison population are likely to have a very different clinical profile to groups previously used in associated research, where exploration of substance use and different measures of impulsivity often compare substance users with a healthy control group. In prison however, even a 'healthy' control sample of non-frequent substance users are still likely to present with significantly high rates of comorbid mental health problems (Fazel & Danesh, 2002), psychosocial adversity and problem behaviours independently associated with elevated impulsivity.

It could therefore be argued that the baseline level of impulsivity in different areas in the current sample may be quite different from a typical study of drug using and non-using groups. If true this makes the task of exploring associations between substance use and impulsivity much more challenging. It perhaps even raises the question as to whether such relationships can be accurately disentangled in complex prisoner populations. It is worth noting that one of the few previous studies looking at the relationship between trait impulsivity and drug abuse in prisoners similarly found no association between BIS scores and substance abuse, other than for alcohol abuse (Fishbein & Rheuland, 1994). Furthermore comparisons with previous related studies are limited by differences in how substance use/abuse has been measured and impulsivity conceptualised. As such one consideration must be to view the current findings in the context of the limited and discrepant research of prisoners that currently exists in the area; rather than making broad comparisons to associated research involving less complex populations.

Nevertheless not all relationships were found to be non-significant. This prompts a question as to why there was such discrepancy between substances in their relationship with impulsivity.

One further hypothesis relates to the prevalence of frequent substance use reported by the sample (i.e. substance use more than once per week, including daily use). This was up to 85% and as low as 15% depending on the substance. As a result there were often large differences in the number of participants who fell into either frequent or non-frequent user groups for biserial correlations. Whilst appropriate non-parametric tests were employed for analysis, it is worth considering whether more variability in the sample would have yielded different results. For instance in related research of non-prisoner studies, where stronger associations between substance-impulsivity variables have been reported, substance using groups have often been recruited alongside an equitable control comparison group. In contrast with the current sample, this was largely not the case.

It is interesting to consider that frequency of crack/cocaine use was the only substance variable with a relatively even spread of prisoners who fell into the frequent and non-frequent categories. In turn this area was where strongest associations to impulsivity were seen, including large significant differences between groups on the BIS. Contrast this with frequency of alcohol use for example. A prominent literature exists associating heavy alcohol use with various aspects of impulsivity, yet findings were null for the current sample, where lifetime use was reported at 94% and lifetime frequent use 74%. Likewise cannabis use was found to be largely the norm in the sample, as is often found in prison more generally (Singleton et al, 2005), with very few categorised as non-frequent users and an absence of any significant association with impulsivity seen.

In this respect some findings from the current investigation can be considered more consistent with previous research; namely of the high rate of substance use and abuse that presents in prison (Fazel et al, 2006; Home Affairs Committee, 2012). With hindsight and different resources, perhaps one consideration could have been to recruit more even groups based on more distinctive criteria, for instance whether participants did or did not meet formal diagnostic criteria for substance misuse or dependence.

Another interesting area to reflect on regarding the current findings is the small evidence base suggesting recovery in performance on tests of impulsivity is possible,

but that this differs between users of different substances. For example rates of delayed reward discounting have been reported to reduce in heroin users after periods of abstinence, but not in users of cocaine or alcohol (Kirby & Petry, 2004). Similarly when comparing current and former users of various substances on discounting tasks, current users are consistently reported to display higher rates of discounting than those who have a stretch of abstinence behind them (Bickel et al, 1999; Bretteville-Jensen, 1999; Petry, 2001a).

This appears to suggest that abstinence from substances can to some extent resolve aspects of impulsive behaviour, but for recovery to differ between types of addiction. This is relevant to consider for the current study, given prisoners are supposed to be in an environment that promotes abstinence and is likely, though not always exclusively preventing their typical use of certain substances. Furthermore periods of abstinence are likely to differ between prisoners involved in the study for various reasons. These may include their length of time served, degree of ongoing use in custody and motivation for abstinence to name a few. The extent to which prisoner abstinence or reduced use may or may not have contributed to the degree of impulsivity exhibited on measures in the current study is difficult to quantify; however it presents another possible contributory factor to the discrepancies seen.

Procedural aspects of the current study comprise one final discussion of the differences between current and past findings in this sub-section of analysis. This included a need to compromise in terms of how both substance use and impulsivity, particularly reflection impulsivity, were measured in a prison setting. For example given most participants were not current substance users on account of their imprisonment, substance use data needed to be recorded retrospectively. As such lifetime use was taken as a more reliable indicator of frequency and categorised on the basis of previous research using the measure. It may have been that with a more reliable focus on current use, as is often the case in substance use research, the observed relationships with impulsivity may have been different. For instance use of a timeline follow-back method in a larger sample of current users would have provided a detailed and accurate recording of drug use over the recent past (for a recent review of this measure, see Hjorthoj et al (2012)). This may have allowed a

more informative analysis of the continuous relationship between drug use and impulsivity than was possible for the current investigation.

Similarly as discussed previously, restrictions on what equipment can be used in prison meant the current study needed to employ photocopies of a pen and paper version of the MFFT-20. Whilst validated for use, presentation of this task in a different format, for instance on a computer, or using a different measure of reflection impulsivity altogether (e.g. Information Sampling Task), may have led to different outcomes.

Summary:

Considering the hypothesis, an overall conclusion that can be made is that the relationship between frequent substance use in prisoners and impulsivity was found to differ depending on the substance used and type of impulsivity considered.

Notably prisoners who have frequently used crack/cocaine in their lifetime were seen to have significantly elevated trait impulsivity, particularly trait motor and to a lesser extent non-planning impulsivity. Furthermore those who have frequently used opiates showed significantly higher rates of discounting delayed reward in favour of immediate reward. Both of these findings appear supportive of previous research undertaken with non-prisoner groups and suggest meaningful relationships may exist between these variables in this distinct population.

In contrast various other associations found between frequent substance use and impulsivity, on both trait and discounting measures, were not robust enough to remain significant when correcting for multiple testing of the data or were not found at all. Broadly findings also indicated there to be no relationship in the prisoner sample between frequency of substance use in any area and reflection impulsivity.

These contrasting findings are somewhat inconsistent with previous studies reported in the non-prisoner literature, which may or may not relate to both methodological issues with the current study and the various confounds that present when exploring the relationship between these variables in a complex prisoner population. Certainly

the prisoner literature to date in the area is limited and the current findings should therefore be considered within this context.

4.2.2. HYPOTHESIS 2: Problem gambling in prisoners will be associated with (i) trait impulsivity (ii) reflection impulsivity and (iii) delayed reward discounting

Supportive evidence:

Findings supportive of the hypothesis that engagement with problem gambling behaviour would be associated with impulsivity were limited. One subscale of trait impulsivity (BIS motor) showed a significant moderate-large correlation and exploratory analyses revealed problem gamblers to evidence slightly higher mean BIS scores across domains; though this difference was not statistically significant. Similarly both BIS attentional impulsivity and the total BIS score were significant in their association with problem gambling; though only at a more relaxed alpha level.

This discrepancy may reflect the study being underpowered to detect more significant effects in the other areas of trait impulsivity, given only a minority of the sample screened positive for any degree of gambling problem. In support of this, previous findings have reported problem gamblers to show elevated increased scores on the BIS (DI Nicola, 2010; Lee et al, 2012) and other trait measures (e.g. Vitaro et al, 1999). Alternatively the findings may reflect the relationship between engagement with problem gambling and trait impulsivity being exclusive to specific traits.

Non-supportive evidence:

However the above findings may also represent a chance finding for BIS motor impulsivity, given the broader context of non-significant associations with other impulsive traits and also behavioural measures of impulsivity. For instance no significant associations were found between problem gambling and either reflection impulsivity or delayed reward discounting in the current sample. The association to the latter in particular was found to be very small.

One conclusion could therefore be that there is a lack of underlying relationship between the variables in this population. However research of specific facets of impulsivity and problem gambling remains in its infancy. Studies of non-prisoner samples have also come to different conclusions. For example differences in reflection impulsivity have been seen between problem and non-problem gamblers, including on the MFFT (e.g. Kertzman et al, 2010); for some these difficulties are likened to those seen in substance users, where the evidence-base is much stronger (e.g. Lawrence et al, 2009). Similarly research of discounting provides even more robust evidence of the difficulties problem gamblers have with delayed reinforcement (Petry, 2001; Dixon et al, 2003). Certain issues are therefore worth considering with regards to the current findings.

An important context to consider again includes this study being the first to investigate associations between different facets of impulsivity and problem gambling in a prisoner population. As discussed the challenges of recruiting in prison, including an increased prevalence of difficulties related to impulsivity independent of addictive disorders, mean it is difficult to control for prisoners presenting with significant impulsivity regardless of their level of engagement with gambling activities. These challenges are presumably less apparent in a less complex population, perhaps allowing for more conclusive investigation.

One further consideration for the current findings draws upon an important theoretical model of problem gambling behaviour; the pathways model (Blaszczynski & Nower, 2002). The pathways model provides an empirically valid synthesis to consider different types of problem gambling, stipulating that whilst a similar range of clinical issues may present across individuals, the underlying factors driving their behaviour differ.

In doing so the model suggests the existence of three underlying ‘categories’ of gambler, which may be relevant to contextualising the current findings. The *behaviourally-conditioned gambler* is considered to be a product of conditioning processes, where habit and the occasional experience of operant reinforcement drives a transition from recreational to heavy gambling behaviour. This may include the development of distorted beliefs about winning and biases in decision-making,

however is generally associated with a lack of additional psychopathology. Contrast this with the *emotionally-vulnerable gambler* presented by the model, whose behaviour also becomes habitual but originates through an inability to cope with adverse affective experiences and premorbid disturbances in mood, from which gambling becomes an escape. Finally the *antisocial impulsivist gambler* presents with gambling as one problem in the context of wide ranging difficulties in behaviour, typified by high levels of impulsivity and characteristics reflective of an antisocial personality.

In view of this multidimensional perspective of problem gambling, it could be argued that whilst all gamblers may appear somewhat impulsive in their behaviour, the role of impulsivity and specific facets of impulsivity as a key part of the problem may vary depending on their gambling aetiology. Without a real qualitative understanding of the nature of their gambling problem, it is difficult to discern how best to explore associations between their behaviour and impulsivity, or even whether such investigation is warranted.

For example it may be that behavioural-conditioned gambling may associate more to reflection impulsivity than other types, given the important role for poor decision-making and distorted cognitive reflections that drive this type of gambling. The original model even argues against impulsivity being an issue relevant at all for conditioned gamblers. In contrast perhaps emotionally-driven gambling could be considered to relate more to a tendency for discounting, for instance in seeking out immediate relief from unmanageable emotional strain over the rewarding outcomes that may come with longer-term abstinence. Or consider the antisocial impulsivist who presents as impulsive in lots of different contexts including in their gambling behaviour, perhaps due to the shared influence of high levels of trait impulsivity; thus complicating investigation of how specific types of impulsivity may relate to different behaviours.

These considerations invite further research, whilst drawing attention to the potential complexities of the current study population in investigating a relationship between impulsivity and problem gambling. For instance given the known high rates of antisocial personality disorder in prison, reported by some as 47% (Fazel & Danesh,

2002), one possibility for the limited associations found in the study may relate to a high prevalence of antisocial impulsivist gamblers in the sample (relative to other types of gambler), for whom the specific relationship between impulsivity and problem gambling will be much harder to determine.

Summary:

The current findings do not provide explicit support for an association between trait or specific facets of impulsivity and problem gambling in the prisoner population. However again placing these findings in the context of limited research in the area is worthwhile. Particularly for trait impulsivity, there was evidence of some association and it may be that the study was underpowered to detect further effects. The pathways model of pathological gambling (Blaszczynski & Nower, 2002) provides a useful theoretical model to consider these complex relationships further and can potentially be used as a platform for ongoing psychological research of the role for impulsivity in gambling behaviour.

One important finding to observe from the current study is the prevalence of severe problem gambling in the prisoner sample, which far exceeded expectations based on estimations of prevalence in the normal population, currently 0.9% (The Gambling Commission, 2010). In the current sample 14% were found to meet clinical threshold for severe problems with gambling, also known as pathological gambling, which would likely meet reach criteria for the newly formed diagnosis of Gambling Disorder (DSM-V; American Psychiatric Association, 2013). A further 18% endorsed enough items on the PGSI suggestive of some problems, which places them at risk of developing severe problems; though currently not at threshold for this.

Important also to consider is the format for the PGSI asking only about behaviour over the past 12 months, which for many participants may have been less than the time they have been in prison. As such it is possible that the figure of 14% is underestimating the true prevalence of severe problems that may be present in prison, if individuals had regular access to facilities they may usually use but that are denied to them during their sentence. The findings suggest a need for appropriate screening of gambling problems in the prison setting to identify those at risk prior to their

release. This includes the need for emphasis on an equal focus between gambling problems and more well-established substance-related addictions, for which the prison system already has services in place to address.

4.2.3. HYPOTHESIS 3: In cases where multiple types of impulsivity associate with an addictive behaviour, at least one will emerge as an independent predictor of (i) frequent substance use (ii) problem gambling.

Exploratory regression analyses were undertaken to assess whether particular domains of impulsivity were able to distinguish particular subsets of participants. Where there was evidence of significant or trending association between an addiction variable and multiple forms of impulsivity, binary logistic regression models were created to assess whether any forms emerged as independent predictors of engagement with the addictive behaviours. In other words, regression was assessing the independent contributions of different types of impulsivity to differentiating (i) frequent users of particular substances from non-frequent users and (ii) problem from non-problem gamblers.

Supportive evidence

For the predictive model of crack/cocaine use, BIS motor impulsivity was found to be an independent significant predictor of whether prisoners were frequent or non-frequent users of crack/cocaine. Whilst actual or trends toward association were found between all subscales of the BIS and frequency of crack/cocaine use, when accounting for the influence of each other trait motor impulsivity emerged as the most relevant in predicting crack/cocaine use. The findings showed that elevated scores on trait motor impulsivity significantly increased the odds of frequent crack/cocaine use in the sample by 19%.

Non-supportive evidence

Aside from this finding however, other aspects of the regressions models did not yield significant findings. This included non-significant findings for BIS non-planning and attentional impulsivity as predictors of crack/cocaine use; delayed

reward discounting and BIS non-planning impulsivity as predictive of opiate use; and BIS motor and attentional impulsivity as predictive of problem gambling.

Summary:

The hypothesis that particular domains of impulsivity would be independently predictive of engagement with addictive behaviours was supported in one area. Specifically, one subscale of trait impulsivity (motor) emerged as an independent predictor of crack/cocaine use when controlling for other impulsive traits. This appears to suggest that the probability of prisoners being frequent users of crack/cocaine was increased in the context of elevated trait impulsivity, specifically in the area of motor impulsivity.

Nevertheless the findings also show that whilst significant, the predictive value of this variable is still quite small. This suggests other factors are relevant to consider in terms of what predicts frequent crack/cocaine use. As discussed in the synthetic theory of addiction (West & Brown, 2013), impulsivity represents only one factor in the complex range of issues contributing to the development and maintenance of addictive behaviour.

In the areas of opiate use and problem gambling, earlier analyses suggested these variables do correlate well with particular types of impulsivity. For opiate use this included delayed reward discounting and one area of trait impulsivity; for problem gambling this related to two areas of trait impulsivity. However using regression models none of these impulsivity factors emerged as independent predictors of engagement with the addictive behaviour when controlling for the effects of the other factors. This is the same for the BIS subscales of attentional and non-planning impulsivity in being able to predict crack/cocaine use.

It may be that whilst the other impulsivity variables do associate with particular addictive behaviours, individually they are not related strongly enough to have utility in predicting engagement with the behaviour. This hypothesis appears to be supported when looking at the univariate relationships between variables, where the strongest correlation was reported between BIS motor and crack/cocaine use ($r_b =$

.58). In contrast the correlations for other variables varied at lower values ($r_b = .34-.45$)

One further hypothesis to consider for this discrepancy, at least for the opiate regression model, is whether the overlap between trait and behavioural measures in the sample accounted for the null findings. For instance earlier analysis had suggested a significant correlation exists in the sample between the MCQ and BIS measures. It may therefore have been that the overlap between these different types of impulsivity meant neither emerged as an independent or better predictor of opiate use than the other.

4.2.4. HYPOTHESIS 4: Associations between (i) frequent substance use (ii) problem gambling and impulsivity will be significantly different between those who screen positive versus negative for personality disorder

Supportive evidence:

There was no evidence supportive of the hypothesis that associations between addiction and impulsivity would be different between those screening positive versus negative on the SAPAS, a validated screening tool for personality disorder. Associations were found to differ between groups only for two substances on subscales of the BIS. However comparisons found these group differences in association were not statistically significant.

Non-supportive evidence:

Correlations between addiction and impulsivity variables appeared broadly similar on inspection across those screening positive and negative on the SAPAS; even for those variables where significant correlations were found. As such no further analyses of an interacting effect of personality disorder screen were undertaken. Whilst there were some differences between groups of some variables, these were generally small and none large enough to be significant under statistical testing.

Summary

Broadly the findings were not supportive of the hypothesis of a difference in association between impulsivity and addictive behaviour between those screening positive and negative for personality disorder.

In hypothesising about reasons for this, several issues are worth considering. One factor includes the remit of the SAPAS as a general tool in screening for personality disorder and the implications this may have had for this sub-section of analysis. Firstly as the SAPAS is only a screening tool, it is not diagnostic of personality disorder. Secondly it is also not a particularly specific screen in terms of looking at different types of personality disorder.

This is important to be mindful of given previous research in the wider population, which implicated personality disorder in the relationship between impulsivity and addictive behaviours, has focussed specifically on the role for cluster-B disorders; particularly borderline and antisocial types (Petry, 2002; Dom et al, 2006; Rubio et al, 2007). Whilst individual items of the SAPAS may relate more to characteristics of one disorder over another, the threshold for a positive screen will include scoring up on multiple items relevant to different disorders. This could include disorders which may be protective against high impulsivity or engagement with addictive behaviours. As such it could be argued that without a specific focus on disorder-specific associations between the groups, similar results to those previously reported would be challenging to find even with a larger sample to detect differences between groups.

Previous research is also somewhat inconsistent in reports of the relationship between impulsivity and addiction differing in the context of personality disorder. For instance Dom et al (2006) reported performance on a measure of response inhibition to be different between alcoholics with and without personality disorder, but no difference was found on a measure of delayed reward discounting. Similarly others have reported a complete absence of an interacting effect of antisocial personality disorder in the relationship between cocaine abuse and both BIS impulsivity and discounting (e.g. Moeller et al, 2002). As such it could be argued

that the current findings fit in with the inconsistency seen in the limited wider literature in reporting a lack of difference between groups for all areas of impulsivity.

One area the findings perhaps overlap more with previous research is on the high prevalence of positive screening for personality disorder, found in the current sample to be 51%. Using estimates from previous validation of the SAPAS, which reported that a positive screen correctly identified DSM-IV diagnosable personality disorder in 90% of cases (Moran et al, 2003), it could be expected that over 45% of the current sample may meet the clinical threshold for full diagnosis if properly assessed. This would be in keeping with the high rates reported from transnational research of personality disorder prevalence in prison and amongst offender groups (Fazel & Danesh, 2002; Pluck et al, 2012).

However it is also interesting to note that across the sample, participants provided relatively low scores on the SAPAS. Even the SAPAS positive group averaged a mean only just over the cut-off. As such there was limited variability in the sample between those scoring positive and negative with few participants scoring very highly, where perhaps it could be considered with more confidence that their score is truly reflective of an underlying disorder. One further consideration therefore includes whether a sample of SAPAS positives with a much higher mean score, perhaps reflecting a more valid representation of true personality disorder, would be found to differ more from a SAPAS negative group in associations between impulsivity and addiction variables.

4.2.5. HYPOTHESIS 5: No significant relationship is expected between two specific behavioural measures of (i) delayed reward discounting and (ii) reflection impulsivity. Significant relationships will be found between these behavioural measures and a trait measure of impulsivity.

Supportive evidence:

A small yet significant positive association was found between trait impulsivity as measured by the BIS-11 and delayed reward discounting as measured by the MCQ. This suggests that to some extent higher scores on the BIS were related to increases

in participants discounting larger future rewards in favour of smaller but more immediate reinforcement. Similar correlations have previously been reported in related research of non-prisoner samples (e.g. Kirby et al, 1999), with the current findings appearing to extend understanding of a relationship between trait impulsivity and delayed reward discounting to a prisoner population. For the current sample further analysis revealed the association to be strongest for the BIS non-planning subscale. Relative to other traits measured by the BIS, this could suggest the relationship between discounting and trait impulsivity may be more related to traits associated with poor planning and deliberation over mental tasks in order to inform choices and decisions about behaviour.

An additional finding was of no statistical relationship being seen between measures of reflection impulsivity and discounting, with the correlation coefficient close to zero. It could be inferred that this lack of relationship is indicative of these tools measuring different aspects of impulsive behaviour distinctly different from one another. Such an inference would provide support for a multifaceted conceptualisation of impulsivity (e.g. Evenden, 1999), which argues that impulsivity presents itself in various ways through different aspects of behaviour. Each of these areas would therefore need to be measured in its own way and a relationship between these measures would not necessarily be expected.

Non-supportive evidence:

There were no significant associations found between any aspect of trait impulsivity and reflection impulsivity as measured by the MFFT-20 ($p = .09$). This finding was a little surprising, particularly given the positive relationship between BIS scores and discounting, another specific facet of impulsivity under study.

It may be that in the sample no relationship actually exists between trait impulsivity and reflection impulsivity; a previous study using a different measure of reflection impulsivity has also reported no relationship to BIS scores (Clark et al, 2006). However it would seem theoretically dubious to consider that there would be absolutely no association between an individual's capacity for reflective decision-making and their underlying trait level of impulsivity. Furthermore some have

previously concluded that behavioural measures of impulsivity do associate with self-report measures such as the BIS, though these associations often tend to be statistically quite small (Kirby et al, 1999).

It is interesting to consider that despite no overall relationship to trait impulsivity, exploratory analysis found performance on the MFFT-20 to be approaching a significant positive relationship with one particular BIS domain (BIS motor). One possible explanation for this independent trend may be that reflection and trait impulsivity are associated, but only for particular traits. For instance a key aspect of calculating the MFFT-20 i-score considers participants' latency to first response on items (i.e. considering how quickly they took action to respond to each item). As such it may have been that participants with elevated self-reported motor impulsivity therefore trended towards shorter latencies (quick responding) on the MFFT-20.

Nevertheless the observed association was small and did not quite reach statistical significance, meaning reflections on this trend should be considered cautiously. This interpretation is also at odds with there being an absence of a comparable trending relationship between MFFT-20 performance and the BIS trait of non-planning impulsivity, which theoretically may be as expected given the reflective nature of this trait domain and the core focus for the MFFT-20 being to measure the extent to which participants are reflective in a behavioural task.

One tentative hypothesis for this discrepancy could be how data on the MFFT-20 was distributed. Assessing performance via the MFFT-20 i-score involves several steps (Salkind and Wright, 1977; Messer and Brodzinsky, 1981). The first is to ascertain per participant the total numbers of errors they committed across all items; the second to calculate the mean latency to first response across all items. These scores are then standardised to produce a Z-score for each, with Z-latency subtracted from Z-error producing the i-score for each participant. The distribution of i-scores across the sample was found to be broadly normal. However analysis of the distribution of unstandardised latency and error scores shows significant skew in the sample towards short latencies (see Appendix 10.7).

Put more simply, a disproportionate number of participants demonstrated very quick responding across items. One idea is that this skew may have biased i-scores towards a closer relationship with BIS motor impulsivity, as opposed to other BIS domains; given BIS motor is associated with the speed at which people engage in behaviour. As discussed no significant relationship between the BIS-11 and MFFT-20 was found anyway; perhaps with a more even distribution of latencies contributing to the i-score, this specific trend with the BIS motor domain would not have been seen either.

Considering hypotheses for why a relationship between trait impulsivity and reflection impulsivity may not have been found more generally; one consideration is for the degree of general problems with reflection that may present in prison populations and whether this had an impact on the current study of reflection impulsivity. For instance it could be argued that ineffective reflection over behaviour may be a common factor relating to the decisions and choices individuals make that lead to them being imprisoned. It may be that the population of a prison generally present as a baseline with poor capacity for reflective decision-making regardless of their underlying level of trait impulsivity. As such studying the nature of association between reflection impulsivity and those higher versus lower in trait impulsivity becomes harder to conclude on. Alternatively it could be that the observed findings reflect a ceiling effect on the measure when used with particular populations.

A second factor worth considering is therefore how reflection impulsivity was measured in the current study. Given restrictions of the use of equipment in prison the current study used a pen and paper version of the MFFT-20. As discussed previously, other means of measuring reflection impulsivity do exist (e.g. Clark et al, 2006) and the MFFT can also be presented digitally. As such it may be that use of the MFFT-20 in another format (e.g. presented with more visual clarity on a computer) or a different measure of reflection impulsivity may be more sensitive to strengths and limitations in reflective capacities that may or may not relate more to participants underlying traits.

Summary

Considering the hypothesis, trait impulsivity in prisoners was found to be positively associated with delayed reward discounting (i.e. preference for immediate over delayed reward), supporting previous findings. This was particularly so for the trait domain of non-planning impulsivity, which may suggest the relationship between discounting and traits to be related to traits concerning the ability of individuals to carefully plan and deliberate over mental tasks to inform decisions about behaviour. Unexpectedly there were no similarly significant associations found between trait impulsivity and a measure of reflection impulsivity in the sample, with a trend towards certain aspects of reflective performance likely to be accounted for by skew in the data. It may be that no such relationship exists in prisoners, though other inferences may include that both general characteristics of a prison population make study of convergent validity challenging and further investigation of the relationship using different measures of reflection impulsivity may present contrasting findings.

A related consideration is for ongoing debate regarding whether behavioural aspects of impulsivity and traits even associate with each other. For instance some have previously argued that the lack of consensus around what constitutes behavioural aspects of impulsivity means there is limited scope for saying whether or how these behavioural aspects even relate to underlying personality structures (Enticott et al, 2006). Previous findings are also discrepant in the degree of overlap reported between trait and behavioural measures in non-prisoner samples (e.g. Reynolds et al, 2006; Meda et al, 2009). As such the current findings of one facet associating with trait impulsivity whilst another did not appear in keeping with this inconsistency.

Finally a null finding was seen for the relationship between performance on the MCQ and MFFT-20. One interpretation is that within the sample these tools may have been measuring different aspects of impulsivity in prisoner's behaviour and as such no statistical association was seen between them. Within this interpretation, the finding could be seen as supportive of the relevance of studying impulsivity as multifaceted in prisoners. However given this is a null finding, it should also be acknowledged that such findings may instead result from inadequacies in the measures, for instance in terms of power or perhaps even construct validity.

5. LIMITATIONS

5.1. METHODOLOGICAL ISSUES

Given the design of the study being cross-sectional, the results from this investigation should be considered relevant to the current time and provide no longitudinal context to the understanding of impulsivity and addiction in prisoners. Sampling for the current study within one prison setting also restricts how these findings can be generalised to other prisoner groups. For instance recruitment was undertaken from a specific pool of prisoners in HMP Brixton, namely those screened by OASISp, limiting the relevance of findings to those outside of this pool (e.g. prisoners outside of the ages of 21 to 35). Similarly prisoners being detained in other settings, such as non-Category C prisons, female prisons or young offender institutions, were not represented in the sample. This again limits the applicability of the current findings to these populations.

The choice of instruments for measuring certain variables has also previously been discussed as a key limitation of the current study methodology. With hindsight the absence of continuous measures of substance use was particularly limiting in terms of how the relationships between impulsivity and substance use could be explored in the analysis. Alternatives were considered, including the use of a time-line follow up measure (Hjorthoj et al, 2012), for instance on the Maudsley Addiction Profile (Marsden et al, 1998). However the focus of these measures on current or very recent use was considered unsuited to the study population, given participants reports of current use would likely be biased by their detainment and for many not a reliable indicator of their typical use in the community. The use of lifetime frequent use as a measure of frequent substance use was therefore a related and necessary compromise.

The measure used to record substance use was derived from another previously employed in the study setting (Barkus et al, 2006; Valmaggia et al, 2014). This was considered preferable to devising a completely novel and bespoke measure unfamiliar to the study setting, which may not have received the necessary approvals in the time-frame for the current investigation. It may be that a new measure of recording substance use for this type of research is warranted.

Similarly the use of a pen and paper copy of the MFFT-20 was a compromise in the measurement of reflection impulsivity, due to restrictions on what equipment can be used in prison. As discussed the use of different measures of the same construct, or presenting the same measure in a different format, may have contributed to different outcomes.

5.2. PRISON FACTORS

Procedural aspects of the current study were in part determined by the prison environment and could be considered an additional area of limitation. For instance given local policies governing access to prisoners, recruitment was restricted to particular times and settings. Whilst promoting consistency in procedure, this also meant participation having to take place in classrooms on busy prison wings, where the ability to control for noise, distraction and interruption is largely removed. Although no participants provided feedback that these issues were interfering, the environment is not one ideally suited to the administration of measures, particularly in the assessment of behavioural performance on challenging tasks.

As previously discussed the complexity of prisoner needs also makes it difficult to draw firm conclusions from the findings about the nature of the relationship between impulsivity and substance use in this population. This includes the known prevalence of other difficulties in a prisoner population that independently relate to impulsivity. The imposed exclusion criteria were intended to minimise this risk, for instance in screening out prisoners known to have a history of head injury or an existing depressive or psychotic illness. However other factors were not considered, including formal screening for ADHD. This was both because of resources available for the current study and the potential for disrupting concurrently running projects looking at ADHD in HMP Brixton. Furthermore seemingly problematic use of certain substances appeared to be the sample norm, particularly for alcohol, tobacco and cannabis use. This contributed to over 90% of the sample reporting lifetime polysubstance use and thus makes it difficult to control for or rule out the overlapping influence of these factors on the significant relationships reported.

Additionally the majority of data collected, both in terms of screening information that informed decisions around exclusion and details about engagement with addictive behaviours, was reliant on prisoner self-reports. Some have argued that self-reports amongst detainees are less valid than in community samples (e.g. McElrath, 1994), for instance due to evidence that reports may be influenced by fear of sanctions (Kosten et al, 1988). Other factors may also include limited trust in figures of authority, of which healthcare professionals may well be considered, and prisoner's conceptualisation of and willingness to disclose issues related to the state of their mental health when asked. For instance exposure to events that increase risk of head injury may be more prevalent in prisoner populations and could perhaps be conceptualised differently amongst prisoners compared to other groups. As such it is possible that without the development of more trusting relationships with participants, self-reported behaviours and issues relevant to the study may not always have been completely valid; in spite of assurances around the confidentiality of study data.

Finally awareness of the focus for study being on impulsivity and addictive behaviour may also potentially represent a demand characteristic in participants responding on both self-report and behavioural tasks.

5.3. STATISTICAL CONSIDERATIONS

Important factors relating to statistical limitations with the current investigation are discussed earlier and form the basis for caution in how the results should be interpreted. This includes the enhanced risk of Type 1 error. Due to the number of different relationships being studied (e.g. between each substance and different types of impulsivity), there remains a possibility that significant findings reported are a product of chance rather than a reflection of true relationships between the relevant variables. To compensate for this elevated risk, coefficients were considered significant only at a reduced significance level; in doing so only a minority of significant values were found to persist beyond these safeguards.

Whilst it could be argued that such values may therefore be suggestive of truly meaningful relationships between these particular variables, it is still worth being

mindful of the statistical context underlying these results. This context precludes too firm conclusions being drawn. With hindsight a more efficient approach to studying the relationship between the broad areas of impulsivity and addiction may have been to reduce the number of variables under study, perhaps allowing for more narrow but reliable interpretation of specific relationships. For example focussing on one addiction variable and exploring its relationship to one or different aspects of impulsivity in more depth; though this itself brings challenges, for instance in deciding what variables or groups would be most appropriate to select.

A related limitation is the use of biserial correlations for the majority of analyses. These do not provide particularly robust or detailed understanding of the relationships between the study variables, but were necessary given the data obtained. Nor do correlations more generally provide further clarity on the longstanding debate regarding the direction of causation in the relationship between impulsivity and addiction. For instance the interpretation that frequent users of opiates show elevated discounting relative to non-frequent opiate users tells us nothing about whether this proclivity for immediate reward preceded onset of or results from substance use. Instead what the results do highlight are potentially meaningful areas of association between these variables in prisoners, which invites further investigation.

6. CLINICAL IMPLICATIONS

It is important to recognise and emphasise the focus for the current investigation being in one area of addiction research (i.e. the role for impulsivity). As such the potential clinical implications are narrowly focussed on addressing specific aspects of addictive behaviour relevant to this. As discussed in the ‘synthetic theory’ (West & Brown, 2013) there exists a multitude of other factors contributing to the development and maintenance of addiction, both substance and behavioural. The potential benefit of understanding and addressing impulsivity therefore represents a relatively small part of a much larger issue. In doing so two steps are important to consider.

Firstly an improved understanding is needed as to how impulsivity presents in the behaviour of an addict and how, if at all it relates to their problem. The evidence to date suggests a strong link between impulsivity and addiction, however there is less certainty around the specifics of this. Whilst people with an addiction may be said to present as impulsive, a reasonable question to ask is what this actually looks like in terms of their behaviour and how does this differ depending on the addiction. For instance it has been argued that impulsivity can present behaviourally in various ways, which relate differently to different behaviours (Evenden, 1999).

The second step is using this improved understanding to inform and develop targeted interventions that address the different aspects of impulsive behaviour that contribute towards problems seen in addiction. For instance the individual who demonstrates poor capacity for cognitively reflecting on their behaviour (i.e. reflection impulsivity), continuing to use drugs because of difficulty weighing up consequences or assimilating negative feedback to guide future behaviour, may find one type of intervention helpful. However this may be a very different type of intervention to that which may help someone who is reward-driven in their behaviour and frequently returns to a problem activity because it is immediately gratifying or a fast relief from low mood.

The crux of the current study is focussed on the former step, specifically considering how to better understand impulsivity in the addictive behaviour of prisoners. Whilst the study is limited in being too conclusive about the relationships between different

facets of impulsivity and different addictive behaviours, four key findings are considered in terms of their potential clinical implications.

Firstly the finding that prisoners with a lifetime history of heavy opiate use show high rates of reward discounting supports previous findings in non-prisoner groups and fits with general clinical observations of opiate dependent patients, for instance in the experience of cravings and repeated relapse; common features of opiate addiction. For example it is not uncommon clinically for dependent opiate users to appear to attribute reduced value for the longer-term benefits of abstinence in the face of a current period of aversive withdrawal or to value a quick euphoric fix for intense emotional and physical distress. Previous researchers have offered thought-provoking ideas for the development of effective psychological treatments to address these issues. This has included highlighting the futility of treatment strategies that focus on promoting the longer-term benefits of abstinence, given the difficulty opiate users have with attributing such distant outcomes with much value (Petry et al, 1998). Particularly relevant for the current study sample, this also includes the limited effectiveness of threatened sanctions for ongoing use (e.g. imprisonment), given the reduced salience this has for the individual at the time of using (Kirby et al, 1999); perhaps relevant to the topical debate on drug policy ongoing in the United Kingdom.

As an alternative, strategies focussing instead on immediate rewards for abstinence are considered better placed for effective treatment of opiate abuse, particularly evidence-based contingency management interventions (National Institute for Health and Clinical Excellence; NICE, 2007). This is relevant to both community and prison settings. Prison settings provide a containing environment to begin addressing these issues for those who have received sanctions, both to prevent ongoing drug use whilst in custody and ensure individuals are in a better place upon release to work towards the longer-term benefits of prolonged abstinence. The current findings of impulsivity and opiate use support the ongoing use of such interventions with prisoner groups.

A second potential implication relates to the finding that prisoners with a lifetime history of heavy crack/cocaine use show elevated trait impulsivity. Whilst not

highlighting specific patterns of behaviour to be addressed in treatment, this finding does suggest an association more generally between an impulsive personality style and abuse of cocaine-based substances, which invites further research of how this may present behaviourally. Particularly the lack of association with reflection impulsivity and reward discounting may suggest the role instead for other behavioural facets of impulsivity. For instance in looking at trait-specific associations to crack/cocaine use in the sample, trait motor impulsivity was found to be most associated and an independent predictor of use. It may be that behavioural issues of habitual responding and poor motor control are therefore most relevant to consider (e.g. impulsivity as response disinhibition).

The broad implication from this finding is therefore again on the potential benefit of considering impulsivity in addiction as multifaceted to identify the particular behaviours relevant to different types of addiction. This in turn will inform the most appropriate intervention strategies, for example in addressing poor response inhibition through behavioural techniques aimed at interfering with habit. For instance methods of stimulus control involve the introduction of strategies that directly modify environments that trigger habitual patterns of behaviour (Mitcheson et al, 2010). These are routinely used in both behavioural approaches to treating problem gambling (Echeburua & Fernandez-Montalvo, 2005; George & Murali, 2005) and relapse prevention models of substance abuse (Marlatt & Gordon, 1985; Larimer et al, 1999).

Thirdly results from correlational analyses undertaken between different measures of impulsivity suggest it may be useful to consider a multifaceted conceptualisation of impulsivity as relevant to prisoner populations more generally. Specifically two measures of different behavioural aspects of impulsivity were found to be uncorrelated and presumably distinct in what they were assessing. This finding may have a more general clinical benefit rather than one focussed on understanding prisoner addiction specifically. For instance an understanding that impulsivity in prisoners may present in various different ways may allow for richer and more thorough formulation of issues relating to general behaviour management, the assessment of different types of risk, and assessment and intervention for non-addiction problems where impulsivity is implicated (e.g. incidents of violence or

self-harm, patterns of reoffending). This would be in support of broad and effective rehabilitation.

Finally returning to addiction, the finding of a prevalence of problem gambling in the sample many times higher than is seen in the general population suggests a need for effective screening of problem gambling in prison. This includes better awareness of the evidence suggesting a link between problem gambling and offending behaviour (Blaszczynski et al, 1989; Williams et al, 2005; May-Chahal et al, 2012); an increased understanding of the debilitating impact of gambling disorders on individuals and society; and appropriate prisoner access to support services to address these needs, including through psychological intervention. The role for impulsivity in gambling problems, whilst not substantiated in the current findings, is also worth further consideration in research of prisoners, given the limited research to date.

7. FUTURE IMPLICATIONS FOR RESEARCH

Despite its limitations, the current study provides a further example of the challenges of studying impulsivity in addiction, particularly in the context of a complex prisoner population, and highlights how the relationship between these variables will likely vary depending on the types of addictive behaviours and impulsivity being considered. Certainly there is a limited literature in the area to date on how these issues may relate in prisoners. As such the current study highlights potentially meaningful areas of association in this group to be considered for future investigation, perhaps in a larger scale study.

As discussed previously, an optimal approach to future investigation would be well placed to include a multifaceted conceptualisation of impulsivity. It should also involve a narrower but more comprehensive focus on how different areas of impulsivity relate specifically to different addictive behaviours; rather than the broader and more exploratory approach taken in the present study. This could include consideration of other impulsivity facets previously considered in the non-prisoner literature but not included in the present study, for instance in the role for poor response inhibition. Extending such research to different prisoner groups would also help to overcome the issue of representativeness discussed as a limitation for the current study.

In addition optimal definition and measurement of addiction would be important for future study, given relationships may well differ depending on how addiction, not just impulsivity, is operationalised under study. For instance the role for impulsivity may vary depending on how frequent use of substances is defined; whether substance or behavioural addiction is the focus for study; whether current or lifetime engagement with behaviour is considered; whether data relating to addictive behaviour is collected as continuous or categorical; or whether a study chooses to measure general use, frequency of use or pathological dependence on a behaviour. A more circumscribed focus on a smaller number of variables may also allow for more appropriate control of the various confounding factors that present in a prisoner population.

Future research may also benefit from exploring further the processes that may explain, change or underlie the relationship between impulsivity and addiction. For instance given the frequent comorbidity between addiction and other difficulties, including several factors known to associate with impulsivity (e.g. depression), it may be of interest to explore if such variables are seen to mediate or moderate the relationship between impulsivity and addiction. Other factors of potential interest may include the role for emotion regulation, disorders characterised by dysregulated emotion (e.g. borderline personality disorder) and experience of trauma; all highly relevant and prevalent in addiction populations (Bowden-Jones et al, 2004).

Finally the present findings offer no further insight into the debate surrounding the direction of the relationship between impulsivity and addiction, in terms of which may precede the other. Research to date in largely non-prisoner samples has provided evidence for both sides of the debate and as discussed a reasonable inference is that in many cases the combined impact of premorbid vulnerability and the subsequent effects of behaviour may both be relevant. As with the focus for the current study, prisoner populations represent an understudied but relevant group for future research on causality to consider.

8. CONCLUSION

The current study sought to explore associations between impulsivity and engagement with addictive behaviours in a sample of young adult male prisoners. In two areas lifetime frequent use of particular substances was found to associate with either elevated trait or behavioural impulsivity, though this was not seen in several other areas studied. The variance in findings suggests the need for more thorough and narrower investigation of how different types of impulsivity may or may not relate to different addictive behaviours in the prisoner population, to support firmer conclusions being drawn on the relationship between these variables.

The current study presents potential evidence for the relevance of a multifaceted conceptualisation of impulsivity to prisoners, which would be important to consider in future research of prisoner addiction. It may also have implications clinically in terms of the assessment, formulation and treatment for a range of behavioural needs that prisoners may present with. The high prevalence of severe problem gambling reported by the sample suggests this may be one key area of unmet need, which would benefit from further research and be important to consider in terms of the provision of support services offered within the justice system.

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10. APPENDICES

10.1 NHS ETHICAL APPROVAL



Health Research Authority

NRES Committee London - South East
Bristol Research Ethics Committee Centre
Level 3, Block B Whitefriars,
Lewins Mead,
Bristol BS1 2NT

Dear Dr Valmaggia

Study title: **Impulsivity and addictive behaviours in prisoners**
REC reference: **13/LO/1035**
IRAS project ID: **130415**

Thank you for your letter of 10 September 2013, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered in correspondence by a sub-committee of the REC. A list of the sub-committee members is attached.

We plan to publish your research summary wording for the above study on the NRES website, together with your contact details, unless you expressly withhold permission to do so. Publication will be no earlier than three months from the date of this favourable opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to withhold permission to publish, please contact the REC Assistant Mr Wai Yeung, nrescommittee.london-southeast@nhs.net.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

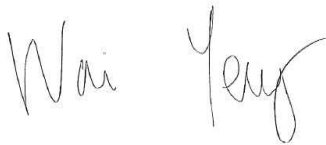
Management permission ("R&D approval") should be sought from all NHS organizations involved in the study in accordance with NHS research governance arrangements.

13/LO/1035 Please quote this number on all correspondence

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at <http://www.hra.nhs.uk/hra-training/>

With the Committee's best wishes for the success of this project.

Yours sincerely



EC Assistant

pp Professor David Caplin

Chair

Email: nrescommittee.london-southeast@nhs.net

Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments

"After ethical review – guidance for researchers"

Copy to: Ms Jenny Liebscher, King's College London, Institute of Psychiatry

10.2. NATIONAL OFFENDING MANAGEMENT SERVICE APPROVAL



HM Prison Service

Greater London Psychological
Services (GLPS)
c/o HMP Holloway
1X Parkhurst Road
LONDON
N7 0NU

Telephone: 020 7979 4618

Email: claire.smith@hmpr.gsi.gov.uk

Dr Lucia Valmaggia
King's College London,
Institute of Psychiatry &
South London and Maudsley NHS
Trust
Department of Psychology (PO77)
De Crespigny Park
London
SE5 8AF

National Research Reference:
2013-217

Dear Dr Valmaggia,

Research Title: Impulsivity and addictive behaviours in Prisoners

Further to your resubmission of your application to undertake research in NOMS, this information has been considered in line PSI I am pleased to be able to support your application to conduct research at HMP Brixton. This approval has been granted in principle and is subject to compliance with the conditions outlined below:

- Approval from the Governor Tullet, Governing Governor of HMP Brixton, prior to the start of this project. Please note that NRC and Regional Psychologist approval does not guarantee access to Establishments this access is at the discretion of the Governor/ and subject to local operational factors and pressures.

- A copy of the final research report must be sent to the Governor of HMP Brixton and the Lead Psychologist for Greater London (Ms Toni Mason).
- HMP Brixton will be unable to provide any resources to support this project.
- The findings should be shared with the Senior Management Team at HMP Brixton
- The findings of the research should only be published with the express permission of the Governor of HMP Brixton and/or the Lead Psychologist for Greater London. This decision will be made AFTER the findings are known and the project report is completed (this does not include the final dissertation report).
- This letter does not give approval to take electronic and/or recording equipment (e.g. Laptop, Dictaphone) into HMP Brixton. In order to use such equipment, permission must be sought from the security department at HMP Brixton
- The research must comply with The Data Protection Act and all NOMS information assurance protocols
- At the end of the project the researcher must prepare a research summary for the NOMS National Research Committee and the Regional Psychology Lead (approximately three pages; maximum of five pages) which (i) summarises the research aims and approach, (ii) highlights the key findings, and (iii) sets out the implications for NOMS decision-makers. It must be submitted to the NRC alongside the NRC project review form (which covers lessons learnt and asks for ratings on key questions). Provision of the research summary and project review form is essential if the research is to be of real use to NOMS. The report must use language that a lay person would understand. It must be concise, well organised and self-contained. The conclusions must be impartial and adequately supported by the research findings.

Please let me know if you require any further information and good luck with your research.

Regards,

Sent by email – no hard copy to follow

Claire Smith, C.Psychol, AFBPsS
Registered and Chartered (Forensic) Psychologist
Cluster Lead Psychologist Greater London

10.3. ETHICAL SAFEGUARDS

Given potential vulnerabilities some prisoners may have in dealing with figures of authority in the prison system, a key ethical concern relating to the study was to ensure individuals did not feel coerced to participate. This was ensured in a number of ways;

1. Clear detail was given on the information sheet that any decision to engage in research would not affect the prisoner's status, sentence or court proceedings in any way, nor the support offered by the various prison services they may be engaged in, including healthcare.
2. It was clarified that prisoners would not receive compensation for participation and instead would be volunteering their time if they chose to participate.
3. A prisoner's right to withdraw from the study, at any time without having to give a reason, was emphasised on several occasions prior to participation.
4. Prisoners were given a minimum of 24 hours to consider their decision between receiving the information sheet and being approached again to confirm their consent. Additionally the above information was reviewed again prior to beginning participation
5. Prior to testing prisoners were informed that information they chose to provide during the study would remain confidential and the process for data handling was explained. Participants were however made aware that if issues regarding significant risk to themselves or others became apparent, these concerns would need to be communicated to prison staff in accordance with safer custody protocols. This could impact on whether their participation would remain confidential.

Further concern related to the level of literacy amongst prisoners and whether this could impact on their ability to understand the study and their participation in it. At the time of study the average reading age in prisons was known to be 11 years old

(Social Exclusion Unit, 2002). These concerns were considered in the assessment procedure;

1. The wording used in the information sheet given to prisoners was checked to ensure it met a reading age of 13 years, which was deemed favourable when compared to the average reading score at the prison. Information in the sheet was also discussed face to face with potential participants prior to taking consent for participation to ensure understanding.
2. Within the information sheet participants were also given details of the researcher and senior members of the OASISp team to contact if they had further questions or concerns about the study following participation.
3. To reduce risks to both the participants and researchers, prisoners were made aware before participating that they may find some aspects of the study challenging and frustrating, and if they did not understand anything or wanted to stop they could raise this with the researcher. Researchers also checked at the end of each section of administration if participants had any questions about what they had done, how they had found that particular task and if they were happy to continue. Researchers had previously engaged in local prison training regarding safety and responding to risks.

10.4. PARTICIPANT INFORMATION SHEET

Institute of
Psychiatry
at The Maudsley

KING'S College
LONDON
Founded 1829
University of London

(Protocol Number:)

Information Sheet for Participants (Version 3, 28/08/2013)

Title of Study

Impulsivity and addictive behaviours in prisoners

We would like to invite you to participate in this original research study.

We are carrying out a study to better understand the link between impulsivity (when people do things quickly without thinking) and addictions. You should only participate if you want to. Choosing not to take part will not disadvantage you in any way.

Before you decide whether you want to take part, please take time to read the following information carefully. It will explain why the research is being done and what it will involve. Please discuss it with others if you wish before making a decision.

Purpose of the study

The study is trying to find out the reasons why people get addicted to drugs, alcohol and gambling. One reason may be the way people make decisions about things. When people make decisions quickly without thinking, this can be called impulsivity. Impulsivity has been linked to having problems with drugs, alcohol and gambling.

This study is looking at whether there are differences in impulsivity (how people make decisions) between people who use drugs, alcohol or gambling, and people who do not do any of these things.

We hope the findings of our study will help improve treatments for addictions.

Why have I been invited to take part?

We are asking everyone who has been screened by the OASIS in Prison team to take part.

Do I have to take part?

No, it is up to you to decide whether or not to take part.

If you do decide to take part you will be given this information sheet to keep and will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time, without giving a reason. Your decision will not affect the services you receive from the prison.

What will happen if I take part?

- You will be asked to give your consent in writing.
- The researcher will ask your consent to access the health care assessments you completed with the OASIS prison team. This would mean you do not have to repeat questions about your age, background, substance use, and difficulties with other people you may have had in the past. If you have not already had this assessment and you wish to take part in the study the researcher will arrange an appointment for this.
- You will be asked to complete some pen and paper assessments with the researcher. This will include tests and questionnaires about how you make decisions. This will take around 60 minutes to complete, however sometimes it can take longer than 60 minutes. You are free to withdraw from the study at any point over this time, without giving a reason.

If I agree to take part what happens to the information?

All the information we obtain from you and your medical records is confidential. It will be used for the purpose of research only. The information will be used in a way that will not allow you to be identified.

The information will be kept on a computer but your name will not be linked to it in any way.

If you tell us something that makes us worried you may be at risk of harming yourself or someone else we might need to tell other people to make sure you and others are safe. This might mean telling the prison health care team about it. If necessary, we might also talk to the wing officers about it. We will try talk to you about this first.

We will also need to tell the relevant authorities if you tell us something that indicates you may have committed a criminal offence that has not already been dealt with by the courts.

Is there any risk involved in taking part?

We do not expect taking part to pose any risks to you.

Some of the questions do ask about how you make decisions about things, which some people can find difficult or uncomfortable to answer. If you feel this way, you can talk to us about this.

If you feel taking part has harmed you in any way or if you feel you have any further questions, you can tell your personal officer. They will tell us and we will come back and see you.

What will happen to the results of the research study?

The results of the study will help us better understand the causes of addictions and help develop better treatments. Copies of any published results will be available to you on request.

Who is organising and funding the research?

The study is carried out by the Department of Psychology, King's College London Institute of Psychiatry in collaboration with the OASIS in prison team.

Who has reviewed the study?

Before any research goes ahead it has to be checked by a Research Ethics Committee. They make sure that the research is fair. This project has been checked by the _____ Research Ethics Committee.

Contact for further information

Whenever you want to get more information on this study, please contact:

Nathan Kitchenham
DClinPSych Student
Contactable via the OASIS in Prison team

The student's supervisors for this project are:
Dr Vyv Huddy & Lucia Valmaggia
Clinical Psychologists
Contactable via the OASIS in Prison team

Thank you for considering taking part in this study. You will be given a copy of the information sheet to keep.

10.5. PARTICIPANT CONSENT FORM

Impulsivity and addictive behaviours in prisoners **Consent form (Version 2, 07/06/2013)**

Name: _____

ID number: _____

Please initial
boxes



1. I confirm that I have read and understood the attached information sheet and have had the opportunity to ask questions. ☐

OR

- I confirm that I have had the attached information sheet read to me and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I can withdraw from the study at any time without having to give any reason, and without my medical care or legal rights being affected. ☐

3. I consent to my medical records being looked at by a member of the research team. ☐

4. I agree to take part in this research project. ☐

Signature of Participant

Date

Signature of Researcher

Date

10.6. SUBSTANCE USE MEASURE

Current and lifetime substance use

Have you ever used any of the following:

- | | |
|-------------------------|-----|
| Alcohol | [] |
| Cigarettes | [] |
| Cannabis | [] |
| Inhalants | [] |
| Crack | [] |
| Cocaine | [] |
| Opioids | [] |
| Amphetamines/stimulants | [] |
| Sedatives | [] |
| Hallucinogens | [] |
| Other..... | [] |
-

For each substance identified, proceed to relevant section and complete information on current and/or past use

Alcohol

Are you current or past alcohol user? (current = <1 month)

☐ Current ☐ Past

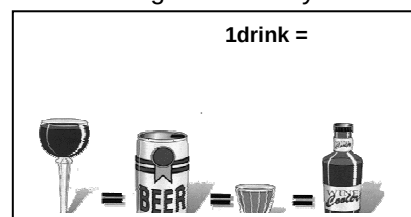
Current use

(i) How often have you drunk alcohol in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical drinking day, how many drinks containing alcohol do you have?

- ☐ None
- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more



(iii) How often do you have five or more drinks on one occasion?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

Past use

(i) How old were you when you first tried alcohol? years old

(ii) When was the last time you drank?

..... days weeks

..... months years

(iii) In the past when you drank alcohol most regularly, how often did you drink?

- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(iv) On a typical drinking day, how many drinks containing alcohol would you have had?

- ☐ None
- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6

- ☐ 7 to 9
- ☐ 10 or more

(v) How often did you have five or more drinks on one occasion?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

Cigarettes

Are you current or past cigarette user? (current = <1 month)

- ☐ Current
- ☐ Past

Current use

(i) How often have you smoked cigarettes in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical using day, how much do you currently smoke?

.....

Lifetime use

(i) How old were you when you first tried cigarettes? years old

(ii) When was the last time you smoked?

..... days

..... weeks

..... months

..... years

(iii) In the past when you smoked cigarettes most regularly, how often did you smoke?

- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(iv) On a typical using day, how much would you have smoked?

.....

Cannabis (e.g. weed, hash, skunk)

Are you current or past cannabis user? (current = <1 month)

☐ Current ☐ Past

Current use

(i) How often have you used cannabis in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical using day, how much do you currently use?

Lifetime use

(i) How old were you when you first tried cannabis? years old

(ii) When was the last time you used?

..... days

..... weeks

..... months

..... years

(iii) In the past when you used cannabis most regularly, how often did you use?

- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(iv) On a typical using day, how much would you have used?

Inhalants, e.g. glue, petrol, gas

Are you current or past inhalant user? (current = <1 month)

☐ Current ☐ Past

Current use

(i) How often have you used inhalants in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical using day, how much do you currently use?

Lifetime use

- (i) How old were you when you first tried inhalants? years old
- (ii) When was the last time you used?
- days
- weeks
- months
- years
- (iii) In the past when you used inhalants most regularly, how often did you use?
- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year
- (iv) On a typical using day, how much would you have used?

Crack

Are you current or past crack user? (current = <1 month)

☐ Current ☐ Past

Current use

- (i) How often have you used crack in the past month?
- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily
- (ii) On a typical using day, how much do you currently use?

Lifetime use

- (i) How old were you when you first tried crack? years old
- (ii) When was the last time you used?
- days
- weeks
- months
- years
- (i) In the past when you used crack most regularly, how often did you use?
- ☐ Everyday

- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(iii) On a typical using day, how much would you have used?

Cocaine

Are you current or past cocaine user? (current = <1 month)

- ☐ Current
- ☐ Past

Current use

(i) How often have you used cocaine in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical using day, how much do you currently use?

Lifetime use

(i) How old were you when you first tried cocaine? years old

(ii) When was the last time you used?

..... days

..... weeks

..... months

..... years

(iii) In the past when you used cocaine most regularly, how often did you use?

- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(iv) On a typical using day, how much would you have used?

Opioids (e.g. heroin, morphine, methadone)

Are you current or past opioid user? (current = <1 month)

☐ Current ☐ Past

Current use

(i) How often have you used opioids in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical using day, how much do you currently use?

Lifetime use

(i) How old were you when you first tried opioids? years old

(ii) When was the last time you used?

..... days

..... weeks

..... months

..... years

(i) In the past when you used opioids most regularly, how often did you use?

- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(i) On a typical using day, how much would you have used?

Amphetamines (e.g. ecstasy, mephadrone, meth-amphetamine)

Are you current or past amphetamine user? (current = <1 month)

☐ Current ☐ Past

Current use

(i) How often have you used amphetamines in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical using day, how much do you currently use?

Lifetime use

- (i) How old were you when you first tried amphetamines? years old
- (ii) When was the last time you used?
- days
- weeks
- months
- years
- (iii) In the past when you used amphetamines/stimulants most regularly, how often did you use?
- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year
- (iv) On a typical using day, how much would you have used?

Sedatives (e.g. valium, sleeping pills)

Are you current or past sedative user? (current = <1 month)

☐ Current ☐ Past

Current use

- (i) How often have you used sedatives in the past month?
- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily
- (ii) On a typical using day, how much do you currently use?

Lifetime use

- (i) How old were you when you first tried sedatives? years old
- (ii) When was the last time you used?
- days
- weeks
- months
- years
- (i) In the past when you used sedatives most regularly, how often did you use?

- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(iii) On a typical using day, how much would you have used?

Hallucinogens (e.g. LSD, mushrooms, PCP)

Are you current or past hallucinogen user? (current = <1 month)

- ☐ Current
- ☐ Past

Current use

(i) How often have you used hallucinogens in the past month?

- ☐ Never in past month
- ☐ Once or twice
- ☐ Weekly
- ☐ Several times a week
- ☐ Daily or almost daily

(ii) On a typical using day, how much do you currently use?

Lifetime use

(i) How old were you when you first tried hallucinogens? years old

(ii) When was the last time you used?

..... days

..... weeks

..... months

..... years

(iii) In the past when you used hallucinogens most regularly, how often did you use?

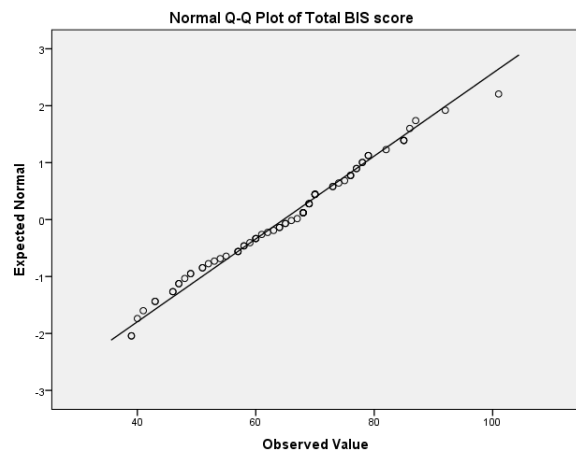
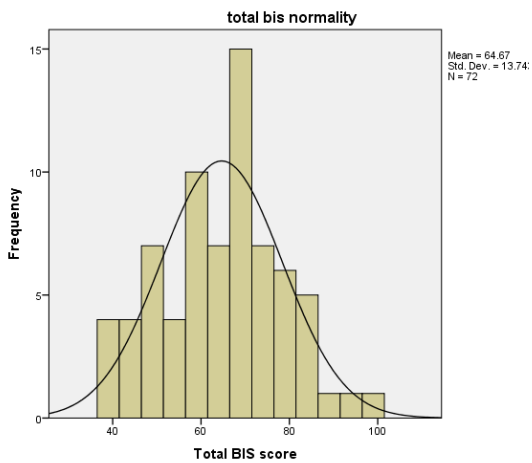
- ☐ Everyday
- ☐ More than once a week
- ☐ About once or twice a month
- ☐ A few times a year
- ☐ Only once or twice a year

(iv) On a typical using day, how much would you have used?

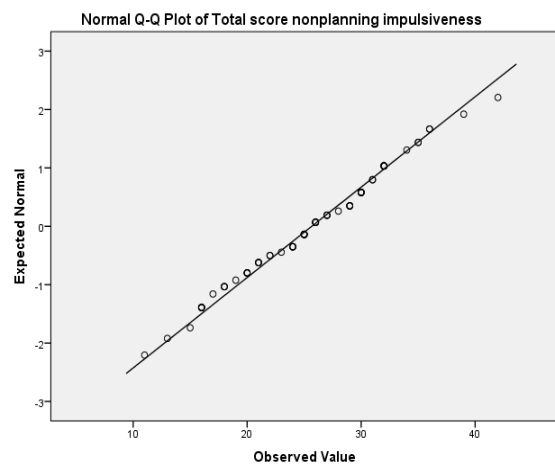
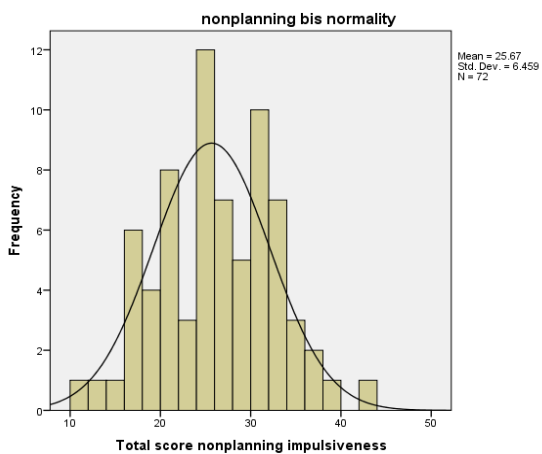
10.7. DISTRIBUTION OF DATA

10.7.1. BIS-11

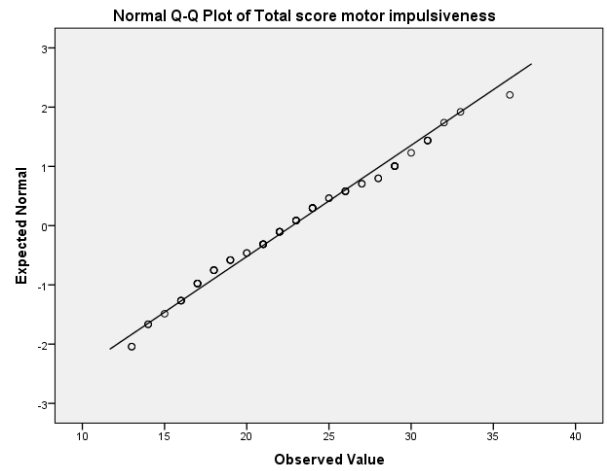
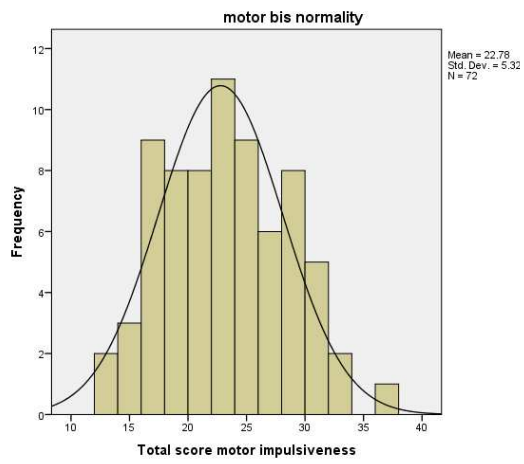
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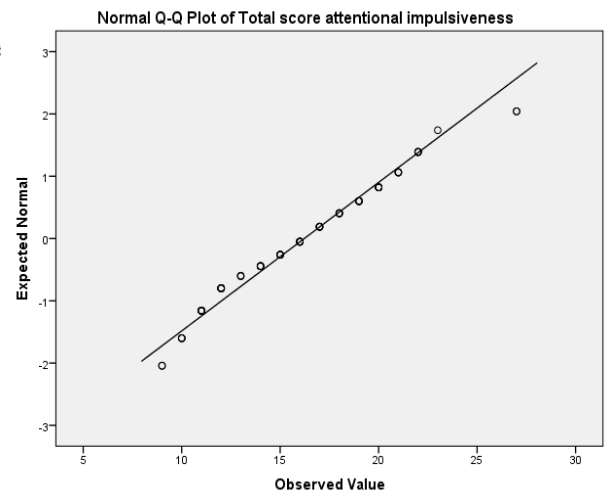
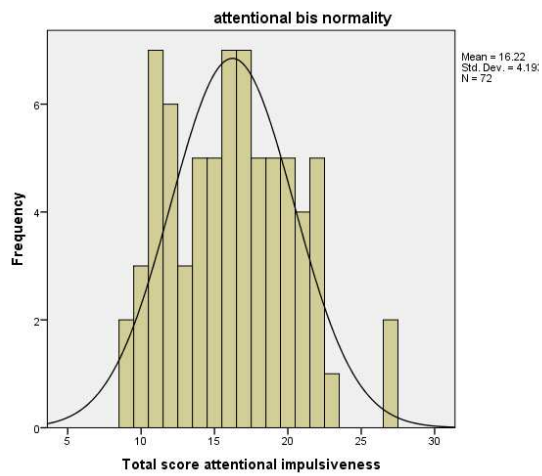
BIS non-planning



BIS motor

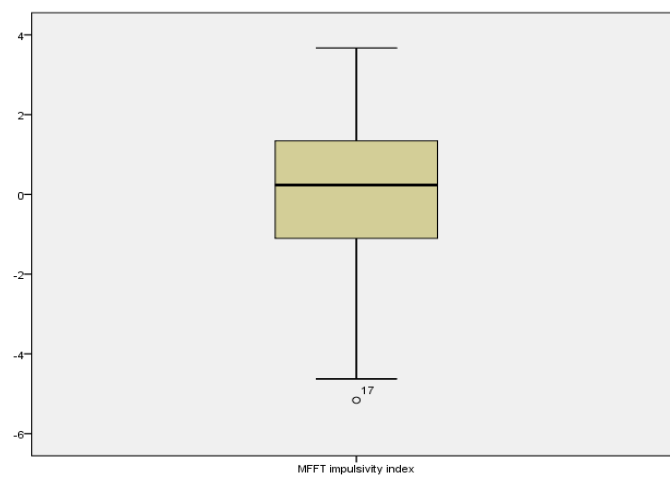
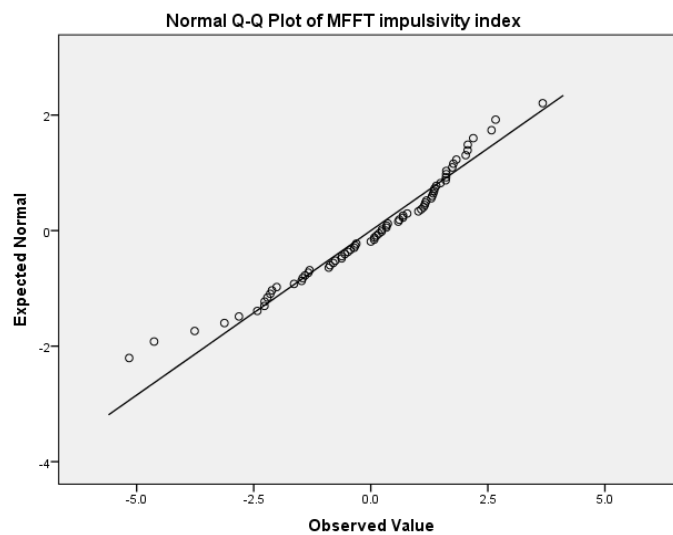
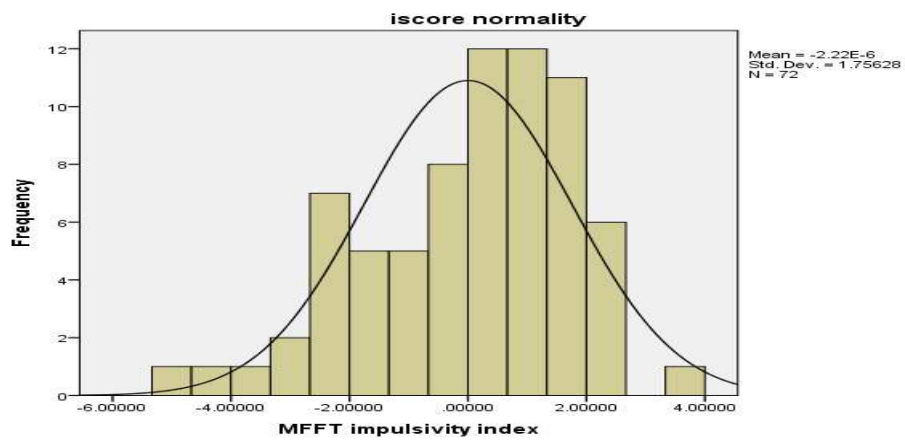


BIS attentional

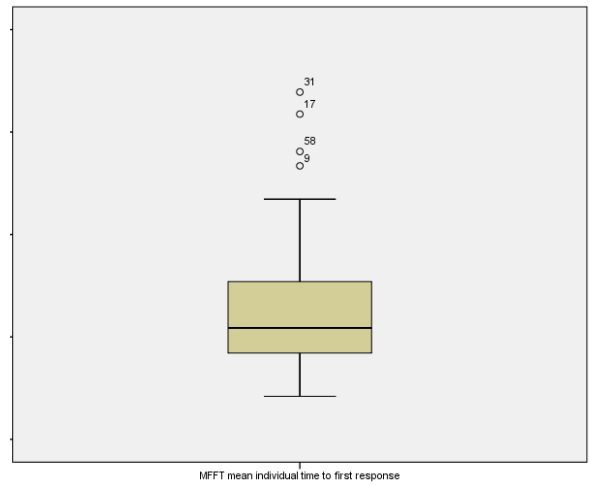
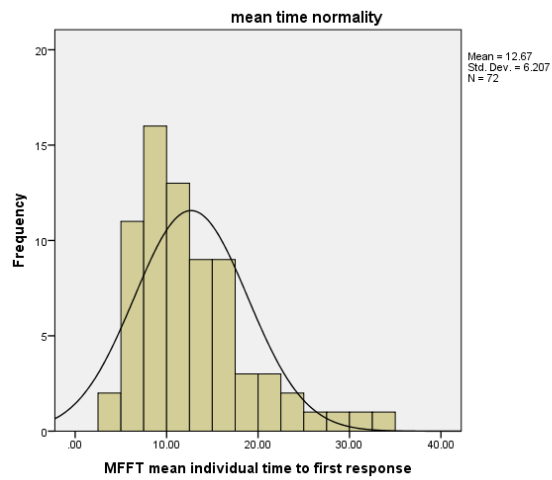


10.7.2. MFFT-20

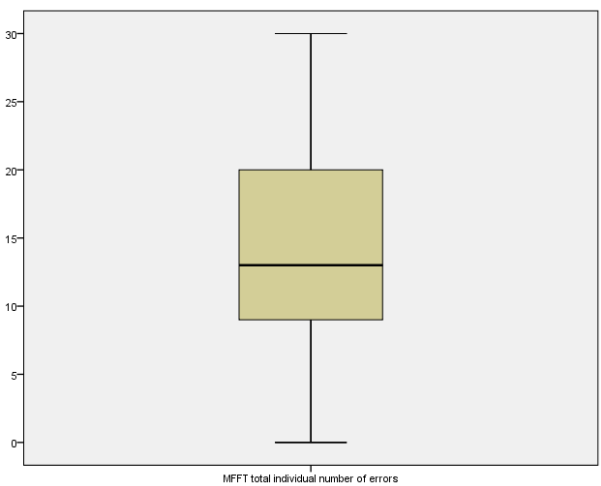
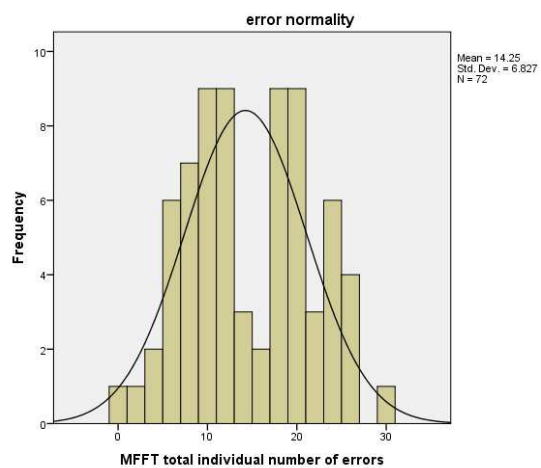
I-score



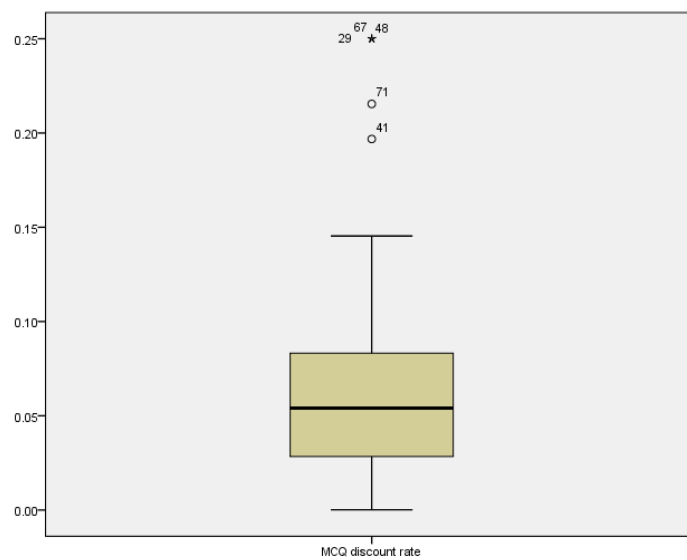
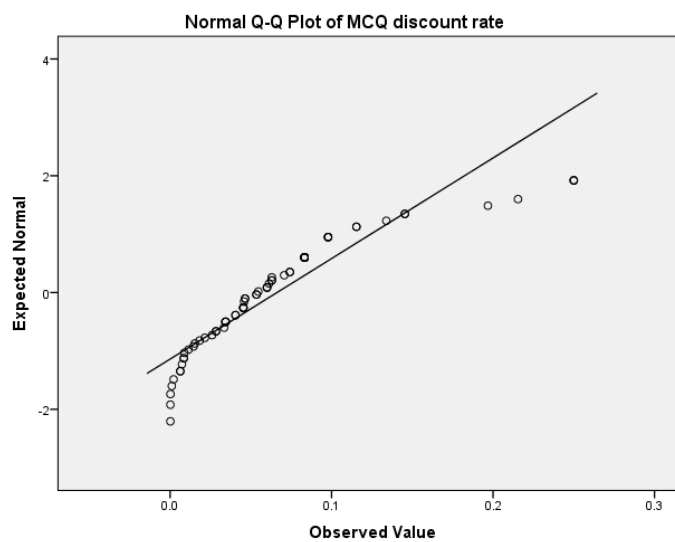
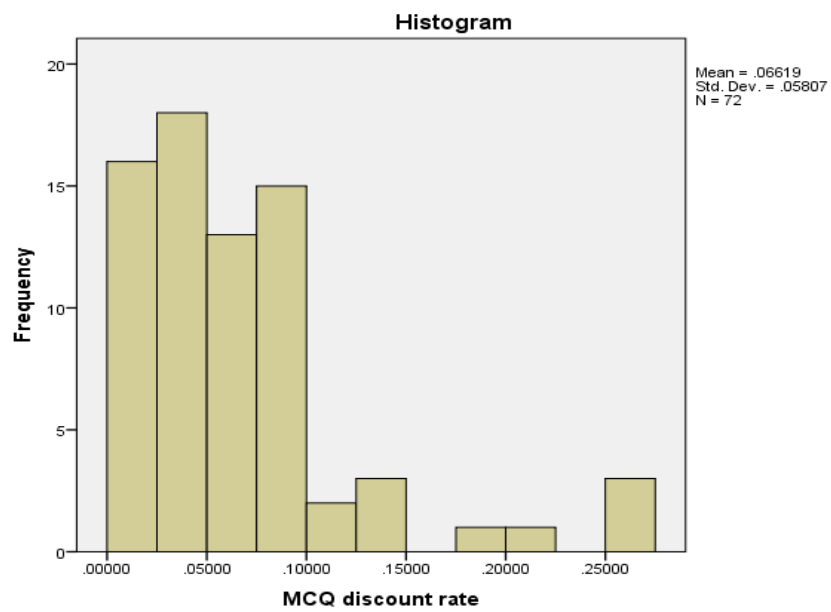
MFFT-20 latencies distribution



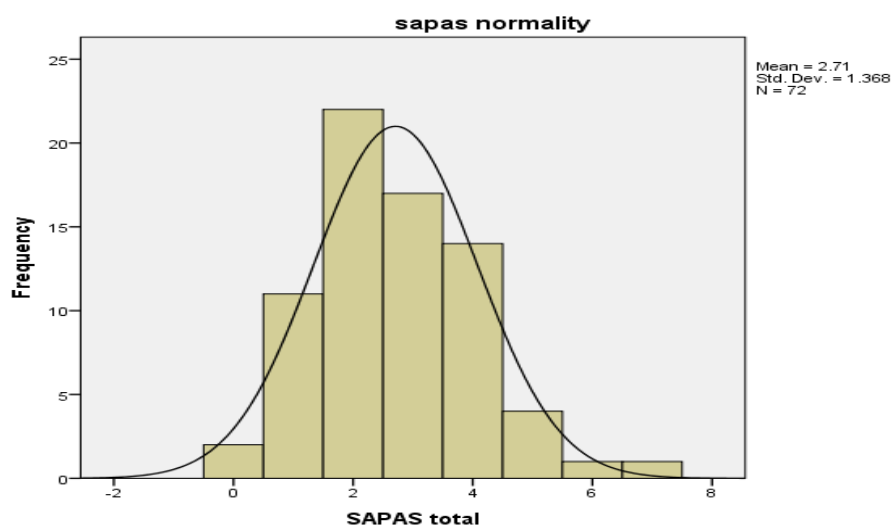
MFFT-20 errors distribution



10.7.3. MCQ



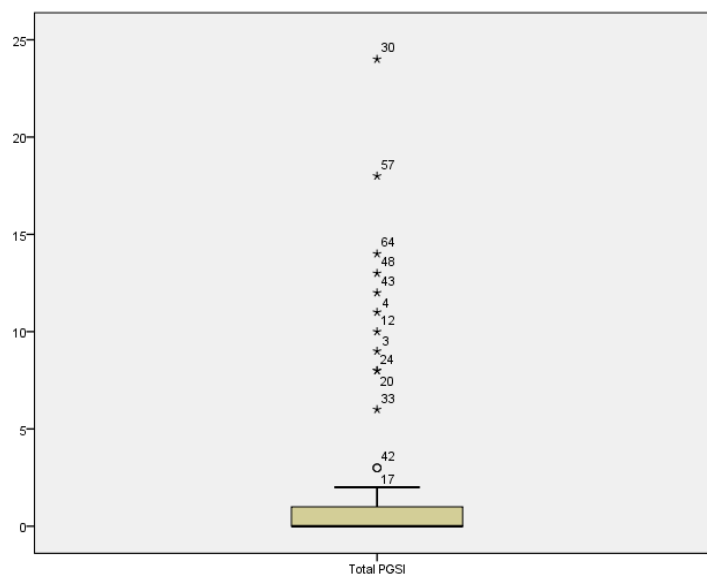
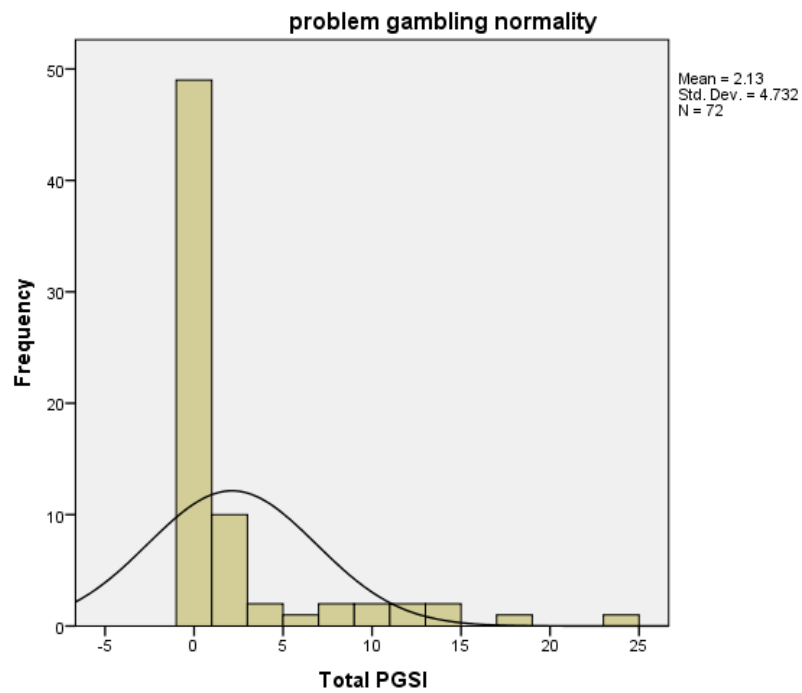
10.7.4. SAPAS



Participant SAPAS responses by items

	% endorsed (n)		% endorsed (n)
Relationship problems	12.5% (9)	Consider self impulsive	37.5% (27)
Consider self loner	12.5% (9)	Worrier	54% (39)
Lack trust in others	60% (43)	Dependant on others	12.5% (9)
Consider self angry	24% (17)	Perfectionistic	58% (42)

10.7.5. PGSI



Service Evaluation Project

**An evaluation of referrer satisfaction with clinical reports
provided by a CAMHS Neuropsychology Clinic**

Supervised by Dr Maxine Sinclair

ABSTRACT

The concept of referrer satisfaction has been given limited consideration in the literature. Whilst initiatives for service-user involvement are common in modern services, less focus is given to how other professionals may experience services provided. The current project aimed to evaluate the level of satisfaction reported by referrers to a neuropsychology clinic within child mental health services. Specific feedback was requested relating to their experience of receiving written correspondence following neuropsychological assessment of young people they had referred to the service. Respondents reported a broadly positive experience, with the majority reporting satisfaction across a range of areas relating to the reports they received. Constructive feedback regarding areas of reports that could be improved is outlined and the implications this may have for the provision of neuropsychology reports within the service are discussed.

TABLE OF CONTENTS

1. INTRODUCTION.....	178
1.1. DEVELOPMENTAL NEUROPSYCHIATRY AND NEUROPSYCHOLOGY SERVICE.....	178
1.2. NEUROPSYCHOLOGY CLINIC.....	178
1.3. REFERRER SATISFACTION.....	179
2. AIMS/OBJECTIVES.....	183
3. METHOD	185
3.1. PARTICIPANTS	185
3.2. MEASURES.....	186
3.2.1. Referrer Satisfaction Survey.....	186
3.3. PROCEDURE.....	187
4. RESULTS.....	188
4.1. OVERALL SATISFACTION.....	188
4.2. LENGTH.....	188
4.3. STYLE, STRUCTURE AND FORMAT.....	189
4.4. HELPFULNESS, QUALITY AND PROFESSIONALISM.....	190
4.5. TIMING.....	191
4.6. RECOMMENDATIONS.....	192
4.7. IMPROVEMENTS.....	192
4.8. FINAL COMMENTS.....	193
5. DISCUSSION.....	195
6. LIMITATIONS.....	201
7. CONCLUSION.....	203
8. REFERENCES.....	205

9. APPENDICES.....	209
9.1. EXAMPLE REFERRER SATISFACTION SURVEY.....	209
9.2. EXAMPLE COVERING LETTER.....	214

LIST OF FIGURES

Figure 1 Professional grouping and service line of responding referrers.....	185
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LIST OF GRAPHS

Graph 1 Overall satisfaction with reports.....	188
Graph 2 Satisfaction with report length.....	189
Graph 3 Problems with report length.....	189
Graph 4 Satisfaction with style/format.....	190
Graph 5 Preference for collaborative assessment reports.....	190
Graph 6 Helpfulness	191
Graph 7 Report quality and professionalism.....	191
Graph 8 Satisfaction with timing to receive reports.....	191
Graph 9 Helpfulness of recommendations.....	192
Graph 10 Potential areas for change/improvements.....	193

1. Introduction

1.1. Developmental Neuropsychiatry and Neuropsychology Service

The National & Specialist Child and Adolescent Mental Health Service (N&S CAMHS) Developmental Neuropsychiatry and Neuropsychology Service (DNN) provide outpatient assessment and intervention for children and young people up to 18 years of age. The DNN operates a broad Tier 4 service for young people with known or suspected neurodevelopmental and medical disorders, and additional psychiatric or behavioural problems. Referrals are forwarded on to relevant clinics within the DNN, whose particular expertise would be appropriate for the referral. These include services specialising in acquired brain injury, autism and related disorders, behavioural phenotypes, challenging behaviour, learning disability, and neuropsychiatric and neuropsychological conditions.

1.2. Neuropsychology Clinic

The N&S CAMHS Neuropsychology Clinic sits within the DNN and offers specialist neuropsychological assessment and treatment for a range of difficulties, including the neurodevelopmental conditions of attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder, and conditions associated with acquired brain injury, physical and intellectual disability and genetic syndromes. The service provides neuropsychological input for other N&S CAMHS clinics, particularly the neuropsychiatry and forensic clinics with whom collaborative assessments often take place. Referrals to neuropsychology are typically accepted from a range of clinical groups, including general practitioners (GPs), pediatricians, consultant psychiatrists and other mental health professionals, including psychologists, social workers and nurses. Solicitors for these referrals are generally requested from local services.

Typically young people referred and accepted to the service undertake a comprehensive assessment during their initial session. This process includes taking a detailed history of the presenting problems and development, inclusive of information obtained through health documents and school reports. Additionally frequent use of a wide ranging selection of neuropsychological test batteries and standardised methods of assessment are necessary, following which detailed description of the findings from these assessments is outlined in written clinical

reports. Reports are then typically fed back to the young person, their family, the referrer and associated services. The process of providing written feedback is particularly important, not only in the provision of feedback to young people and their carers around the difficulties they may be experiencing and appropriate interventions available, but also to ensure adequate communication between services as to the young person's ongoing care. Clinical reports often act as a bridge for the transition of the young person's care back to the referrer, who in the majority of cases will be asked to coordinate any intervention for the needs identified through liaison with local services, including mental health services and relevant professionals in education.

Frequently referrals are prompted by concerns of relevant professionals or members of family as to the impact the young person's difficulties may be having on their functioning, for instance in education or in social and family life. Questions of prognosis may need answering and issues around the young persons' potential for future independence and need for ongoing support may need to be resolved. There may be disagreement as to the young person's suspected difficulties or a request for a second opinion on an earlier assessment. In many cases there is a long standing lack of clarity regarding the precise nature of the young person's presentation, to which the assessment aims to resolve. To this end the objective of clinical reports is often to articulate a detailed understanding of the young person's needs from a neuropsychological perspective, the relevance of their established difficulties to the presenting concerns of the referrer and/or carers, and the available options for providing ongoing support for the young person's needs in a variety of contexts. Recommendations regarding appropriate interventions form a significant part of the reports provided and it is important for these reports to provide an accurate reflection of the young person's circumstances and potential for the future.

1.3. Referrer satisfaction

One means of understanding the extent to which clinical reports are achieving their objective is to ask the recipients of these reports for feedback. The views of service users in particular and the promotion of service user involvement in mental health services have been a long established aim of healthcare providers (Williams, 1994; Department of Health, 2004a; Hogg, 2007). Much research has been undertaken in

the area of client satisfaction with services, from the perspective of service users themselves (Larsen et al, 1979; Jenkinson et al, 2002; Blenkiron & Hammill, 2003) and their carers (Denning & Lawton, 1998; Barber et al, 2006; Bodin et al, 2007), however less of a focus has been placed on the experience of referring professionals who also experience the services provided. As an example, a literature search for 'referrer satisfaction' yielded only 45 results compared with the hundreds and thousands of results for 'carer satisfaction' and 'patient satisfaction', respectively.

The concept of referrer satisfaction has been given limited consideration in terms of evaluating both general levels of satisfaction with services (e.g. Graham et al, 1992; Dagnan et al, 1993; Eyers et al, 1994) and more specific appraisals of different aspects of service delivery (e.g. Parker et al, 1996; Bjertnaes et al, 2008). A common conclusion drawn from these studies is the importance of evaluating referrer satisfaction in improving the interaction between different services. A qualitative study undertaken by Speissl et al (2001) reported on the expectations of referrers to psychiatric hospitals, to ascertain which aspects of service delivery were considered to be most important. Of note over half of respondents included comments about the need for efficient communication between the local service and hospital around patient needs, with conclusions from the study highlighting the use of understanding referrer expectations of a service to reduce problems in the continuity of patient care. Similar conclusions were drawn from a later report (Lewis et al, 2004) highlighting expectations of referrers to frequently be around diagnosis and treatment advice, in addition to issues of communication for ongoing care. Referrers are likely to differ in terms of their hopes for the referral and the service, and expectations may not always be realistic in terms of the scope of services that can be provided. However an improved awareness of what the spectrum of expectations may include would be beneficial in working towards a valued outcome.

An additional consideration to the expectations of referrers is the previous experience of a service had by the referrer. This could relate to personal experiences, for example in terms of the helpfulness of staff in responding to referral queries, measurable aspects of service delivery, such as response and waiting times, and feedback around what was clinically provided, including the content of reports, letters and clinical advice. Previous research examining this further has found utility

in evaluating referrer satisfaction when making changes to procedures for service provision, including obtaining feedback as to the accessibility and clarity of reports and treatment recommendations (e.g. Lewis et al, 2004) and using feedback to make formalised changes to written correspondence and the way information about the service is provided to referrers (e.g. Witts & Gibson, 1997).

Likewise the importance of feedback has been demonstrated with regards to understanding the potential concerns referrers may have when approaching a service, particularly if based on earlier unsatisfied experiences. As an example, Allison et al (2008) reported on the concerns of referrers working in education about the perceived waiting times and flexibility of mental health services, forming the basis for improvements in clinical practice across regional CAMHS teams to increase the likelihood of referrals being made. Again these findings highlight the need for broad awareness, with particular regard to any discontent with services previously provided in order for appropriate adjustments to be made. Conversely positive feedback can also be used to gain a better understanding of which aspects of a service are functioning well. A recent report has highlighted this further in obtaining feedback about aspects of a CAMHS neuropsychology service found to be beneficial in the assessment of young people (Allott et al, 2011), contributing to calls for inclusion of neuropsychology into routine mental health service provision. The evaluation of referrer satisfaction is therefore vital in understanding not only which aspects of a service may be of concern and need improving, but also which aspects should be preserved and considered an integral part of the services offered.

The opinions of other professionals also holds potential to be used constructively in the planning of services, for example in terms of decisions about the assessment tools and therapeutic interventions that may be offered by a service. Considering drives for innovation and new developments within the field of clinical psychology, feedback as to the usefulness and helpfulness of different approaches to clinical work can be valuable. Referrer satisfaction in this context has been investigated, for instance in terms of obtaining views about the implementation of telephone-consultation services to assess and recommend treatment for mental health patients (Clarke, 1997) and the development of novel computer-guided cognitive behavioural therapy interventions (Macgregor et al, 2009). Feedback obtained in these studies

has been able to inform on the likelihood of new approaches being taken up by referring services and whether the advice and support provided to referrers has been adequate in enabling them a proper understanding of the services on offer. Given the complexity and increasingly specialised nature of the work undertaken by some services, such evaluations can be an important step in improving the communication between different professionals about the nature of care being offered to service users. Neuropsychological services provide one example of the specialist nature of work undertaken, often requiring use of a range of intricate and detailed assessment procedures in working with complex presentations, with information obtained from assessment typically shared with those involved in an individual's care (Jurado & Pueyo, 2012). In the same way that consideration has been given to how information is provided to users of these services (e.g. Tharinger & Pilgrim, 2012), the importance of communication between services, and feedback as to the accessibility and usefulness of information given to relevant professionals, should not be understated.

An audit of referrer satisfaction could be considered a contributory measure towards meeting standards set by the Care Quality Commission (CQC), including steps towards ensuring proper care and welfare of those who use services, through effective cooperation with other providers. Such standards stipulate the need for thorough personalised and coordinated assessment of the needs of service users and the planning and delivery of care to meet these needs, including through appropriate sharing of information. Achievement of these goals is likely to be increased with effective communication between different services and a request for the feedback of referring services is one means of enhancing such communication. Similarly requests for comments and feedback from other services about their experiences can contribute towards the continual assessment and monitoring of service quality, following which any concerns identified can be addressed.

2. Aims/Objectives

The current project aims to evaluate levels of referrer satisfaction with written clinical reports provided by the N&S CAMHS Neuropsychology Clinic. This includes an evaluation of overall levels of satisfaction with reports and more specific appraisals of different aspects of the reports, for example in terms of their length, format and content. The service aims to use feedback obtained to identify aspects of the reports and service provision that need improving, amending or continuing to the eventual benefit of the young people involved. Referrer satisfaction has not been formally investigated within the service and reasons for undertaking the project are numerous.

Of particular importance is the objective of building and maintaining stronger working relationships with referring services, to whom reports are sent and the care of young people often handed back to. Receiving feedback as to their experience of reports will work to enhance communication between different professionals regarding the ongoing care of the young people referred. Key to this is ensuring reports are of relevance to the individual concerned and asking for feedback as to whether reports have been effective at accurately describing their needs as identified during assessment. Consideration will also be given to how accessible referrers have found the reports, in light of the specialist nature of work undertaken by the service and the detail often required to properly describe outcomes of frequently complex clinical assessments.

A related objective is providing referrers with an opportunity to voice any preferences they would have for future reports, in consideration of their role in the young persons' care following their assessment, as they may have ideas for ways in which the reports could be provided that would be of most help to both themselves and their service users. This evaluation will include feedback about specific aspects of the reports which referrers have found both helpful and unhelpful, for instance with regard to recommendations provided about intervention, in addition to more measurable aspects of service delivery, including satisfaction with the length of time it took to receive a report following a referral being made. Feedback in these areas will help highlight areas for improvement in service quality and the efficiency with

which reports are provided, in addition to providing an understanding of referrers' expectations for reports, which the service can aim to meet and manage.

3. Method

3.1. Participants

Participants were identified by examining the referral history of the N&S CAMHS Neuropsychology Clinic. Inclusion criteria was for those who had referred to the DNN within one year of the current project starting, which had required the involvement of neuropsychology to undertake an assessment. These were between July 2011 and 2012. In total 66 referrals were identified as eligible for the study. At the time of recruitment, 23 individuals referred were identified as having yet to complete assessment or for whom reports had yet to be sent out. An additional one individual had been discharged from the service prior to assessment taking place. As such 42 (63.6%) individuals were identified as having both a complete assessment and written clinical report, which had been fed back to the referrer. This latter group was therefore identified as an appropriate sample for the project.

Of this group eleven referrers responded to an invitation to take part in the study, reflecting a modest response rate of around 26%, much lower than response rate estimates from reviews of previous studies undertaking survey research with healthcare professionals, including psychologists (e.g. Cook et al, 2009 – 57.5%). Responders were given the opportunity to remain anonymous, of which all remained. They were instead asked to provide information relating to their professional group and the type of service they work in. Respondents came from across the spectrum of healthcare professions and worked within both child and more general healthcare services. This information is summarised below in Table 1.

Profession	Total	Service Line	Total
Psychologist	3	CAMHS	7
GP	2	Primary Care	2
Psychiatrist	3	General Hospital	1
Nurse	1	Not provided	1
Paediatrician	1		
Not provided	1		

Figure 1. Professional grouping and service line of responding referrers

3.2. Measures

3.2.1. Referrer Satisfaction Survey

The Referrer Satisfaction Survey is a novel measure designed and used to assess levels of satisfaction with written clinical reports provided by the Neuropsychology clinic. A review of the literature failed to yield any validated measures for assessing referrer satisfaction and given the aims of the current study, the survey developed did make specific reference to areas of the reports the team had an interest in receiving feedback on, to the benefit of the work they undertake. Items for inclusion were therefore decided on through discussion with members of the team. A version of a client satisfaction survey developed within the service for a previous audit was adapted for use in this study, inclusive of the items agreed upon by the team.

The Referrer Satisfaction Survey is an 11-item questionnaire (see Appendix 9.1), comprising of questions about both general levels of satisfaction with reports and satisfaction with specific aspects of reports. One question relates to general satisfaction, where respondents are asked to provide a tick-box response to one of four possible answers (i.e. Very satisfied; Quite satisfied; Slightly dissatisfied; Very dissatisfied).

Seven questions then relate to level of satisfaction with or opinion of specific aspects of the reports, including (i) length, (ii) style, structure and format, (iii) quality and professionalism, (iv) helpfulness of content, (v) time taken to receive the report and (vi) usefulness of recommendations. Each question again requires respondents to provide a tick-box response to a set of possible answers. Respondents are also asked for qualitative feedback for each question in an adjoining box. A ninth question then asks respondents to summarise which aspects of the reports they feel could benefit from change and improvement.

An additional question relates only to referrals requiring collaborative assessment by neuropsychology and medical colleagues from other N&S CAMHS clinics, such as neuropsychiatry. Respondents for whom this is relevant are asked for feedback on receiving separate reports from clinical psychologists and psychiatrists, as is the practice currently undertaken between services (i.e. as to whether this is preferable to

the option of receiving a combined report). Given that not all referrals require collaborative assessment, meaning not all referrers will receive two separate reports, this is taken into account in the answer scheme provided (i.e. including a non-applicable (N/A) option for referrers who only receive one report, that from neuropsychology).

As discussed the questions posed within the survey largely reflect areas where professionals working in the Neuropsychology clinic have an interest in receiving feedback on. The aim of this feedback is both to help identify aspects of the reports which may benefit from improvement in the opinion of referrers and also those areas which are valued and felt to be useful. To this end one final question invites respondents to provide more detailed qualitative feedback about their general experience of the reports provided by the service (i.e. Do you have any final comments to make regarding your experience of the clinical report(s) you received from our service?).

3.3. Procedure

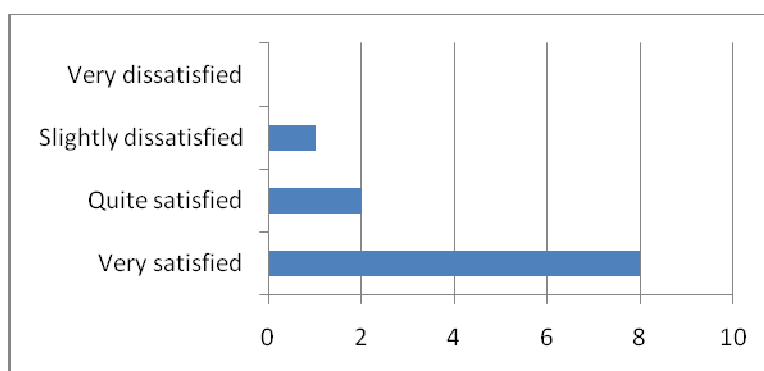
Questionnaires were posted to referrers with a covering letter (Appendix 9.2) explaining the purpose of the project and with reference to the young person they had referred. Involvement in the study was voluntary and no incentives were provided for participation. Participants were asked to fill in the questionnaire with reference to the report they had received and to return completed forms to the Neuropsychology clinic. Responses were returned in all cases by either post or fax. Participants were given assurances that their responses would be treated as confidential and anonymous, with the exception of requesting information around profession and service line. All respondents kept their anonymity and all but one provided the requested information. Responses were recorded for analysis on an electronic database in Microsoft Excel, whilst hard copies were filed and stored in a locked cabinet.

4. Results

All participants responded to one question relating to their overall satisfaction and a number of questions relating to their satisfaction with specific aspects of the clinical reports they received. Graphical illustrations of the results for each area are outlined below.

4.1. Overall satisfaction

All but one of respondents rated themselves to have been very or quite satisfied with reports, as illustrated in Graph 1. Such responses reflect a generally positive overall experience of the services received, with one individual providing additional comment as to “extremely thorough” nature of their report. One further respondent rated themselves as overall slightly dissatisfied, commenting on their belief that the content of the report “failed to consider all possible contributors to the child’s presentation”, which they felt could have had an impact on the diagnosis given following assessment. This one respondent was responsible for the majority of negative feedback received.

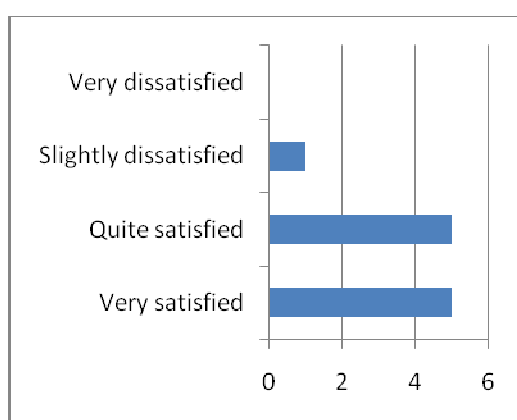


Graph 1. Overall satisfaction with reports

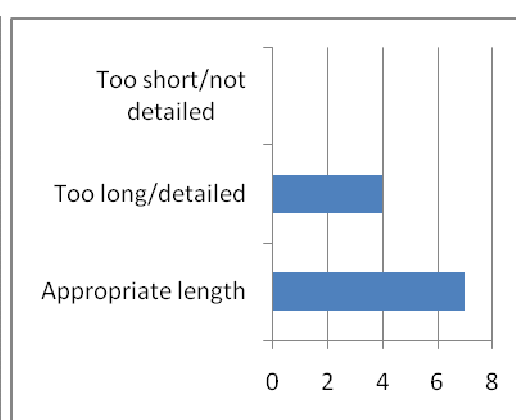
4.2. Length

Responses to two questions provided a measure of both respondents’ general level of satisfaction with and more specific feedback as to the length of reports they received. As seen in Graph 2 the majority of individuals again rated themselves to have been very or quite satisfied with this aspect of their report, though detailed feedback was provided by four of these respondents reflecting a view that reports written are “very long” and came with “a lot of information to process”. These views were couched by additional comments expressing an expectation that reports “have to be” of such

length and whilst appreciated may benefit from the inclusion of summaries alongside the detail (e.g. “a summarising final paragraph would have been helpful, summarising was mid-document and hard to get to”). To this end as illustrated in Graph 3 not all individuals commenting on reports being very long identified this to be a problem, with the majority of respondents rating reports to be of appropriate length and in one case comments about the detail of a report corresponded to a response of being very satisfied. One respondent did however comment on the report being “too lengthy” and rated themselves as slightly dissatisfied. No respondents expressed a belief that reports were too short or lacking in detail.



Graph 2. Satisfaction with report length



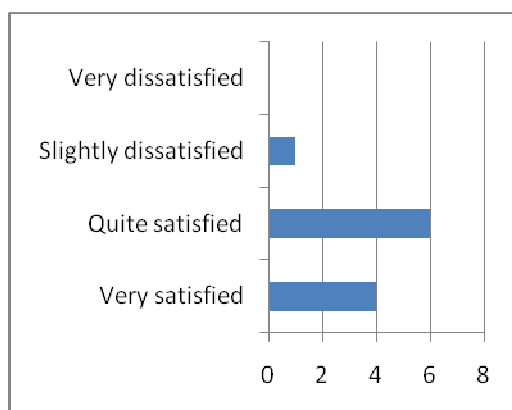
Graph 3. Problems with report length

4.3. Style, structure and format

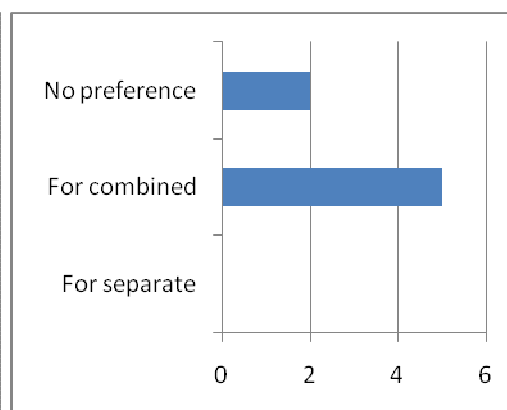
Responses to two questions were analysed in relation to feedback about the style, structure and format of reports. Graph 4 provides feedback regarding the style and format with which reports are written and again shows nearly all respondents to rate themselves as quite or very satisfied with this aspect of the report, though no additional comments were received. One rating of slightly dissatisfied was also received but again no comments to elaborate on this view were expressed.

An additional question asking for feedback on the structure of collaborative assessment reports was relevant for only seven of the eleven respondents, in cases where neuropsychology undertook a joint assessment with medical colleagues. Among these respondents, as detailed in Graph 5, five expressed preference for a combined psychology and medical assessment report to none in favour of the separate reports currently utilised within the service, though no additional comments

were provided as to why a combined report would be favoured. One respondent commented that “in this case separate reports were unhelpful”, but again provided no elaboration. Two further individuals expressed no particular preference regarding collaborative assessment reports and no additional comments with the exception of one statement of “no preference”.



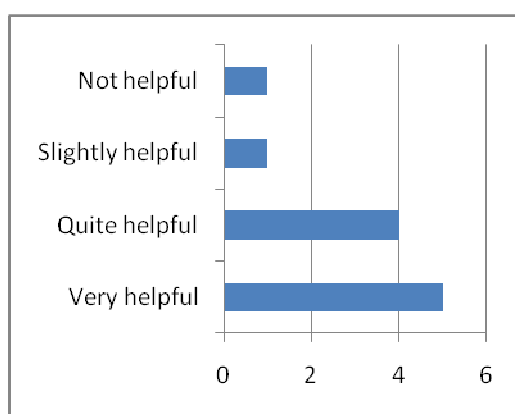
Graph 4. Satisfaction with style/format



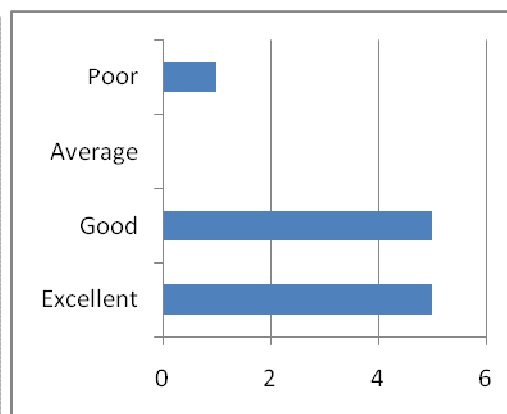
Graph 5. Preference for collaborative assessment reports

4.4. Helpfulness, quality and professionalism

Two questions assessed for feedback as to the quality of reports, both in terms of the perceived level of quality and professionalism with which reports were written and in terms of how well reports helped respondents to understand the needs of the young person they had referred. Graph 6 highlights how the large majority of respondents rated reports as being quite and very helpful in understanding the young person’s needs. An additional individual rated their report as being slightly helpful, though in no cases were additional comments provided to explain specific ways in which reports had been helpful. One further respondent rated their report as not being helpful in clarifying the young person’s needs, commenting that they had found the report “misleading” and held a different opinion clinically to the diagnosis that had been given. Similarly the same respondent rated the overall quality of their report to have been poor, commenting that they felt “vital information was missing” despite the report being “thorough in some areas”. However it should also be noted that the remaining ten respondents rated the quality and professionalism of reports to be good or excellent, in one case commenting on the “accurate and detailed” nature of the report received.



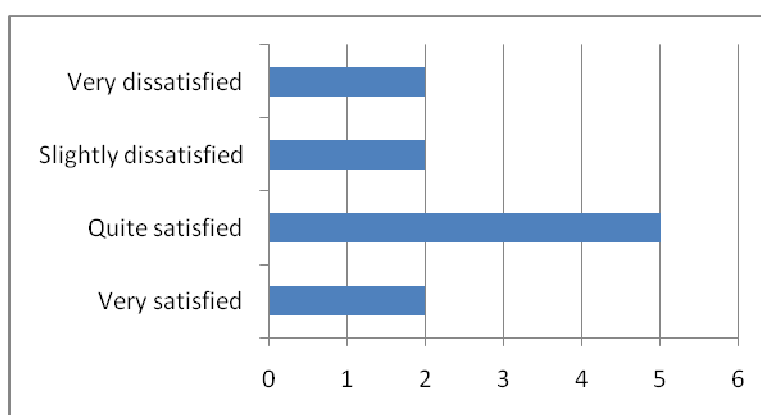
Graph 6. Helpfulness



Graph 7. Report quality and professionalism

4.5. Timing

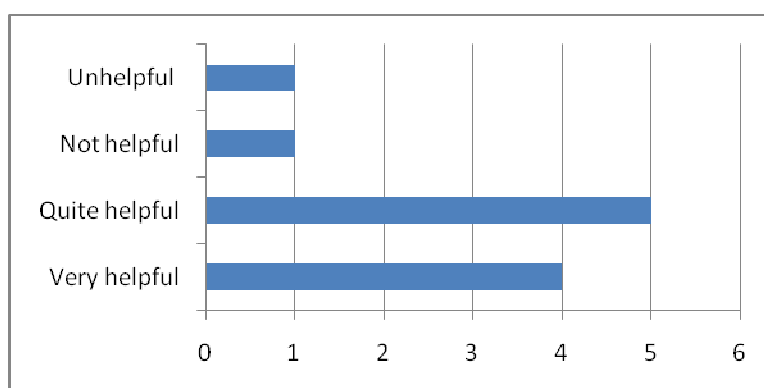
Responses to one question asking for feedback as to the time taken to receive a report provided more variance in levels of satisfaction. Whilst the majority of respondents again rated themselves as quite or very satisfied with procedures, 36% rated themselves as slightly or very dissatisfied, as detailed in Graph 8. Additional comments made by this latter group highlighted issues around the delay between the young person's referral being made and a final report being completed, for instance with a delay of 5 months being considered unsatisfactory in one case and another respondent referencing frequent "missed deadlines". One further case commented on the "delay between referral and child seen", though still rated themselves as quite satisfied with the report received, whilst another questioned whether the involvement of different disciplines in their assessment could explain why "it can take a while for reports to come through".



Graph 8. Satisfaction with timing to receive reports

4.6. Recommendations

The helpfulness of recommendations provided formed the basis of feedback for one question, with respondents again varying in their experience of reports as detailed in Graph 9. Over 80% of individuals found the reports to be either quite or very helpful in planning the young person’s ongoing care, though for two cases respondents highlighted the “lack of local resources” and limitations in local service provision in additional comments, perhaps demonstrating the difficulties in implementing recommendations in practice. Another respondent felt the report was very helpful, though may have benefitted from additional information as to “who will be doing which element” of the recommendations. Similarly two other cases raised in their comments the limitations of the recommendations they received, either through a lack of clarity as to how they should be used (“really was not sure what was required of me as a GP”) or in terms of them not being specific enough to the case they were working with (“the recommendations were of some use in a generic way, i.e. any children would benefit as the recommendations were transdiagnostic”). Responses in these cases rated recommendations as being not helpful and unhelpful, respectively.

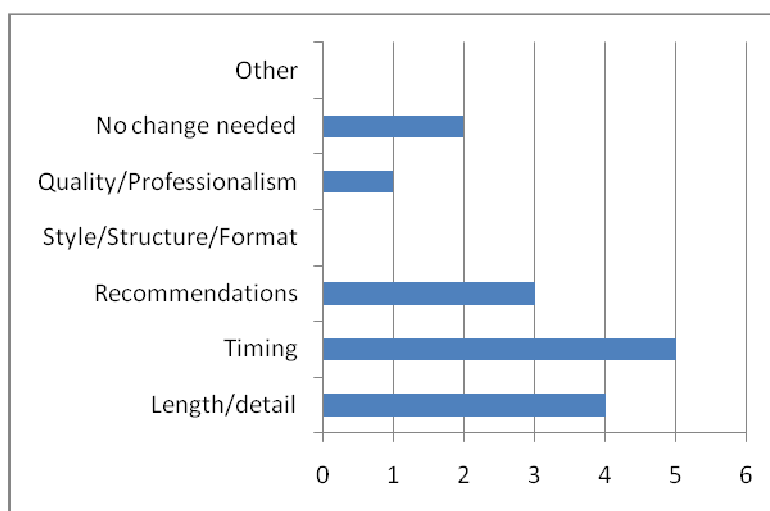


Graph 9. Helpfulness of recommendations

4.7. Improvements

The penultimate question provided respondents with the opportunity to summarise areas of the reports that may benefit from change or improvement, with respondents varying from feedback stating that no changes are currently needed up to the identification of four areas for improvement. Results are illustrated in Graph 10. Areas for improvement identified in this question appeared consistent with the constructive feedback received in questions relating to each specific area examined in the survey. Half of respondents highlighted the issue of timing as needing to be

addressed, representing the most popular area for change, whilst 36% of respondents felt the length and detail within reports could be reviewed and 27% selected recommendations as in need of improvement. Additional comments were consistent with views expressed earlier in the survey, for instance providing feedback that report length is fine with the exception of requesting “a summary to go with the detail” and that reports should “bear in mind local service provision” more when making recommendations. One further respondent highlighted the area of quality and professionalism as in need of improvement, though provided no further comments. This may relate to views expressed in an earlier question (see Graph 7) and was consistent with their feedback throughout, which comprised the majority of negative feedback received in this study.



Graph 10. Potential areas for change/improvements

4.8. Final comments

The last section of the survey collected any final comments respondents wanted to make regarding their general experience of reports. Additional feedback was received in six of the eleven cases. Comments from two respondents could be considered to reflect one theme that their reports succeeded in providing a thorough overview of the assessments undertaken with the young people referred (“Thank you very much for such a thorough and carefully thought out assessment”; “Very thorough reports and prompt assessments. Puts adult services to shame, in all honesty.”). Given the primary aim of assessment being to identify the needs of the young person referred, and that of reports being to effectively articulate these needs

to those involved in their care, it is helpful to know that in such cases these aims are considered to have been achieved through the detail provided.

Comments from one further respondent represent a related theme of constructive feedback for improving reports further (“The detail was fascinating but as a GP with 30-50 letters to read a day a summary paragraph is essential to ensure we understand the salient points”). These comments are congruent with feedback made in earlier parts of the survey, suggesting a summary of the most important information identified during assessment may help referrers to digest the detail provided in reports, which overall is considered to be useful. Given the specialist nature of the service and the need for often complex assessments, suggestions as to the most helpful way for information to be communicated to referrers is valuable in helping them to make best use of reports in planning the ongoing care of the young people they refer.

Comments from another three respondents could be considered to comprise one final theme reflecting on the use of reports within the context of the wider system around the young person (“Really a very helpful process/report, which informed the next steps with this family, who have some complex needs. Thank you!”; “Generally very helpful and for other members of the team e.g. neurologist who also get to review the patient”; “Had the psychologist made contact to certain professionals within our service fruitful information would have been gained, leading to a richer and more valid outcome.”). These comments help to consider reports in the context of both the family system surrounding the child, who may often need to be considered and included in interventions undertaken with the young person, and to the multi-disciplinary professional network involved in the young person’s care, where effective communication is essential in achieving a collective understanding of their needs and agreement as to the next steps that need to be taken in providing for their needs. Comments regarding the wider professional system can also be considered in light of earlier feedback in the survey, particularly relating to the need to be mindful of the resources available to local services in making recommendations, given the constraints they may be under as part of another system, the wider healthcare system.

5. Discussion

The current project aimed to evaluate the level of satisfaction reported by referrers to the N&S CAMHS Neuropsychology Clinic regarding written clinical assessment reports they received following their referral of a young person. Feedback from respondents reflected a broadly positive experience of the reports they received, with the majority reporting overall satisfaction in addition to satisfaction with various specific aspects of the reports. These included their length, style and format, quality, professionalism and helpfulness of content, time taken to be received and recommendations.

An important objective of the project was to receive feedback on whether reports are accurately describing the outcome of often complex assessments young people undertake, both to enhance communication and ensure effective working relationships with other professionals involved in their care. The feedback communicated in these surveys has been useful in evaluating the extent to which reports are fostering a mutual understanding between professionals, for instance in terms of an accurate and shared understanding of the young person's needs and the steps that need to be taken to ensure these needs are met. In most cases this understanding appears to have been achieved, with positive responses and additional comments from the majority of respondents a testament to this. In the case of feedback from one respondent, there appears to have been a less positive outcome regarding the report provided and it would be important to follow this up to clarify the issues highlighted, including differing opinion on formulation and diagnosis of the young person's difficulties, to the benefit of the young person, the team around them and any potential future referrals from that service.

One means of addressing the points raised could be to ensure with referrers just prior to an assessment taking place that all relevant documentation to be considered in the young person's case has been provided. This is not to say that a different clinical opinion to the referrer would not still be provided following assessment. However this may ensure that any opinion provided would be definitively inclusive of any and all information that the referrer considers pertinent to the young person, after being given a further opportunity to raise anything of note to the team. As is custom, further liaison during the assessment and write up process is important, particularly

in more complex cases where additional assessment and information may need to be sought prior to any conclusions being drawn about the young person's difficulties. Encouragement for referrers to raise any concerns directly to the team upon receipt of a report is also warranted to ensure any differences within the professional network are resolved as early as possible. This could potentially be achieved through inviting referrers to feedback appointments alongside families or even at an earlier point to hold discussion with the team at the clinical case discussion held after the young person's assessment.

Given referring services typically take back the care of young people following their assessment, and are usually responsible for the implementation of recommendations, a further objective of the project was to provide referrers with a platform for voicing any preferences for future reports they may receive. This includes an opportunity to recommend changes or improvements they would like to see to ensure reports are of most help to them in understanding the young person's needs and planning their future care. In many cases respondents to the surveys provided constructive feedback for the service to consider.

Many provided comments regarding the length of reports, which as described was broadly considered to be appropriate and useful with regard to their level of detail, for example in descriptions of the results of psychometric testing. One view expressed was for the potential inclusion of a summary section toward the end of reports to accompany the earlier detail, with the respondent reporting difficulty finding a summary of the main points mid-document. Another commented on their tendency to skip most of the report in order to reach the recommendations section, which presumably was most relevant to their role with the young person.

Considering the detail often required to describe the complexities of some forms of neuropsychological assessment, a brief synopsis encapsulating all parts to the assessment may be more difficult to achieve. However a broader summary of the key findings and an initial formulation may be a valuable addition, providing referrers with a snap shot chunk of the most relevant conclusions to take away from the assessment. This could also be helpful for those whose main interest is in reading through recommendations they may be looking to implement, to provide a

quick understanding of some of the key points that may be underlying the recommendations described. In collaborative assessments, medical colleagues tend to include a brief summary formulation early on in their report and something similar may work to enhance the accessibility of reports given to referrers to neuropsychology.

One further comment highlighted another important area for consideration, that being how the length and detail of reports may be experienced by families of the young person (“whilst I read the whole document I admit I jumped to the 'recommendations' section. I also wonder what families' experience of reading the reports are”). Typically families are provided with the same report as the referrer and other relevant professionals, inclusive of all the details of the assessment process. The comment raises an important point as to whether families, perhaps without much background understanding of the assessments undertaken and some of the issues discussed in reports, are able to access much of the content. For many families, receiving as much information as possible about the difficulties faced by their child may be their aim for the assessment, though for others these aims may differ.

An additional consideration could therefore be to offer the young person and their families an accessible version of the report, either alongside or instead of the main report, perhaps with less of a ‘clinical’ focus and more around providing an accessible understanding of what the implications of the assessment are for them. Similar approaches are known to be used routinely in other psychology services where neuropsychological assessment is offered, for instance in services for people with learning disabilities, and could cut through some of the detail that some may find more challenging to comprehend at what can be a difficult time for families. It should be noted however that the team have previously undertaken an audit of user satisfaction with reports, including their views on the length of reports, with the feedback obtained being positive.

Other respondents provided constructive feedback on how the recommendation section of reports could be amended to increase their specificity. These include a suggestion of tailoring recommendations to include specific actions for specific professionals to undertake, such that each member of the professional network

understands what they are responsible for implementing as part of their role in the young person's care. Potential benefits of such changes could be to provide further clarity on who should be taking responsibility for each recommendation and may help to prevent against circumstances where confusion about responsibilities could lead to some recommendations not being followed up. Another comment highlights a related need to ensure recommendations are not too broad and remain as person-centred and specific to the young person being assessed as possible. Broad recommendations can often be useful in circumstances where there are typical methods for managing a particular difficulty, for instance in recommending a child with attentional difficulties is educated in a setting free from lots of distraction or that an individual on the autism spectrum may benefit from a structured routine in their home or school environment. However it would be important to ensure that such recommendations are still described in a way that applies directly to that individual and accounts for factors that may make more generic recommendations less useful in their case.

Further comments highlight the issue of when the utility of recommendations can be limited by the availability of resources in other services. For instance one respondent reported the complete absence of commissioned services for people with learning disabilities in the local area, which likely had an impact on their ability to follow through with particular guidance on their case. Other factors to consider could also include limited or lack of access to certain professional groups, such as behavioural support specialists, or particular therapies who would undertake specific interventions (e.g. speech and language, occupational, psychology, etc). In some circumstances this may result in further tertiary referrals requesting for intervention to be undertaken, which may or may not be commissioned.

This feedback highlights an important issue regarding the difficult position assessing clinicians are put in, whereby recommendations for intervention are made appropriately on the basis of a sound evidence base, but often within a wider context where there exists variability in the extent to which these expectations can be met. With regard to reports and their utility to referrers, one way to manage these difficult situations could be to consider inclusion of viable alternative recommendations to those listed as preferable for managing any identified needs, if services are unlikely

to have access to particular resources they would need. Inviting referrers to case discussions and feedback following assessment may again be one way of opening up a discussion of the feasibility of recommendations and could allow for alternative options to be sought out if necessary, prior to the referral being closed.

The area which received most dissatisfied feedback related to the time taken for referrers to receive assessment reports. Comments made reference to both delays between a referral being made and the young person being assessed and between referral and receiving a final report. One issue that should be acknowledged is that families of the young person are provided with a draft copy of the report for checking factual accuracy, only after which time referrers are sent a report. As such the time taken for referrers to receive written feedback about the outcome of an assessment is in part dependent on the parents' urgency to confirm accuracy with the service.

Nevertheless maintaining transparency with referrers around potential waiting times for an appointment is necessary in ensuring any expectations they may have around the assessment are managed, given potential fluctuations in the number of referrals received over time and length of subsequent waiting lists. In the same way transparency regarding the likely time for a report to be completed would be helpful in giving referrers notice of when to expect a report following completion of assessment. This could be achieved through liaison with the referrer following the first assessment appointment, for instance in a letter or email confirming the young person's attendance at assessment and possible date for completion of a report. This could be particularly relevant in cases where extended assessment appointments are necessary, to ensure referrers are aware of any delays there may be prior to a final report being sent to them.

In cases where there are delays in the context of deadlines or urgency on the part of referrer to receive a report, one consideration could be for the provision of a brief summary letter in the interim. This could be used to explain the reasons for a delay (e.g. extended assessment, collecting more information, etc) and to provide both an estimate of when a final report will be received and any preliminary findings from the assessment that may be appropriate to share prior to the full report being written.

In such cases discussion with referrers may prove fruitful in understanding what, if any, information they would be keen to have shared as early as possible.

One final area where feedback was obtained related to cases where joint assessments are undertaken, usually between psychology and psychiatry, and how referrers experienced receiving separate reports from these two disciplines, as is currently practiced. Whilst two respondents highlighted no preference regarding the structure of these reports, the majority (5/7) for whom this was relevant indicated a preference for a combined report, with none in favour of a separation. Unfortunately no further comments were provided to explain why this would be preferable and only one respondent referred to separation being unhelpful, again without including further explanation. Without such feedback it is more difficult to conceptualise how reports could be combined to be of most use to referrers, though it could be inferred that having a combined report reduces the likelihood of the same information being repeated by different authors. It may also ensure that any potential discrepancies in opinion between the assessing teams are resolved prior to a report being completed, guaranteeing a consistent opinion is provided to the referrer.

Consideration of a combined report may be particularly relevant in cases where there is a clear priority need for the referral (i.e. where either psychiatry or psychology has been identified as the lead for an assessment, though both may still be involved). In such cases clinicians from the leading team could be given responsibility for writing the bulk of the report and coordinating with the collaborating team for relevant information to include from their assessment. Requests for feedback from the referrer may then help to collate the more qualitative feedback absent from the current investigation and provide further clarity on whether combined reports would be routinely preferred.

6. Limitations

Some limitations to the current study are noted and should be considered in the event of any follow-up evaluations. One issue relates to the relatively small sample, whereby feedback was not obtained for nearly 75% of referrers who received reports over the period investigated. Whilst respondents did span the breadth of professional groups often referring to the clinic and a sample size of eleven provided much useful information, a larger sample may have provided a more representative understanding of referrers' experiences. The relatively modest response rate of 26% obtained is somewhat inconsistent with previous estimates of expected response rates on surveys for research undertaken with physicians alone (Cummings et al, 2001 – 61%) and healthcare professionals more generally (Cook et al, 2009). Similarly reviews of counselling and clinical psychology research studies using survey methodology have reported estimated response rates of 49.6% (Van Horn et al, 2009) on average whilst use of surveys within an organisational system also reports much higher expected rates than obtained in this study (e.g. Anseel et al, 2010 - 54-58%).

The request for feedback on reports received up to a year prior to the current study may also have hindered respondents' ability to provide accurate feedback and in some cases may have led to a decision not to respond. One means of addressing this could be a more prospective approach to collecting feedback in the future, for example through routinely requesting feedback from referrers using the satisfaction survey when reports are sent out, which may lead to a greater response rate and pool of data to explore. Previous studies have also detailed effective methods for increasing response rates to surveys in the field of healthcare research, for instance through clinician-to-clinician phone calls to remind respondents of their survey (e.g. Martins et al, 2012).

A further limitation relates to the survey used, which was developed by members of the team for the current study. The use of a more standardised measure of referrer satisfaction was desirable, though such a tool was not yielded in a search of the literature. Additionally given the aims and purposes of this investigation, the survey developed did have specific relevance to the areas of interest the team wanted feedback on, which holds potential to directly benefit the clinical work they undertake. Instead some aspects of the questioning used in the current survey could

be considered for amendment in the event of the same survey being used again, for instance for questions which received little or no additional comments. The pattern of feedback to these questions may reflect a lack of clarity as to what was being asked for in terms of feedback, given the broad nature of some questions (e.g. “How satisfied were you with the style/format of the clinical report(s) you received?”; “How would you rate the quality of clinical report(s) you received?”). Changes could therefore be considered in terms of how these aspects of feedback are defined, for instance as to what exactly is meant by ‘quality’ or ‘style/format’, which may help to obtain richer feedback in these areas.

7. Conclusion

The aim of the current study was to evaluate the satisfaction of referrers to a CAMHS neuropsychology clinic. Investigation was prompted given the potential use of such feedback in service development and the limited attention given to referrer satisfaction more generally in the literature. The focus of the discussion has therefore been on exploring the constructive feedback received from respondents about ways in which reports could be improved to increase their utility to referrers and address issues of dissatisfaction raised during this study. Based on feedback received, the following suggestions may be of benefit to consider for future reports:

- Ensuring all information considered relevant and pertinent to the assessment is discussed and collected from referrers prior to an assessment report being finalised.
- Inclusion of a summary section towards the beginning or end of a report, as a clear means of highlighting key findings and initial formulations from the assessment.
- Providing the young person, their families and perhaps the referrer with the option of an accessible version of their report outlining the implications of the assessment and its outcome for them.
- Ensuring recommendations remain person-centred and specific to the individual being assessed, whilst being tailored such that each member of the professional network understands their individual responsibilities
- Inclusion of viable alternative recommendations to those listed as preferable for managing any identified needs, in the event of local services lacking the necessary resources to follow up particular recommendations.
- Inviting referrers with the consent of the young person and their families to feedback appointments to discuss the feasibility of recommendations prior to the young person's referral being closed.

- Maintaining transparency with referrers over waiting times and potential dates to receive a completed report through liaison with the referrer following the young person's attendance at their first assessment appointment.
- Providing referrers with a brief interim summary in the event of significant delays to a report being finalised, particularly in the context of deadlines, including an estimate of when a final report will be received and any preliminary findings from the assessment that may be appropriate to share.
- Trialling the provision of combined assessment reports in cases of collaborative assessment with other disciplines, with the lead discipline for the assessment taking responsibility for coordinating the report.

Further investigations in the future could be used to evaluate the impact of any changes made to reports based on these recommendations and to assess again the extent to which referrers are satisfied with the reports they have received.

Consideration of the discussed limitations of the current study would be of benefit to address in any further studies undertaken.

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9. Appendices

9.1. Example referrer satisfaction survey

We are currently evaluating levels of referrer satisfaction with the clinical reports provided by our service. We would be extremely grateful if you could help us by filling out this brief questionnaire. Please tick a box to indicate your response for each question and add any supplementary comments in the box provided.

Profession (e.g. Doctor, Psychologist, Nurse, etc):

Service (e.g. CAMHS, Social Services, Education, etc):

1. Overall how satisfied were you with the clinical report(s) you received?

<i>Very satisfied</i>	☐	<i>Have you any comments you wish to add?</i>
<i>Quite satisfied</i>	☐	
<i>Slightly dissatisfied</i>	☐	
<i>Very dissatisfied</i>	☐	

2. How satisfied were you with the length of the clinical report(s) you received?

<i>Very satisfied</i>	☐	<i>Have you any comments you wish to add?</i>
<i>Quite satisfied</i>	☐	
<i>Slightly dissatisfied</i>	☐	
<i>Very dissatisfied</i>	☐	

3. Did you have any problems with the length of the clinical report(s) you received?

<i>No, it was of appropriate length</i>		<i>Have you any comments you wish to add?</i>
<i>Yes, it was too long and detailed</i>		
<i>Yes, it was too short and not detailed enough</i>		

4. How satisfied were you with the style/format of the clinical report(s) you received?

<i>Very satisfied</i>		<i>Have you any comments you wish to add?</i>
<i>Quite satisfied</i>		
<i>Slightly dissatisfied</i>		
<i>Very dissatisfied</i>		

5. How would you rate the quality of the clinical report(s) you received?

<i>Excellent quality</i>		<i>Have you any comments you wish to add?</i>
<i>Good quality</i>		
<i>Average quality</i>		
<i>Poor quality</i>		

6. How helpful did you find the clinical report(s) in understanding the young person's needs?

<i>Very helpful</i>		<i>Have you any comments you wish to add?</i>
<i>Quite helpful</i>		
<i>Slightly helpful</i>		
<i>I did not find it helpful</i>		

7. How helpful did you find the recommendations provided in planning the young person's ongoing care?

<i>Very helpful</i>		<i>Have you any comments you wish to add?</i>
<i>Quite helpful</i>		
<i>Not helpful</i>		
<i>I found them unhelpful</i>		

8. How satisfied were you with the length of time it took to receive the clinical report(s) following your referral of the young person?

<i>Very satisfied</i>		<i>Have you any comments you wish to add?</i>
<i>Quite satisfied</i>		
<i>Slightly dissatisfied</i>		
<i>Very dissatisfied</i>		

9. How did you find receiving separate clinical psychology and medical reports from our service?

<i>I preferred receiving two separate reports</i>		<i>Have you any comments you wish to add?</i>
<i>I would prefer to receive one combined report</i>		
<i>I have no preference</i>		
<i>N/A</i>		

10. Where do you see the main areas for change/improvement in the clinical report(s) provided by our service? (Tick all that apply)

Length and amount of detail		Style, structure and format	
Timing		Quality and professionalism	
Recommendations		No change/improvement needed	
Other (please provide further details)			

11. Do you have any final comments to make regarding your experience of the clinical report(s) you received from our service?

We sincerely appreciate your support in completing this questionnaire and kindly request that you return it to the address listed at the top of the survey. If you have any questions or queries regarding this evaluation please do not hesitate to contact us at the contact details listed listed.

9.2 Example covering letter

South London and Maudsley

NHS Foundation Trust

N&S CAMHS Neuropsychiatry & Neuropsychology Clinic
Michael Rutter Centre for Children and Young People
Maudsley Hospital
De Crespigny Park
London
SE5 8AZ

Dr #####

##

Dear Dr...

RE: #####
DOB: #####
Address: #####
NHS Number: #####

We are contacting you following your referral of the above named patient to our service over the past year.

We are currently evaluating levels of referrer satisfaction with the clinical reports provided by our service. Of particular interest to us is how useful and accessible you found our reports, both in terms of helping you to understand the young person's difficulties and in implementing recommendations regarding their ongoing care.

We consider this evaluation to be of great importance in helping us to develop our clinical services for the better. We would be extremely grateful if you could help us by filling out a brief questionnaire and returning it to us at the address listed above. The information you provide is anonymous and will be treated as confidential.

If you have any questions or concerns, please do not hesitate to contact us.

Yours sincerely,

Nathan Kitchenham
Clinical Psychologist in Training