Exploring the understanding and experience of cognitive impairment in chronic opiate users: An Interpretative Phenomenological Analysis

Sophie Bates

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School of Psychology
Faculty of Health and Medical Sciences
University of Surrey
Guildford, Surrey
United Kingdom
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Abstract

Introduction: Cognitive difficulties are evidenced in opiate-dependent populations, whether they are caused by drug use per se, or other associated life-style factors. To date no research exists which explores the subjective experience of cognitive impairment in opiate-dependent populations attending drug and alcohol services. In comparable fields such as brain injury and dementia, the subjective experience of cognitive impairment has been explored with important and beneficial results.

Method: Using a qualitative design, data were collected from in-depth interviews with six working-age adults with a diagnosis of opiate-use disorder, attending a service for opiate-substitution therapy, who self-identified as experiencing memory and thinking difficulties. Transcripts were analysed in accordance with Interpretative Phenomenological Analysis.

Results: Three superordinate themes emerged: “a damaged brain and mind” which included the extent of the impairment and how participants made sense of such difficulties; “perceptions of the self as spoiled” which explored the perceived changes in independence and dependence and resultant negative feelings about the self; and “coping with a lesser self” which included acceptance and adaptation, and familiar but maladaptive coping strategies.

Conclusions: Participants’ understanding and experience of their cognitive difficulties contributed to their sense of well-being, and further impacted on chosen coping strategies. Consideration of cognitive impairment is important to effectively support individuals attending drug and alcohol services.
Acknowledgments

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Thank you to my clinical tutors for their support and guidance in my personal and professional development throughout the three years of training. Thank you to all of the course staff and visiting lecturers that have provided three years of excellent teaching and learning opportunities.
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PART 1: RESEARCH – EMPIRICAL PAPER

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1.1 Introduction

1.1.1 Opiate-use and cognitive impairment

The aetiology and nature of cognitive impairment is varied (Lezak et al., 2012). Specialist services, e.g. memory clinics and head injury rehabilitation centres, exist to diagnose and offer support for cognitively impaired individuals, recognising that an individual with significant cognitive impairment requires specialised support tailored to their needs.

A large body of quantitative research has been dedicated to exploring cognitive impairment in long term opiate-users (Baldacchino et al., 2012; Baldacchino et al., 2017; Ersche & Sahakian, 2007; Ornstein et al., 2000). Research to date suggests that long term opiate-use impacts an individual’s cognitive functioning, most likely caused by factors associated with illicit drug use rather than opiates per se (Darke, Sims, McDonald, & Wickes, 2000). For example, non-fatal overdose can cause anoxia and concomitant alcohol abuse can result in alcohol related brain injury. Furthermore, traumatic head injury can result from a lifestyle of crime and aggression associated with a motivation to commit crime, as a result of opiate-dependence and an expensive addiction (Department of Health, 2017).

Existing meta-analyses focused on establishing the presence and extent of cognitive impairment in chronic opiate-users (Baldacchino et al., 2012; 2017). These reviews reported significant and reliable cognitive impairment across many domains, including cognitive impulsivity and flexibility, attention, short term and long term memory. Despite this evidence, specialist services do not exist to support individuals with long-term opiate dependencies and cognitive impairment. These meta-analyses focused on establishing the causal role of opiate-use alone on cognitive functioning, and as a result excluded a number of studies on the basis of participant complexity, i.e. past or present drug or alcohol use/dependence. It is important to consider the heterogeneity of an opiate-dependent population. Figures from Public Health England (PHE) indicate that a significant proportion of opiate-users in treatment also present
with other drug dependencies, including 42% with crack cocaine, 20% with alcohol, 18% with cannabis, and 11% with benzodiazepines (PHE, 2017a). Cognitive impairment is likely to be multi-factorial (Darke et al., 2000) and excluding these individuals from research and reviews may result in an underestimation of impairment reported in people with an opiate-use disorder. A literature review was carried out to identify and evaluate studies investigating cognitive impairment in a more typical and heterogeneous sample of opiate-users in treatment. Of the 19 studies that were reviewed, 17 reported that people in treatment for opiate-use disorder performed significantly worse than healthy controls when tested on certain psychometric tests across a broad range of cognitive domains (attention and information processing, short and long term memory, cognitive impulsivity, non-planning impulsivity, and cognitive impulsivity). Despite the literature reviews aims, there was a paucity of studies which included participants reporting commonly occurring co-morbidities in drug-using populations, such as other drug and alcohol use, head trauma, and mental health diagnoses. Evidence suggests drug-users with concurrent mental health diagnoses have poorer psychosocial functioning (Kennedy & Paykel, 2004), and experience more relapses (Trivedi et al., 2008). Opiate treatment completion rates remain the lowest of all substance groups (26%) and it is important to consider factors that may impact this (PHE, 2017b). PHE states “a large proportion of the opiate-users in treatment have entrenched long term drug use, are often in ill health and less likely to have access to the personal and social resources that can aid recovery, such as employment and stable housing. These factors result in opiate-users being less likely to complete treatment successfully and/or sustain their recovery when compared to users of other drugs and alcohol alone” (PHE, 2017a).

1.1.2 Consequences of cognitive impairment
The recent UK Guidelines on Clinical Management of drug misuse and dependence (DoH, 2017) state that cognitive impairment is associated with poor retention in treatment, reduced
likelihood of achieving abstinence, and a greater risk of relapse. Better understanding the nature of cognitive impairment in a typical opiate-dependent population in treatment could identify a need for such deficits to be considered. Deficits on particular cognitive domains are likely to have profound consequences for individuals engaging in drug addiction treatment. Slower processing speed results in difficulties performing learnt tasks, which can consequently impact everyday routines such as arriving at appointments on time, participating effectively in therapeutic activities and completing tasks outlined in treatment. This could feasibly lead to frustration and disengagement if services do not take into account these deficits and make necessary adaptations. Prospective memory impairment could have real world consequences such as forgetting to attend appointments or taking medication (Terrett et al., 2014).

1.1.3 Qualitative research and cognitive impairment

So far, research on cognitive functioning in substance-dependent populations is dominated by quantitative studies focused on identifying the presence and extent of impairment. Research is lacking with regard to how these deficits impact people’s lives, and how they are understood and managed. This gap is in contrast with other contexts including cognitive impairment in traumatic brain injury (TBI) (Levack et al., 2010) and dementia (Qazi et al., 2010). Qualitative research has investigated the impact of memory and thinking difficulties in people with a diagnosis of mild cognitive impairment (Lingler et al, 2006; Parikh et al., 2015). Findings indicated that mild memory changes had a notable impact on an individual’s feelings and views about the self, social relationships, and engagement in work and leisure activities. People varied in how they made sense of their diagnosis; positive appraisals were associated with relief and satisfaction, and negative appraisals were associated with fear and distress. Factors such as shame and embarrassment, burden, frustration with memory problems, and loss of self-confidence reflect the far-reaching impact of a ‘mild’ cognitive impairments on all aspects of life (Joosten-Weyn Banningh et al., 2008). Qualitative research exploring the experience of
cognitive impairment in epilepsy also indicated that an individual’s mood, social experiences and self-representation can mediate the relationship between TBI and a positive outcome (Di Battista et al., 2014). Furthermore, a recent study investigated the subjective experience of cognitive impairment in psychosis (Wood et al., 2015). Participants identified a number of thinking difficulties including blanking and forgetting, concentrating, and thinking ahead. Such deficits resulted in a range of management strategies including coping alone and hiding, becoming dependent on others, or using expertise. These studies show the value of understanding service-user perspectives of living with cognitive difficulties. Understanding service-user experiences supports a recovery-focused approach (Gould, 2012), and reflects guidelines which emphasises the importance of seeking service-user experiences to guide service delivery (DoH, 2011).

However, in a review of the literature, no qualitative studies were found which focused on opiate-user’s subjective experiences of cognitive impairment. Nonetheless, the need for qualitative research in the field of addictions has been noted. Larkin and Griffiths (2002) emphasised that qualitative research can help develop a more detailed and nuanced understanding of addiction, noting that self and identity are integral to the subjective experience of addictive behaviours. Exploring individuals’ subjective experiences of phenomenon such as cognitive impairment will support this process.

1.2 Objectives

This research is an exploratory study which uses Interpretative Phenomenological Analysis (IPA) to gain a deeper understanding of the lived experience of opiate-dependent individuals who self-identify as living with memory and thinking difficulties. The aim is to explore how individuals’ describe their memory and thinking difficulties, and their impact. A qualitative method is used to explore how these individuals make sense of and manage their difficulties.
2.1 Method

2.1.1 Sampling Strategy

Six participants were purposively recruited to take part in an in-depth interview. A small sample size was necessary to ensure each interview could be analysed in an idiographic, detailed, and iterative manner, all within this project’s timeframe (Smith et al., 2009). The sample size was also guided by existing studies which used IPA to explore individuals’ experiences of cognitive impairment (Howes et al., 2005; Watson & Parke, 2011; Wood et al., 2015).

To be included in the study individuals were aged 18-65 with a primary diagnosis of opiate-use disorder, and were attending an NHS drug and alcohol service in the South West of London. Participants had to identify as experiencing “memory and thinking difficulties”, and be prescribed an opiate-substitution drug, such as methadone or buprenorphine. To identify a reasonably homogenous participant group in accordance with IPA requirements, individuals had to be in treatment for their opiate addiction for over five years, establishing a stable yet chronic group.

Participants could take part if they reported using other drugs and/or alcohol, co-morbid mental health diagnoses, and were taking related prescribed medications. This was to ensure the sample reflected the complexities of a typical opiate-using population (PHE, 2017a). Participants were excluded if they had an intellectual disability defined as IQ<70. Participants were required to be sober from alcohol and not intoxicated or withdrawing from drugs at the time of the interview, to ensure appropriate risk management and to ensure the individual was able to complete the interview. The researcher used their clinical judgment to determine if the individual was able to take part at the time of interview and did not complete interviews with intoxicated individuals.
2.2 Design and Procedure

2.2.1 Recruitment

The researcher attended fortnightly “recovery groups” to recruit from a total of 20 individuals attending as part of their treatment program. These groups were mandatory for people who were in the service longer than five years and perceived as resistant to recovery, based on their difficulties in coming off the prescribed opiate-substitute. A recovery worker introduced the study, and handed out posters and information sheets in the group (appendix 2&3). Following this, the researcher attended the group and interested individuals could leave the session to take part. Recovery workers were also asked to discuss the study with their clients (who were not attending the group described above) who struggled with memory and thinking difficulties, and posters were handed out. If an individual was interested in taking part in the study the recovery worker booked an appointment for the individual to meet the researcher. Posters advertising the study were also placed within the service building. Participants were offered a voucher of £10 for an agreed outlet store, subject to completing the study. Although it was relatively easy to identify potential participants in this service, people showed little interest in taking part, therefore an incentive was used to increase motivation.

The meeting between the researcher and interested individuals took place in a private room at the service. After a brief description of the study’s aims, inclusion/exclusion criteria were assessed. Individuals were asked to provide examples of memory and thinking difficulties. Individuals were informed that the interview would take up to an hour, and could take part immediately, or at a suitable time in the future. The researcher read aloud the information sheet and gave time for questions throughout. The consent form was then completed (appendix 4). The researcher explained the confidentiality agreement; information would only be shared outside of the research team if the researcher was concerned about the safety of the participant or others.
2.2.2 Interview

The development of the interview schedule (appendix 5) was guided by the research question, guidance on IPA interview development (Smith & Osborn, 2008), supervision, and a comparable IPA study (Wood et al., 2013). Furthermore, individual consultations with three members of a service user group at a community substance misuse service were completed. Questions were piloted on these individuals to ensure acceptability and clarity of questions. These processes guided further development of the interview schedule. An empathic and questioning approach was used both to understand the experience from the participant’s point of view, and to help illuminate and make sense of their experience. The interview schedule was used flexibly and the participant played an important role in what was discussed. The interview began with specific questions to help contextualise the participant, i.e. employment status, relationship status, drug taking histories, and mental health diagnoses. The semi-structured interviews lasted between 30-45 minutes. The interviews were audio-recorded and subsequently transcribed anonymously. After the interview participants had the opportunity to ask questions and learn more about the project. Participants were given a £10 voucher in compensation for their time, a copy of the information sheet, their consent form, contact details of the researcher, and a hand-out of memory management strategies (appendix 6).

2.3 Ethics

Ethical approval was obtained from an NHS Research and Ethics Committee, and the Research and Development department from the relevant NHS Trust. The study was sponsored and funded by the University (appendix 7-9).

2.4 Data Analysis

2.4.1 Interpretative Phenomenological Analysis

IPA fitted the aims of the project to explore cognitive difficulties from the participants own perspective, understanding their individual experiences, and gathering information about their
relationship to their cognitive difficulties with regard to their understanding, the emotional impact, and their coping (Smith et al., 2009). IPA has been applied successfully in other studies seeking to understand the experience of cognitive impairment in different contexts: psychosis (Wood et al., 2015), dementia (Qazi et al., 2010), and traumatic brain injury (Levack et al., 2010).

IPA techniques were followed according to Smith and colleagues (2009) method (see appendix 10 for more details). All interviews were transcribed clean verbatim by the researcher and notes regarding laughter and long pauses were included. Transcriptions were read and re-read, whilst also listening to the audio-recording. Themes were searched for one participant at a time, and then collated across participants. The process was iterative at all stages and involved checking meaning in the data continually. Differences between participants were not ignored and variation between each individual was considered, in light of possible heterogeneities. Superordinate and subordinate themes were identified and developed into a conceptual framework, with examples provided from the data in the form of quotes

2.4.2 Quality Assurance

Yardley’s (2000) framework (appendix 11) was used to support the study’s validity and reliability at all stages, as recommended for IPA (Smith et al., 2009). A reflexive diary was kept by the researcher to develop their awareness and understanding of personal assumptions and to identify the potential impact of these biases at all stages of the research project. Being transparent about assumptions and expectations aimed to reduce their potential influence on data collection and interpretation, therefore reducing the impact of bias (Fischer, 2009). However objectivity is not an aim within IPA, instead the study hopes to offer a plausible account of the data using examples in the form of quotes to offer substantive evidence for the results (Larkin & Griffiths, 2002). Examples of self-reflexivity and credibility checks can be found in the appendix 12-14.
3.1 Results

To protect participants’ anonymity and confidentiality, age and ethnicity neutral aliases have been used (table 1). Table 2 gives an overview of demographic information for the participants.

Table 1

**Participant Aliases**

<table>
<thead>
<tr>
<th>Participant Number</th>
<th>Participant Alias</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Jack</td>
</tr>
<tr>
<td>2</td>
<td>Matt</td>
</tr>
<tr>
<td>3</td>
<td>James</td>
</tr>
<tr>
<td>4</td>
<td>Emily</td>
</tr>
<tr>
<td>5</td>
<td>John</td>
</tr>
<tr>
<td>6</td>
<td>Robert</td>
</tr>
</tbody>
</table>

Table 2

*A summary of demographic information across the sample*

<table>
<thead>
<tr>
<th>Demographic Information</th>
<th>Sample (n=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (range)</td>
<td>38-55 years</td>
</tr>
<tr>
<td>Gender</td>
<td>5 Males: 1 Female</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>4 White British: 2 Other</td>
</tr>
<tr>
<td>Length of opiate-use (range)</td>
<td>16-40 years</td>
</tr>
<tr>
<td>Type of opiate-substitution</td>
<td>4 Methadone: 2 Buprenorphine</td>
</tr>
<tr>
<td>Time taking opiate-substitution (range)</td>
<td>5-10 years</td>
</tr>
</tbody>
</table>

1 ‘[]’ indicates missing material
‘…’ indicates a pause in the participants’ parlance
‘[word]’ indicates added material to clarify what a participant is referring to
Demographic Information

<table>
<thead>
<tr>
<th>Employment status</th>
<th>Sample (n=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School-leaving age (range)</td>
<td>13-17 years</td>
</tr>
<tr>
<td>Partnership status</td>
<td>2 Co-habiting; 4 Single</td>
</tr>
<tr>
<td>Other diagnoses</td>
<td>Depression (4); Hepatitis C (2); Chronic pain (1); Diabetes (1)</td>
</tr>
<tr>
<td>Other current drug use</td>
<td>Cannabis (4); Crack cocaine (2); Benzodiazepines (1); Alcohol (4)</td>
</tr>
<tr>
<td>Prescribed medication</td>
<td>Benzodiazepines (2); Anti-depressants (4)</td>
</tr>
</tbody>
</table>

3.1.1 Overview of themes

Interpretative phenomenological analysis of the six semi-structured interviews revealed the master themes and sub-themes, outlined in table 3. The themes are then explored and interpreted in a narrative account using verbatim quotes from the interviews. Nuances and individual differences between participant experiences are highlighted and considered throughout.

Table 3

Master themes and related sub-themes

<table>
<thead>
<tr>
<th>Master themes</th>
<th>Sub-themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A damaged brain and mind</td>
<td>Memory and thinking difficulties impact everyday functioning</td>
</tr>
<tr>
<td></td>
<td>Making sense of what caused the impairment</td>
</tr>
<tr>
<td>Perceptions of the self as spoiled</td>
<td>Perceived changes in independence and dependence</td>
</tr>
<tr>
<td>[by the damaged brain and mind]</td>
<td>Negative feelings towards and about the self</td>
</tr>
<tr>
<td>Coping with a lesser self</td>
<td>Acceptance and adaptation</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Familiar but maladaptive coping strategies</td>
<td></td>
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</table>

The first theme, ‘a damaged brain and mind’ explores how participants perceived and described the difficulties they experienced with memory and thinking, how these impacted their everyday functioning, and the process of trying to make sense of why these problems exist. Participants’ experiences are considered in relation to contextual factors which could help explain individual differences in the experience of impairment, such as the stage in their journey. Data suggest that an individual’s perception and understanding of such difficulties influenced their perception of themselves as spoiled. This second theme includes evidence of participants’ perceptions of changes in their level of independence and dependence, and resultant negative feelings about the self. The extent to which a person identified with having a damaged mind, and their perceived control over its cause, influenced the extent to which perceptions of their self was negatively impacted. Changes to an individual’s independence, which were often associated with negative feelings, led to a need to cope and manage, which is explored in the third theme ‘coping with a lesser self’. Again, participants’ stage in coming to terms with their difficulty impacted their chosen coping strategies. Participants’ varied from processes of ambivalence and denial to accepting and adapting to the impairment. Less adaptive coping strategies were prevalent across all participants, irrespective of their stage in their journey, and drug use appeared as a familiar coping mechanism for difficult feelings and experience.

### 3.2 A damaged brain and mind

#### 3.2.1 Memory and thinking difficulties impact everyday functioning

Five participants reported difficulties remembering recent experiences and events. Matt said “I just don’t remember days or whatever [] I can’t remember what I did bloody last week, I can’t remember yesterday”. Matt’s use of the word ‘bloody’ and his exasperated tone suggested recalling this information was uncomfortable for him, he later shared he had not realised the
extent of the impairment before now, saying “what the f*** (laughs)... that happens a lot actually now I think about it”. The long pause suggested Matt was going through a process of realisation, and his use of emotive language and laughter suggested this was a poignant moment for him. Other participants appeared more familiar with their impairment, as Robert stated in a matter-of-fact manner “I just don’t remember”. This suggested Robert was holding a position of acceptance of his impairment, contrasting Matt’s experience, who wondered whether “everyone has it [memory difficulties]”. Matt struggled to reflect on his experiences often saying “I don’t know, I can’t answer that”. The anxiety Matt felt facing up to his impairment, evidenced by him saying “I mean it’s memory isn’t it memory loss, and I don’t like saying I have memory loss” may have impeded his ability to reflect, as well as the possibility that he had not before thought about such issues. Matt’s discomfort in accepting his memory loss was further explicated when he shared, “it’ll [memory loss] probably get worse I mean my dad’s got it, Alzheimer’s, we’ve only just found out [] I dunno if it runs in the family does it?”. This comment suggested Matt was fearful of whether he may develop Alzheimer’s in the future. Such fear and uncertainty may have made it more challenging to accept and reflect on his memory difficulties.

Evidence suggested Matt and Robert might have been at different stages in making sense of their impairment. Matt’s younger age and shorter length of opiate-use could mean he was behind Robert in his journey to realising the extent of the impairment. Furthermore Robert’s diabetes meant he had already faced up to his memory difficulties, receiving input from services to support his medication adherence which had been poor due to memory problems. Robert and Matt may have also varied in the overall severity of their impairment. In contrast to Matt, Robert explored how his memory impairment impacted his daily life, “It was only two weeks ago I put a pie in the oven, and completely forgot about it”. On further exploration it seemed difficulties with attention better explained his experience as Robert clarified that
interruptions easily distracted him away from a task, saying “and in that instant because I know now I’ve got to be somewhere else [] I’ve forgotten that I’ve put the oven on”. The term ‘and in that instant’ suggested a quick and automatic process that Robert felt little control over. John further stated “as soon as 3 or 4 different issues that I need to deal with [] there will always be 1 or 2 that I forget”. The word ‘always’ indicated a sense of inevitability over his difficulties, and the impact of this is considered later.

Four participants talked of difficulties remembering upcoming events. Jack commented “I won’t attend my appointments, most the time I forget” and Robert said “If you look at my appointment record here it’s been terrible because I just keep forgetting”. John said “I think missing appointments here has been a nightmare, an absolute nightmare”. These participants outlined how their cognitive impairment directly impacted their ability to engage in treatment and work towards recovery, and the impact of this is considered further in the following themes. Some participants spoke of difficulties remaining in the present, Jack said “my eyes are there but my brain is not”, whilst James shared “It’s coming in but I don’t remember what I’m watching”. These comments bear resemblance to the phrase ‘the lights are on but there’s no-one home’, a statement of loss of self, which is explored in the second theme.

**3.2.2 Making sense of what caused the impairment**

Participants went on to attribute these impairments to a damaged brain which they considered to be caused by factors such as drug use, harm from others, and other organic causes. Matt’s sense-making process continued as he considered different causal factors for his difficulties, on one occasion saying “cus I’m abusing myself [] it makes me forget stuff”, and on another saying “maybe it’s in there anyway, maybe it’s f****** in my head and like years to come I’ll end up with f****** Alzheimer’s or something”. These aetiologies differed in where the blame is placed, internally (Matt said “it’s self-inflicted”) or externally (Alzheimer’s). Matt was open about his continued drug and alcohol use, and his ending comment “if we weren’t abusing
ourselves we probably would remember”, suggested he believed the impairment to be related to intoxication of substances, rather than a result of lasting damage. His statement suggested he believed his memory would recover if he stopped using drugs and alcohol, suggesting he felt in control of his impairment. Matt’s sense of control might help explain his reported lack of negative emotions, explored in the second theme. Interestingly, Matt’s use of the term ‘we’, could suggest that he experienced his peer group as also having memory difficulties, which could have reduced the levels of associated distress as he perceived himself as no different to his peers. It might also have suggested that Matt was struggling to accept he was more impaired than others. In contrast, Emily said “when I was drinking it was terrible but it has got better but I’m not back to normal, I’ve done permanent damage definitely”. Emily, who no longer drinks, had personal experience of the impairment persisting outside of substance misuse; a situation Matt had not experienced. Feeling little control over the extent of the difficulties were consequently associated with a range of negative emotions, explored below.

Other participants also considered multiple causes for their difficulties, varying with regard to locus of control. Jack repeatedly made comments such as “I think if I take this medication my brain is blocked [] and it [medication] has blocked my mind”. Jack’s use of the word ‘blocked’ suggested the interference of another agent i.e. medication, which was out of his control. Jack’s comment about his “mind going a different way” further suggested the lack of control he felt over these changes. Jack also linked early experiences of trauma with his memory difficulties “and after that [trauma] it was lots of affect my memory, that was the start”. James and John shared experiences of trauma which they linked to their cognitive impairment. John said “I got hit on the head with a hammer [] once I had the head injury [] my memory then was just terrible”. James said that “I got beaten very badly [] it get worse actually [after that], it was before too”. These explanations located the control externally and the impact of this is considered later. As well as John’s head injury he also said “I think the drugs did have a part
in the memory loss”. These comments reflect the complex nature of cognitive impairment in drug-users. The interview reflected a sense-making process for some participants, allowing the opportunity for to-ing and fro-ing between possible explanations. This could reflect the possibility that participants had not yet made sense of their difficulties.

3.3 A self that is spoiled (by the damaged brain and mind)

3.3.1 Perceived changes in independence and dependence

Participants talked about how their impairment resulted in an inability to depend on themselves to manage and cope with everyday life. When talking about treatment engagement, Robert explained “I got to remember when it is what time it is and I can’t I know I can’t do it I know I can’t do it. I wish I could”. His repetition of ‘I can’t’ served to emphasise and reinforce his belief in his inability, reflecting the idea that the more something is said the truer it becomes, defending his experience of impairment. Robert went on to say “I feel lucky if I can remember your name”. Use of the words ‘luck’ and ‘wish’ indicated his perception that he has no control over his memory, it instead being down to chance or good fortune. The uncontrollability and inevitability of memory failure was also present in John’s comments, who said “I’ll always forget something. Always. Guaranteed”. Using complete statements emphasised his certainty, relaying these statements as fact rather than beliefs or perceptions. John emphasised that even if he does try to support his memory, he could still fail, saying “but even though sometimes when I’ve written stuff down I will still forget them [] unless they’re in front of me”. John suggested that the strategy does not manage the memory difficulty effectively, as ultimately the usefulness of his memory aids depend on his own abilities, which were perceived as poor. For John and Robert there was a sense that even if they wanted to achieve something, they could not.
These comments related to a low sense of self-efficacy, a concept which reflects how capable an individual feels in carrying out a behaviour (Bandura, 1977). The perceived uncontrollability of the impairment contributed to feelings of low-self efficacy, and were further associated with a range of difficult feelings (discussed below). In contrast, Matt portrayed a stronger belief in his abilities to remember, stating “writing shit down so you remember, I’m not that bad”. This comment suggested that Matt’s perceived abilities to remember without aids was good, with little change to his perceived independence. As described above, Matt also felt a sense of control over the impairment, and when compared with the other participants, he spoke least about negative feelings about the self.

A corollary of participants believing they could not depend on themselves, was the need to depend on others to manage everyday life. The two participants who were in a relationship talked about the importance of their partner. Jack said “most often my wife has to remind me to take my medication”, and John said “my partner noticed all the time, you’ve forgotten to do this you’ve forgotten to do that”. These comments indicated that without their partners support they would likely be functioning less effectively. Their relationships had a new focus as a result of the cognitive impairment, as the individual perceived themselves as needing an increased level of support. Both reflected on how they felt a burden in the relationship, for example Jack said “always we [me and my wife] have a problem [] sometimes even my wife she is crying, she says I don’t know what happened to you, you don’t remember even nothing [] and that’s everything is make me just feeling so bad”. This highlighted a discrepancy between the person Jack used to be, the person he is now, and the person his wife wants him to be, a gap known to contribute to negative feelings about the self (Higgins et al., 1985). Furthermore Jack was aware that the cognitive impairment not only affected himself, but it also affected others, saying “I worry about my kids [] more than everybody it affects my kids”. Jack shared the ‘bad feelings’ he experienced as a result of letting others down, and further commented “my son thinks I don’t
want to spend time with him or play with me”. This experience may have been more difficult to bear than letting himself down. Later Jack reflected on his desire to be alone, reducing opportunities for disappointment, saying “I don’t want nobody come to visit me because it make you know upsetting people [] I don’t want to feel I’m a rude person”. The impact of this coping strategy is explored in the final theme.

All other participants were single and spoke more about their dependence on professionals. James said “if it wasn’t for [name of recovery worker], I would lose all appointments”, and Robert said “and now they [professionals] put it [medication] all in dosette boxes [] they sort it out for me”. These comments highlighted the reliance on other people to manage and cope, and further reflected the severity of the consequences if this support were not available; for example Robert said “very easily I can take another dose and not realise that I am in trouble... cus my medication [insulin] it will kill you”. Robert’s emphasis of his dependence on others for life or death matters powerfully reflected a loss of agency, an individual’s capacity to exercise control over the nature and quality of one’s life (Bandura, 2001).

In addition to depending on others, participants spoke about the need to rely on compensatory strategies to manage and cope with their everyday lives. Emily experienced this as neutral, saying “I make sure I write them [appointments] down, they’re very important”. In contrast, Matt (who is evidenced to show more ambivalence to accepting his memory difficulties) said “That [writing] makes it sound like there’s a problem [] you don’t write it down, that’s like saying it’s not right in the head”. Here he associated the strategy with incapacitation and making the problem more visible, rather than coping. The use of stigmatising language (‘not right in the head’) offered an insight into the difficulties he might be having in accepting there is a ‘problem’, again reflecting that Matt may be at a different stage in the process of sense-making. In contrast Emily talked openly and consistently about her difficulties, actively pointing them out during the interview, saying “see that’s a memory thing, my mind just goes
Emily also showed more certainty regarding the aetiology, saying “I used to drink an awful lot and that damaged a lot of my memory [I’ve got Hepatitis C and you do lose your memory with that]”. The impact of acceptance of the impairment on the process of coping is explored in the final theme.

3.3.2 Negative feelings towards and about the self

For all six participants, a loss of belief in their own abilities and an increased dependence were associated with negative thoughts and feelings. Four participants spoke about feelings of frustration as a result of cognitive difficulties. Emily said “[I can’t find my words] and it’s so frustrating”, and Jack said “[trying to concentrate] makes me angry, I show some physical signs you know”. Jack explained that the frustration can cause him to act out physically, “hitting my shoe”. These comments all suggested a perception that they cannot do anything about their cognitive deficits, giving a sense they are not in control, which resultantly frustrated them.

For some participants there was a sense that their cognitively impaired identity differed from their true identity, as James said “They’re gonna blame me [for missing appointments], no not me, it’s my memory but”. He highlighted a separation between himself and his memory and went on to explore his difficulty accepting what his impairment might say about his identity, exclaiming “I cannot have weakness you know what I mean, I am weak I am weak – impossible!” James’s awareness of his flaws impacted on his self-esteem as his deficits challenged his sense of self as competent. He later said “I’m thinking, I could, I’m sharp, but I know I am not, so this affects me”. In the first theme, James’ comment relating to a loss of self was further developed when he said “I was just a man who never turn up”. These statements suggested that James had lost a sense of who he was, instead defining himself in terms of the deficit.

John also reflected on how the impairment challenged his view of himself and his abilities, saying “get very annoyed with myself, disappointed, very disappointed”. These feelings of
disappointment highlighted the contrast between his expectations and actual abilities, which was associated with negative feelings. Furthermore, Emily experienced memory difficulties in the interview and said “see what I mean I feel so stupid [] I get angry with myself [] it is very frustrating [] I criticise myself most of all because I should remember these things you know”. Other participants talked about feelings of depression associated with their difficulties. Jack said “I don’t feel good you know I don’t feel good”, and John said “It’s depressing it’s depressing it gets you down as well”. Feelings of low self-esteem and depression were reported in the above comments as participants compared what they can do with what they ‘should’ be able to do. Additionally, Robert said “But I do get frustrated with myself I give myself really a hard time, I call myself names, you’re so stupid you’re thick, you’re this you’re that”. He went on to say “and that [forgetting] just sends me into like a spiral of it [] get depressed, it’s not worth living”. Self-criticism featured heavily in participants’ accounts of their impairment as they attempted to deal with the discrepancy between how they are and how they want to be. Participants spoke about a vicious cycle of memory difficulties, negative feelings, self-criticism, and low self-esteem. The use of negative labels and self-degradation further suggested that participants had internalised their impairment, seeing their difficulties as part of the self, for which they deserved to be punished.

Interestingly, Robert and Emily were evidenced to confidently attribute the cause of their impairment to drug use and drinking, an example of self-infliction. This internal blame seemed to be associated heavily with self-criticism. In contrast, Jack assigned the cognitive impairment to external factors, including medication and trauma, which were through no fault or choice of his own. Jack instead said “my mind goes completely different way [] I don’t want to do [this] purposely”, suggesting a lack of self-criticism and self-blame. Matt spoke less about the impact of his impairment on his sense of self, as when questioned about the impact of forgetting on his feelings he said “I just don’t remember, that’s it!”. As outlined above, Matt may not have
perceived his difficulties to be particularly severe, and/or was in an earlier stage of awareness and acceptance of his impairment. This seemed to protect him from the potential negative consequences of acceptance on his self-esteem.

Notably, Jack, James, Emily, John, and Robert all reported significant mental health difficulties, such as depression and anxiety. Difficulties described above regarding negative feelings about the self are factors commonly seen in depression and anxiety, and these mental health difficulties may have contributed to their tendency to respond to their impairment in a self-critical manner. Matt, who reported no mental health difficulties, did not express any negative feelings about the self.

3.4 Coping with a lesser self

3.4.1 Acceptance and adaptation

Where individuals were in their process of accepting the cognitive impairment varied across the group. Matt expressed ambivalence towards accepting whether there was a problem, saying “I think everyone has it [memory difficulties] but sometimes it’s like, I dunno, I dunno, maybe I put it down to the drinking”. Matt had not been able to consider the process of adaptation to an impairment he had not yet accepted, saying “Why do you need to write things down to make you remember, you don’t write things down to remember, you say ‘oh I’m gonna remember that and you remember’, and if you don’t you’ve forgotten”. This comment highlighted his perception of memory as a simple task, controlled largely by will. As a result Matt was unable to talk any further about possible compensatory strategies to manage memory difficulties.

The five other participants showed greater acceptance of their cognitive difficulties. Although for some this had a negative impact on their feelings about the self, as outlined in the second theme, it also enabled participants to face up to the impairment and consider the use of compensatory strategies. John said “I do [write lists] now I do a lot now, I never used to, cus
obviously I didn’t realise how bad my memory was getting”. Here he commented on the process of awareness and acceptance of the difficulties being a necessary precursor to adaptation. He went on to say “I’ve learnt to cope and adjust and yeah I write notes [] especially for appointments [] I have texts on my phone I keep going over the texts”. John talked about the changes he has made to support his memory which included visual reminders and rehearsal of information.

In contrast James talked about his dependence on his recovery worker to remind him of appointments, saying “yes [he helps me] with like dates and things [] he makes sure I turn up”. The importance of a valued person to support the cognitive impairment was prevalent for five participants. They offered insight into what factors contributed to support being experienced as positive and helpful. James emphasised the importance of a trusting relationship with his recovery worker, saying “the only man I trust for real is him [recovery worker] [] he don’t give up on me”. This comment highlighted that James had no other trusting relationships in his life, and the importance of feeling cared for was a significant motivating factor to remain engaged in treatment, as he went on to say “I try and keep myself going because I don’t want to let [name of recovery worker] down because he’s done so much”. In contrast Robert talked about his lack of trust in professionals, “people still don’t care enough though [] they don’t ring me up and go ‘we’re just wondering how you are we haven’t seen you’”, and it seemed this consequently impacted his willingness to engage with more support, contradictorily saying “I just find it an intrusion [] I don’t want another thing [] I’ve got enough”. These comments highlighted the importance of building a positive relationship to support treatment engagement.

Another important finding emerged whilst talking about support in the form of text message appointment reminders, as three participants commented on their shortcomings. John said “they’ll send me a message saying your appointment is due in an hour or something, they’re good, but your appointments due in two weeks, that ain’t no good for me really, actually asking
you to remember something for two weeks is difficult”. Similarly, Robert said “sometimes the chemist will tell me ‘in two days times it’s [opiate prescription] going to run out’ but they don’t normally tell me until the day its run out, so the day it’s ran out, I know I’ve missed my appointment”. These comments evidenced the importance of well-timed appointment reminders, suggesting that if they were too far in advance they would be forgotten.

A poignant moment in all interviews was when participants spoke about what other support would be helpful. Five participants shared that they found talking in the interview particularly therapeutic. James said “I need to talk man I need to get this out”. Further comments suggested that participants felt there was not enough support available to them, as Jack said “I don’t think [there is enough support], except for psychiatrist I don’t see any different help”. Comments were made which suggested that participants resorted to maladaptive coping strategies due to a lack of awareness or access to more helpful strategies. Robert said “That’s [drug use] the only way I know how to cope”, and John said “I’m not sure what they [professionals] could to do help, I don’t know, hmmm, not really no, not that I know of”. There was a widespread sense across participants that little support was available, and this further manifested in a sense of helplessness as participants did not actually know what might help.

### 3.4.2 Familiar but maladaptive coping strategies

Avoidance was a major maladaptive coping strategy spoken about by all participants. Jack and James talked about avoiding contact with people and the outside world. Jack said “I stopped to go visit nobody, I don’t want nobody come to visit me because it [] upsetting people” and James said “I have to run away from relationships [] avoid questions, avoid things people ask me stupid questions [] this only gets you closer”. Jack expressed his desire to hide away to avoid upsetting anybody, whereas James focused on the negative impact that others have on him. Later James reflected on avoiding being ‘part of the problem’, as he recognised these patterns of avoidance were perpetuating the problem and preventing him from moving forward. A gap
between one’s ideal self and one’s actual self were evidenced in the second theme for both James and Jack. Research suggests this is associated with feelings of depression and low self-esteem (Higgins et al., 1985). Interestingly, both James and Jack reported significant levels of anxiety/panic and depression, of which avoidance is a common symptom.

Participants also spoke about avoiding thoughts, feelings, and experiences as a way of coping. Robert said “I don’t wanna remember things [] there were great big parts of my years missing, because I don’t wanna go there”. Here Robert expressed that forgetting can have a protective function, distinguishing between the usefulness of forgetting past traumatic memories, and the deficit of forgetting more recent experiences. However Robert also talked about the need to avoid and forget the present, when he is feeling overwhelmed by his impairment, saying “too many things, too many things [] I hit the fuck it button then, fuck the appointments, fuck the medication, I can’t be bothered with it, it’s too much aggravation, it’s too much pressure on me. And that can be bad for me. [] The more appointments I’ve got the easier it is for me to just go ‘pfft forget it’.” This comment emphasised how challenging trying to cope ‘adaptively’ can be. When the demand is too high Robert resorted to giving up and giving in, and would often use drugs to support this process, saying “Opiates is the kind of drug that enables you to just let go of all that stuff [] there’s nothing for me to remember”. However Robert recognised “that can be bad for me” as it sets him back in his journey to recovery from addiction, and in effectively managing his cognitive impairment. Other participants also talked about using opiates as a way of coping, enabling the person to avoid difficult feelings and escape reality. John said “I use drugs normally to cope [with difficult feelings], there’s a pattern definitely”. Robert further reflected on the vicious cycle caused by the memory impairment and maladaptive coping strategies, saying “it’s a vicious circle, it’s hard to pull myself out of that [] most of the time I use [] I don’t have to think about nothing do I, that just takes it all away”. An area for further exploration would be to explore participant experiences following drug use,
and whether this further impacts their perceived cognitive impairment and sense of self. However Robert offered insight into the importance of drug use, saying “Because I tell you it’s a big coping mechanism for people [] if that wasn’t there, I wouldn’t be sitting here talking to you now”. Although in the first theme Robert was clear that he believed drugs were a major cause of the cognitive impairment, here he clarified they are in fact keeping him alive; suggesting it is better to be alive with impairment, than not here at all.

4. Discussion

The findings from the current study will be re-examined in light of the existing theories and research in comparable fields. Implications of the findings for clinical practice will be explored. Finally methodological limitations are discussed.

4.1 Summary of findings and existing theory

Using an interpretative approach, this study investigated the individual experiences of long term opiate-users attending a drug and alcohol service for opiate-substitution, who self-reported memory and thinking difficulties. The group reflected a typical sample of opiate-users (PHE, 2017a), as they reported a range of co-morbid mental health diagnoses, concurrent polydrug and alcohol use, health conditions, and use of prescribed medications. Although all participants reported deficits in some regard, individuals varied in the extent to which they had made sense of their experiences, how it impacted their sense of self, and how they coped. The data suggested that participants attributed their difficulties to a range of causes including drug abuse, alcohol use, trauma, medication, and head injury, reflecting the complexity of cognitive impairment in long term opiate-users. These experiences fit with existing research which suggests that impairment is mediated by factors such as concomitant alcohol abuse and head injury (Darke et al., 2000). Participants who attributed their impairment to the drug use referred to it as self-inflicted, placing the blame and locus of control internally. In some cases
this was associated with high levels of self-criticism and low self-esteem. For others who attributed the impairment to external factors such as trauma and medication, the level of self-criticism appeared less severe, although feelings such as low mood and depression were reported. The current data suggest that participants’ co-morbid mental health difficulties were associated with certain styles of coping; for example people experiencing depression and anxiety reported low self-esteem and self-criticism in response to their cognitive difficulties. Existing research indicates that even mild memory changes can result in meaningful impacts on everyday life (Preeyam et al., 2016). Their study suggests that emotional reactions to memory failures, such as embarrassment and frustration, is associated with the use of compensatory memory strategies. This was comparable to the current study which found that participants who were most disturbed by their memory impairment were more likely to compensate. Evidence shows that psycho-educational approaches to support people with mild-cognitive impairment is of benefit, through normalising memory changes and increasing feelings of control over their memory (Wiegand et al., 2013). These suggestions are supported by theory which states that locus of control and self-efficacy contribute to behavioural control (Ajzen, 2002). Sharing knowledge about memory changes and supporting the current participants to manage negative emotions and self-evaluations may also be of benefit. Leventhal’s self-regulation theory posits that the way in which an individual perceives their problem, known as illness representation, influences the related emotions, emphasising the link between cognitive and emotional processing (Leventhal & Ian, 2012). For example, denial may reduce illness perception and as a result decrease negative emotions. This seemed relevant for one participant who had not yet accepted the extent of his difficulties, and reported few negative emotions. In contrast, participants who had accepted their impairment were familiar with a range of negative emotions including disappointment, self-blame, and depression. Another factor contributing to an individual’s illness representation is the extent to which they believe
their difficulties can be controlled or improved. This has been shown to be an important determinant of behaviour (Petrie & Weinman, 1997; Weinman et al., 2000). The participants’ experience of uncontrollability and inevitability about their memory difficulties could resultantly influence their motivation to engage in treatment (Cooper et al., 1999) and utilise compensatory strategies. Notably, all participants in the study had been struggling to achieve drug abstinence for a minimum of five years. An individual with low self-efficacy and agency might feel disempowered towards making any changes. Illness representation theory has also been usefully applied in existing qualitative research exploring the experience of mild cognitive impairment (Lingler et al., 2006). They highlight the need for further research investigating the link between illness representation and health behaviours in cases where the illness trajectory is uncertain, the impact on daily life is less evident, treatment remains elusive, and individuals may be subject to additional threats to well-being; as is the case for people with mild cognitive impairment and drug-users. Furthermore, the impact of co-morbid depression on illness representation and health behaviours is an important area for future research. Current findings suggest depression is associated with significantly worse health outcomes, which can often be explained by behavioural factors (Whooley et al., 2008).

Nonetheless the data did suggest that participants who had accepted their difficulties were better able to engage in compensatory strategies. For example one participant who had involvement from a memory service following a head injury, showed acceptance of his impairment and used helpful compensatory strategies such as memory aids and dosette boxes. However in this study, recognition of memory problems did not lead to better coping per se, as participants also reported using illicit drug to cope with the emotional impact of the cognitive impairment, as well as the stress associated with daily life. This resulted in a conflict for participants who were in treatment for drug addiction working towards abstinence. Leventhal’s self-regulation theory highlights the importance of the environment around an individual
(Leventhal & Ian, 2012). Coping strategies are limited by what the individual knows and what is available. Participants in this study reflected on the lack of support available, in particular regarding their cognitive impairment, and one participant talked about drug use as his only way of knowing how to cope.

Participants’ emotional experiences had a powerful effect on how an individual coped with their cognitive impairment. Self-discrepancy theory suggests that the gap between an individual’s actual self and their ideal can result in emotional discomfort (Higgins et al., 1985). A number of participants reflected on this discrepancy and spoke about feelings of disappointment and frustration, in line with the theory. The theory posits that when one’s actual self does not match another’s hopes or wishes, people are vulnerable to shame and embarrassment. In these instances, participants in the current study reported a desire to avoid contact with others which makes sense in light of their perceived rejection from others. Furthermore, a discrepancy between one’s actual self and their expectations of what they ought to be can be associated with agitation-related emotions such as self-dissatisfaction. Again it was clear that for participants who shared a sense of what they ‘should’ be able to do also showed a readiness for self-criticism and self-punishment. Comparable research exploring the subjective experience of cognitive impairment in people with epilepsy, indicated the presence of a pre and post injury discrepancy in one’s abilities, and the resultant impact on an individual’s sense of wellbeing, and furthermore their coping (Di Battista et al., 2014). They concluded that exploring mood and signs of maladaptive coping could help clinicians support individuals in working towards a more adaptive recovery trajectory. It is possible that exploring these factors with opiate-dependent individuals with cognitive impairment could also support recovery. Furthermore, in the current study, participants valued the opportunity to share their difficult emotional experiences during the interview, and such opportunities might further support individuals in their recovery from addiction and adaptation to cognitive impairment.
4.2 Clinical Implications

These findings, together with existing theory, can be used to develop suggestions for clinical practice. Leventhal’s self-regulation model states that illness perception can be improved by increasing understanding about the difficulties (Leventhal & Ian, 2012). Actively offering service-users an opportunity to talk about memory and thinking difficulties might improve awareness and acceptance, and reduce stigma. The ‘memory management’ hand-out (appendix 6) offered to participants in this study could be utilised across the service to improve service-users awareness of such difficulties, and possible ways to manage. This might increase an individual’s sense of self-efficacy and controllability over such difficulties. However the current data suggest that an individual’s level of acceptance of their difficulties might impact whether such a resource is experienced as necessary and helpful.

There is extensive research outlining the positive effects of improved self-efficacy and agency on behavior change (Bandura, 1977; 2001, Holloway & Watson, 2002). Individuals with a stronger sense of control over their symptoms, and stronger beliefs in their abilities to manage such symptoms, feel more motivated to implement positive changes. Strategies such as problem solving and SMART goals can improve an individual’s self-efficacy (Skinner et al., 2003), and could be utilized in drug and alcohol services to support an individual in working towards challenging goals. It will also be important to consider the impact of any co-morbid mental health difficulties on health behaviours, and people may need treatment for such difficulties if they become a barrier to drug abstinence.

Recognising the presence of cognitive difficulties in an individual’s formulation is integral to support the appropriate and effective management of someone in treatment for an opiate-dependency. Tailored intervention programmes could target specific needs for those who experience cognitive impairment in order to maximise functional outcomes. The recent Clinical Management Guidelines state that simple strategies should be used to support engagement, for
example texting in advance (DoH, 2017). This study highlighted the importance of such strategies taking into account an individual’s impairment, for example well-timed appointment reminders which support a person’s memory difficulties. Furthermore, participants emphasised the importance of positive relationships with professionals, and in some cases were directly linked with an individual’s treatment engagement.

Noticeably, participants focused mainly on memory difficulties when sharing their experiences of cognitive impairment. Participants might have had difficulty considering other ‘thinking’ difficulties, or perhaps such difficulties were outside an individual’s awareness. Although some participants talked about difficulties with attention, other executive functions such as poor problem solving and impulsivity were rarely considered, yet may exist outside of the person’s awareness. Future research needs to focus on the impact of deficits other than memory and attention.

4. 3 Limitations of Methodology

There are limitations associated with IPA methodology. Unavoidably, the researcher will have interpreted the data through the lens of their pre-existing knowledge, which included previous life experience of the topic, and knowledge of certain theoretical frameworks (Willig, 2001). However the provision of verbatim quotes in the report invites readers to assess the researcher’s interpretations for themselves. Additionally, adherence to Yardley’s (2000) guidelines improved the study’s validity and reliability (appendix 11). The researcher also considered the influence of their potential biases throughout the study through keeping a reflective journal (appendix 12). Credibility checks were done at multiple different time points to enable other researcher’s to explore the analysis process and challenge the results (appendix 13-14).

Another inherent limitation was associated with the role of language in conveying meaning. In this study the researcher assumed a common and shared understanding of constructs such as ‘memory and thinking difficulties’, rather than viewing it as purely constructed through social
experiences and language (Ormston et al., 2014). Participants may have had their own varied and personal understandings of such constructs. Language may have been understood subjectively by participants, and their interpretation and language understood subjectively by the researcher. This offers many opportunities for a deviation in the intended meaning between researcher and participant (Willig, 2001). Where appropriate, the interviewer would check their understanding with the participant, in the attempt to make miscommunications known. It is important to consider that self-awareness of memory and thinking difficulties may be part of everyone’s normal life, not just for people with cognitive deficits. Further research needs to include objective measures of everyday functioning problems, such as an ‘Activities of Daily Living’ scale, or a quality of life measure (Lawton & Brody, 1969).

Across qualitative research, a sample size of six could be considered small and seen to impact the generalisability of the findings. However such a small sample size is asserted by IPA, and was necessary to ensure sufficiently detailed analysis and reporting of each participant’s interview, to adequately reflect their nuanced subjective experiences (Smith & Osborn, 2008). Nonetheless, findings and conclusions have been stated cautiously and are to be interpreted with care, given the highly specific nature of the participant group.

Participants in this study were required to self-identify memory and thinking difficulties. Consequently, presence of true cognitive impairment, as defined by scores on valid and reliable psychometric tests, must not be assumed. Participants’ subjective experiences of impairment may be qualitatively different from those defined by psychometric measures. Furthermore participants might have minimised or maximised their impairment due to factors such as insight and awareness, shame, or help-seeking. Notwithstanding, this study highlighted that individuals’ experiences of cognitive impairment were meaningful, impacting their wellbeing and influencing their coping strategies. Furthermore, a lack of formal diagnosis of cognitive impairment more accurately reflects the experience of people attending drug and alcohol
services. Self-reports of cognitive difficulties should therefore be taken seriously and responded to appropriately.

Participants were offered a monetary incentive to take part in the study which could have resulted in a selection bias. Still, it was necessary to increase motivation to take part, as recruitment to the study was particularly challenging. As most participants were referred by their recovery worker it reduced the likelihood that participants self-selected themselves solely for the monetary gain.

Although participants reflected a relatively homogenous group of chronic opiate-users, individual differences were noted. For example two participants reported experiences of significant head injuries, some were using illicit drugs ongoing, whereas others were in abstinence outside of the prescribed opiate-substitution. These factors could have impacted their level of cognitive impairment, and further impacted their approach to making sense of and coping with the impairment. Such contextual factors were considered throughout the analysis to highlight possible hypotheses for individual differences.

A larger study employing mixed methodologies would be beneficial to further substantiate this study’s findings. Participants could be assessed for cognitive impairment using valid psychometric tests, prior to qualitative interviews. However, it remains important for individuals who self-report cognitive difficulties to be recognised, as existing research emphasises the meaning of impairment for the individual, not the severity of the deficit per se (Howes et al., 2005).

4.4 Conclusions

This study is the first of its kind to investigate the subjective experience of cognitive impairment in a group of individuals with long-term opiate dependencies. Findings suggest these individuals’ experience and manage their difficulties in a variety of ways. The difficulties can have a widespread impact on an individual’s daily functioning, resulting in an increased
dependence on other people and strategies, and negative feelings about the self. Findings suggest that services must pay more attention to the impact of cognitive impairment on treatment engagement in addiction services. This is in line with suggestions made in the recent 2017 Guidelines on Clinical Management, which suggests drug services should screen for cognitive impairment and make necessary adaptions, such as shorter sessions and involving family (DoH, 2017). Unfortunately, the vast majority of treatment services for drug addiction do not have access to specialist psychiatry or clinical psychology, and therefore it may be assumed that cognitive deficits are not commonly assessed or taken account of in interventions (Davis et al., 2016).

The current results highlighted a range of clinical implications which could provide people with more support, for example, well-timed appointment reminders to support memory difficulties, and strategies such as problem solving and goal setting to support people’s efficacy in working towards recovery. People might also benefit from the opportunity to talk about the emotional impact of their impairment and the possible barriers to recovery. Such interventions might improve treatment engagement and completion for opiate-dependent individuals, which is currently at an all-time low of 26% (PHE, 2017b).
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Appendix 2. Recruitment advertisement

DO YOU WANT TO TAKE PART IN A RESEARCH STUDY?

This study is interested in understanding people’s experiences of memory and thinking difficulties

To take part you must be:

- Being prescribed methadone or buprenorphine
- Experiencing memory and thinking difficulties
- Age 18-65
- Not intoxicated by or withdrawing from alcohol or drugs at the interview

Do you experience difficulties with:
memory, concentration, organisation, multi-tasking?

The study will involve:

- A 1 hour interview to discuss your thinking difficulties
- Meeting at [ ]
- Meeting at a date and time to suit you
- Receiving a £10 shop voucher for your time

If you would like to find out more information please contact the researcher on [ ] (call backs will be given) or [ ]
Appendix 3. Participant Information Sheet

Participant Information Sheet [08.03.2017, Version 3]
EXPLORING MEMORY AND THINKING DIFFICULTIES IN OPIATE-USERS
IRAS ID:

Introduction
I am a trainee clinical psychologist. This study is part of my doctoral degree and I am supervised by x at the University of Surrey and x at the service. I would like to invite you to take part in a research project. Before you decide whether or not to take part, I would like you to understand why the research is being done and what it will involve for you. Please take the time to read the following information carefully. Talk to others about the study if you wish. If we meet, I will also go through this information sheet with you and answer any questions you have. Please ask if anything is not clear.

What is the purpose of the study?
People who have been given a diagnosis of opiate-use disorder sometimes experience thinking difficulties. For example, difficulty with remembering things, concentrating, planning for tasks and activities, doing several things at once, or switching from one activity to another. This study aims to understand this experience better. I am interested in interviewing people about their experiences of thinking difficulties. I hope this will study will produce knowledge that can be used to improve future services people receive and guide future research.

Why have I been invited to take part in the study?
You have been invited to take part in this study because you have been given a diagnosis of opiate dependence disorder and are receiving treatment at x. You have seen the advertising poster and contacted me, or a member of the NHS team thought you might be interested in this study’s focus on thinking difficulties (difficulty with remembering things, concentrating, planning for tasks and activities, doing several things at once, or switching from one activity to another). I will be interviewing a maximum of 8 people about their experiences.

Do I have to take part?
Participation is voluntary. It is up to you whether or not to join the study. After we have discussed the information sheet, and you have asked any questions, you will be given up to 4 weeks to decide whether to take part. If you agree to take part I will then ask you to sign a consent form before completing the study. You are free to withdraw from the study at any time, without giving a reason. This would not affect the standard of care you receive.

What will my involvement require?
If you agree to take part I will first ask you for some examples of your thinking difficulties. This could be done at the x, over the phone or by email, and will take roughly 10 minutes. If you have the kinds of thinking difficulties this study is interested in, we will then arrange a time and date to meet that suits you best. We will meet in a room at x, and we will meet for between 45 minutes and 1 hour to complete the interview.

Interview: First we will ask you some basic questions about yourself, for example how many years you have had in education, and your current living circumstances. Then we will ask questions about your experience of thinking difficulties, for example, what you notice, what’s hard/easy, what do they get in the way of. However we hope this will take the form of a conversation and that you will free to
talk. This will take between 45 minutes and 1 hour, and you will be able to take breaks if you need to. This interview will be audio-recorded.

At the end of the interview, you will be given a £10 store voucher for an agreed outlet store. If you begin the interview but do not complete it, you will be given a £5 store voucher instead. We can send you a copy of the results of the study when the project is finished. If you would be happy to share your thoughts about these results, please let us know.

The researcher will also access your clinical records at x to gather demographic information, for example, your diagnoses and prescriptions.

**What will I have to do?**

All meetings will take place at x. If you would like to take part I will first ask you for some examples of your thinking difficulties. If you have the kinds of thinking difficulties this study is interested in, then we can arrange a time and date meet and complete the interview. I can answer any questions you have about this. You will need to travel to x to meet with me and complete the interview.

**What are the possible disadvantages or risks of taking part?**

It is possible that during the interview you may find yourself talking about something that brings up difficult feelings. If this happens, we can decide whether you want to take a break, stop, or talk about something different. The researcher will do their best to help you with these feelings at the time. You can contact your recovery worker, or I can contact them on your behalf, if you experience ongoing distress.

**What are the possible benefits of taking part?**

No clinical benefit is intended by taking part, but I hope you will have a positive time sharing your experiences with me. I hope the information I get from this study will help improve the support offered to people with substance misuse difficulties.

**What happens if I don’t want to carry on with the study?**

If you withdraw from the study up to two weeks after the interview, we will not use any data collected in the final analysis and we can destroy the data collected so far, if you wish. Unfortunately after this two week period, data will be used in analysis and therefore we would not be able to remove it from the study.

**What happens when the research study stops?**

All data collected will be stored anonymously and securely for 10 years at University of Surrey. This is in accordance with the University of Surrey policies. You can opt to receive a summary of the results when I finish the study and you can comment on these if you want to. If you would like a copy of the results I will need to retain some personal identifiable information (name, forwarding address/email). This information will be kept securely on an encrypted USB at the University of Surrey and will be used only for the purpose of sending you a summary of the results of the study. Only members of the research team will have access to this information. This information will be deleted once I have sent you the results. It may take up to 2 years after you participate in the research for you to receive the results.

**What if there is a problem?**

If you have any concerns about any part of this study, you can contact me and I will do my best to answer your questions (Telephone – please leave a message and I will return your call). You can also talk to your recovery worker. For further advice you can talk to a member of the Patient Advice and Liaison Service (PALS) on x. If the problem is not resolved, you can contact the head of school at University of Surrey, Derek Moore on 01483686933.

**Will my taking part in the study be kept confidential?**
Your recovery worker will know that you are taking part in this study. However they will not know about the content of the interview, unless during the course of the interview you say something that causes me to be concerned for your safety or the safety of others, or that you might be breaking the law. I will then need to inform your recovery worker immediately, and I will let you know if I have to do this.

Audio-recordings of interviews will be saved anonymously and securely. The recordings will then be transcribed into written notes by the chief investigator. A professional transcriber may be used if you provide consent for this. All names will be changed and identifying information will be removed from these written versions. The professional transcriber will be required to sign a confidentiality agreement to ensure information in the recording remains confidential. Once transcription is completed the professional transcriber will be required to delete their copies of the written transcription and the audio-recording file. The transcriber will be required to act in accordance with Data Protection Act 1998, maintain confidentiality and store data securely and anonymously. Only myself, my supervisors, and you will have access to the audio-recordings and written interviews after transcription.

Your words may be quoted in the final write-up of the study and future publications. However, every care will be taken to ensure these quotations are anonymous.

All of the information will be stored securely for 10 years at University of Surrey. Data will be stored securely in accordance with the Data Protection Act 1998.

What will happen to the results of the research study?
The results will be written up as a doctoral thesis. They will also be submitted for publication in a peer reviewed journal and may be presented at academic conferences. You will not be identified in any report or publication, although your words may be quoted anonymously.

Who is organising and funding the research?
The study is being internally funded by University of Surrey. The project is supervised by x at the University of Surrey, and x at x.

Who has reviewed the project?
All research in the NHS is looked at by an independent group of people called the Health Research Authority, to protect your interests. This study has been approved and given a favourable opinion by South Central-Berkshire Research Ethics Committee.

Contact details of researchers
For further information about the study and taking part please contact:
Sophie Bates: x (call backs will be given); or x
You may also contact x, project supervisor at University of Surrey on x or x.
Appendix 4. Consent Form

Consent Form [08.03.2017, Version 3]

EXPLORING MEMORY AND THINKING DIFFICULTIES IN OPIATE-USERS
IRAS ID:

Please initial each box

- I have read and understood the Information Sheet provided (version 3, date 08.03.17). I have been given a full explanation by the investigators of the nature, purpose, location and likely duration of the study, and of what I will be expected to do.

- I have been advised about any disadvantages and risks on my well-being which may result. I have been given the opportunity to ask questions on all aspects of the study and have understood the advice and information given as a result.

- I agree to take part in a one-off interview to explore my experiences of thinking difficulties.

- I agree for the interview to be audio recorded and transcribed for the purpose of this study.

- I understand and agree that the recording will be transcribed into a written copy by a professional transcriber and all information will be recorded anonymously. The professional transcriber will be required to sign a non-disclosure agreement to ensure the information in your recording remains confidential. The transcriber will delete all written copies of the transcription and the audio-recording file when transcription is completed.

- Only members of the research team will have access to the original recording and written copy after transcription. I understand that this recording and written copy will be saved with an anonymous code and held securely at University of Surrey for 10 years. I retain the right to ask for the tape to be destroyed up to 2 weeks after the interview, in which case my data will not be included in the study.

- I agree for my anonymised data collected in the interview to be used for this study.

- I agree for my anonymised data collected in the interview to be used for future research.

- I give consent to my words being anonymously quoted in written reports.
• I understand that all project data will be held for at least 6 years and all research
data for at least 10 years in accordance with University policy and that my
personal data is held and processed in the strictest confidence, and in
accordance with the UK Data Protection Act (1998).

• I give permission for the principal investigator to access my clinical records and
relevant sections of my medical notes at x for the purpose of this study.

• I agree for the researchers to contact me to provide me with a study results
summary.

• I understand that I am free to withdraw from the interview at any time without
needing to justify my decision, without prejudice and without my legal rights and
care being affected.

• I understand that I can request for my data to be withdrawn up to 2 weeks after
the interview and that following my request all data already collected from me
will be destroyed and not included in the study.

• I agree for the researcher to contact my recovery worker if she has any concerns
for my safety or the safety of others. I understand that she will inform me if she
needs to do this.

• I acknowledge that in consideration for completing the study I shall receive a
£10 store voucher as compensation for my time and inconvenience and I
recognise that the sum would be £5 if I withdraw before completion of the
interview.

• I confirm that I have read and understood the above and freely consent to
participating in this study. I have been given adequate time to consider my
participation.

• I acknowledge that I will receive one copy of the consent form, one copy will be
kept by the research team, and one copy will be kept with my medical records
at x.

Name of participant (BLOCK CAPITALS)

..................................................................

Signed

..................................................................
Date

............................................................

Name of researcher

(Block Capitals)

Signed

............................................................

Date

............................................................
Appendix 5. Interview Schedule

Interview Schedule – Version I (22.05.17)

Demographic Information
Gender:
DoB:
Ethnicity:
School leaving age:
Living circumstances:
Partnership status:
Employment:
Length of opiate-use:
Length of time in contact with drug and alcohol services:
Medications (name, dose, how long):
Other drug previous and current drug use and length:
Mental health diagnoses:

Interview

1. Experiences of cognitive difficulties
   a. What makes you think you have memory and thinking difficulties? When did you first notice them?
   b. What kinds of memory and thinking difficulties do you have?/ Can you give me some examples?
      i. Provide concrete examples if necessary i.e. some people find it hard to remember what someone said....some people find it hard to do several things at once.....some people find it hard to organise their money. Is that the same/different for you?

Prompts: -
   Can you give me an example of..... (whatever difficulty mentioned)? –
   Can you tell me about a recent time when....? –
   What happened?
   How did you feel? (emotions – sad, frustrated, angry, embarrassed)
   What did you do in response?
   Can you tell me what it is like when...?

2. Impact on life
   a. How do they (memory and thinking difficulties) affect your day?
i. Provide concrete examples if necessary, i.e. paying your bills, arranging to see friends, coming to see your recovery worker, going to appointments, shopping, cooking

ii. Can you tell me about a recent time when x happened?

b. How would things be different if you didn’t have these difficulties?

c. What would be normal for you?

i. What was life like before you had these difficulties?

Prompts:
How does it make you feel? How do you feel after...?
What do you think when that happens?
How do you respond?
Can you tell me what it is like when....? / What’s that like for you?

3. Attribution/understanding

a. What do you think has caused these difficulties? / How do you explain these difficulties, what caused them, where did they come from?

b. How long have you had these difficulties? What was happening at the time?

c. Are there any other reasons you may have these difficulties?

i. Has anyone ever told you why you might have them? What do you think about that?

Prompts:
What was going on in your life when they started?
How does it make you feel?... have you always felt that way about the difficulties?

4. Feelings about self – if not already covered.

a. You’ve mentioned x, x and x - I wondered if you could tell me a bit more about how it makes you feel when....? / how does x make you feel?

b. Has it changed how you feel about yourself?

i. Concrete example e.g. how does it make you feel when you forget an appointment?

ii. How do you feel when it is particularly good/bad?

5. Others

a. Do other people notice these difficulties? What have they said to you? How do they react?

i. friends, family, psychiatrist, recovery worker, people you don’t know

b. Does it affect your relationship with them?
i. Does it affect whether you want to see them, what you share with them, or how you talk with them?

ii. Are they supportive? Do they say anything about them? – Give examples

Prompts:
- How does it make you feel?
- How do you respond?
- What do you say?
- What do you think?
- Can you tell me what it is like when....?

6. **Coping** (idea of interviewees as experts, naturally occurring therapeutic strategies)
   
a. *We’ve talked about xxxxx* – what do you do? how do you cope with xxxxxx?
   
b. Is there anything that helps you manage these memory and thinking difficulties?
      Who helps? Can you describe a recent example? (supportive people, strategies etc)
   
c. What makes xxxxx better?
   
d. Is there anything you find unhelpful? What makes xxxxx worse?
   
e. Do you do anything differently because of these difficulties? How do you feel about this?

Prompts
- Can you tell me what that is like?
- What is it like when....?
- How does it make you feel?
- How do you respond?

7. **Help that’s available**
   
a. Do you know whether there’s any help available?
   
b. Does your care coordinator/family/friend etc think that there’s any help available?
   
c. Is there anything that might help? Is this available?

Prompts
- Can you tell me what that is like? How does it feel?
- How do you respond?
Memory Management Tips

BE KIND TO YOURSELF
- Try to avoid stressful situations – anxiety and tiredness can make it harder to remember things
- Try not to do too many things at the same time
- Reduce distractions in your environment such as background noise
- If you do forget something, try and stay calm and think of links that may jog your memory

ORGANISATION
- Routine, routine, routine – doing set activities at set times of the day
- Keep things tidy and organised – have a set place for certain things, and always put things back in the same place

CONCENTRATION
- Focus on one thing at a time and don’t let yourself become distracted
- Finish one task before moving on to the next
- If you have to do something, do it straight away, so that you don’t forget it later
- Have regular breaks to avoid overload and tiredness
- Repeat things in your mind to help you remember – for example names, places, dates

MEMORY AIDS
- Chalkboards / Whiteboards – write down to-do lists for each day and cross things off when they have been done
- Diaries, calendars
- Notepads, post-it notes
- Alarms, mobile phones
- Other people – friends and family
Appendix 7. Ethical Approval: Health Research Authority

Health Research Authority

Dr Paul Davis
Teaching Fellow PsychD Clinical Psychology and Clinical Psychologist
Surrey and Borders Partnership NHS Foundation Trust
18 Mole Business Park
Randalls Park Drive
Leatherhead
KT22 7AD

17 May 2017

Dear Dr Davies,

Letter of HRA Approval

Study title: Exploring the understanding and experience of cognitive difficulties in people with an opiate-use disorder.
IRAS project ID: 218036
REC reference: 17/SC/0082
Sponsor The University of Surrey

I am pleased to confirm that HRA Approval has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

Appendix B provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. Please read Appendix B carefully, in particular the following sections:

- Participating NHS organisations in England – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities.
- Confirmation of capacity and capability - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.
- Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria) - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.
It is critical that you involve both the research management function (e.g. R&D office) supporting each organisation and the local research team (where there is one) in setting up your study. Contact details and further information about working with the research management function for each organisation can be accessed from www.hra.nhs.uk/hra-approval.

Appendices
The HRA Approval letter contains the following appendices:

- A – List of documents reviewed during HRA assessment
- B – Summary of HRA assessment

After HRA Approval
The document “After Ethical Review – guidance for sponsors and investigators”, issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

In addition to the guidance in the above, please note the following:

- HRA Approval applies for the duration of your REC favourable opinion, unless otherwise notified in writing by the HRA.
- Substantial amendments should be submitted directly to the Research Ethics Committee, as detailed in the After Ethical Review document. Non-substantial amendments should be submitted for review by the HRA using the form provided on the HRA website, and emailed to hre.amendments@nhs.net.
- The HRA will categorise amendments (substantial and non-substantial) and issue confirmation of continued HRA Approval. Further details can be found on the HRA website.

Scope
HRA Approval provides an approval for research involving patients or staff in NHS organisations in England.

If your study involves NHS organisations in other countries in the UK, please contact the relevant national coordinating functions for support and advice. Further information can be found at http://www.hra.nhs.uk/resources/applying-for-reviews/nhs-hsc-rd-review/.

If there are participating non-NHS organisations, local agreement should be obtained in accordance with the procedures of the local participating non-NHS organisation.

User Feedback
The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please email the HRA at hra.approval@nhs.net. Additionally, one of our staff would be happy to call and discuss your experience of HRA Approval.

HRA Training

We are pleased to welcome researchers and research management staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

Your IRAS project ID is 216036. Please quote this on all correspondence.

Yours sincerely

Thomas Fairman
HRA Assessor

Email: hra.approval@nhs.net

Copy to: Mr Ali Alshukry, The University of Surrey, (Sponsor Contact)
Miss Olga Balezikova, Surrey and Borders Partnership Foundation Trust, (Lead NHS R&D Contact)
Appendix A - List of Documents

The final document set assessed and approved by HRA Approval is listed below.

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copies of advertisement materials for research participants [Poster]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Sponsor Insurance]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Interview schedules or topic guides for participants [Interview Schedule]</td>
<td>1</td>
<td>10 January 2017</td>
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<td>IRAS Application Form [IRAS_Form_00022017]</td>
<td></td>
<td>08 February 2017</td>
</tr>
<tr>
<td>Notice of Substantial Amendment (non-CTIMP) [Notice of substantial amendment.pdf]</td>
<td>1 (AM01)</td>
<td>12 March 2017</td>
</tr>
<tr>
<td>Other [HRA Schedule of Events]</td>
<td>1</td>
<td>09 March 2017</td>
</tr>
<tr>
<td>Other [HRA Statement of Activities]</td>
<td>1</td>
<td>09 March 2017</td>
</tr>
<tr>
<td>Other [Memory Management Tips]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Other [Non-disclosure agreement (for transcriber)]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Participant consent form [Consent Form V3.docx]</td>
<td>3</td>
<td>08 March 2017</td>
</tr>
<tr>
<td>Participant consent form [Consent form tracked changes.docx]</td>
<td>3</td>
<td>08 March 2017</td>
</tr>
<tr>
<td>Participant information sheet (PIS) [Participant Information Sheet tracked changes.docx]</td>
<td>3</td>
<td>12 March 2017</td>
</tr>
<tr>
<td>Participant information sheet (PIS) [PIS with HRA amendments.docx]</td>
<td>3</td>
<td>12 March 2017</td>
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<tr>
<td>Research protocol or project proposal [Research protocol]</td>
<td>1</td>
<td>10 January 2017</td>
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<tr>
<td>Summary CV for Chief Investigator (CI) [Chief Investigator CV]</td>
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<td>10 January 2017</td>
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<tr>
<td>Summary CV for student [Principal Investigator CV]</td>
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<td>10 January 2017</td>
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<tr>
<td>Summary CV for supervisor (student research) [Collaborator/external supervisor CV]</td>
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Appendix B - Summary of HRA Assessment

This appendix provides assurance to you, the sponsor and the NHS in England that the study, as reviewed for HRA Approval, is compliant with relevant standards. It also provides information and clarification, where appropriate, to participating NHS organisations in England to assist in assessing and arranging capacity and capability.

For information on how the sponsor should be working with participating NHS organisations in England, please refer to the, participating NHS organisations, capacity and capability and Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria) sections in this appendix.

The following person is the sponsor contact for the purpose of addressing participating organisation questions relating to the study:

Name: Mr Ali Alshukry
Email: ngo@surrey.ac.uk

HRA assessment criteria

<table>
<thead>
<tr>
<th>Section</th>
<th>HRA Assessment Criteria</th>
<th>Compliant with Standards</th>
<th>Comments</th>
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</thead>
<tbody>
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<td>IRAS application completed correctly</td>
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<td>No comments</td>
</tr>
<tr>
<td>2.1</td>
<td>Participant information/consent documents and consent process</td>
<td>Yes</td>
<td>No comments</td>
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<tr>
<td>3.1</td>
<td>Protocol assessment</td>
<td>Yes</td>
<td>No comments</td>
</tr>
<tr>
<td>4.1</td>
<td>Allocation of responsibilities and rights are agreed and documented</td>
<td>Yes</td>
<td>The sponsor has submitted the HRA Statement of Activities and intends for this to form the agreement between the sponsor and study sites. The sponsor is not requesting, and does not require any additional contracts with study sites.</td>
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<td>4.2</td>
<td>Insurance/indemnity arrangements assessed</td>
<td>Yes</td>
<td>Where applicable, independent contractors (e.g. General Practitioners) should ensure that the professional</td>
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<td>Section</td>
<td>HRA Assessment Criteria</td>
<td>Compliant with Standards</td>
<td>Comments</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>Indemnity provided by their medical defence organisation covers the activities expected of them for this research study.</td>
<td>Yes</td>
<td>No application for external funding has been made. No study funding will be provided to sites, as detailed at Schedule 1 of the Statement of Activities.</td>
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<td>4.3</td>
<td>Financial arrangements assessed</td>
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<td>5.1</td>
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<td>No comments</td>
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<td>5.3</td>
<td>Compliance with any applicable laws or regulations</td>
<td>Yes</td>
<td>No comments</td>
</tr>
<tr>
<td>6.1</td>
<td>NHS Research Ethics Committee favourable opinion received for applicable studies</td>
<td>Yes</td>
<td>REC Favourable Opinion was issued by the Berkshire Research Ethics Committee on the 7th March 2017. Amended documents were submitted on by the researchers to comply with HRA Approval standards. These were classified by the sponsor as a substantial amendment. This was given a Favourable Opinion by the REC on the 6th April 2017.</td>
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<td>6.2</td>
<td>CTIMPS – Clinical Trials Authorisation (CTA) letter received</td>
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<tr>
<td>6.3</td>
<td>Devices – MHRA notice of no objection received</td>
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<td>No comments</td>
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<td>6.4</td>
<td>Other regulatory approvals and authorisations received</td>
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<td>No comments</td>
</tr>
</tbody>
</table>
Participating NHS Organisations in England

This provides detail on the types of participating NHS organisations in the study and a statement as to whether the activities at all organisations are the same or different.

All participating NHS organisations will undertake the same study activities. There is therefore only one study site 'type' involved in the research.

The Chief Investigator or sponsor should share relevant study documents with participating NHS organisations in England in order to put arrangements in place to deliver the study. The documents should be sent to both the local study team, where applicable, and the office providing the research management function at the participating organisation. For NIHR CRN Portfolio studies, the Local CRN contact should also be copied into this correspondence. For further guidance on working with participating NHS organisations please see the HRA website.

If chief investigators, sponsors or principal investigators are asked to complete site level forms for participating NHS organisations in England which are not provided in IRAS or on the HRA website, the chief investigator, sponsor or principal investigator should notify the HRA immediately at hra.approval@nhs.net. The HRA will work with these organisations to achieve a consistent approach to information provision.

Confirmation of Capacity and Capability

This describes whether formal confirmation of capacity and capability is expected from participating NHS organisations in England.

NHS organisations in England that are participating in the study will be expected to formally confirm their capacity and capability to host this research.

- Following issue of this letter, participating NHS organisations in England may now confirm to the sponsor their capacity and capability to host this research, when ready to do so. How capacity and capability will be confirmed is detailed in the Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria) section of this appendix.
- The Assessing, Arranging, and Confirming document on the HRA website provides further information for the sponsor and NHS organisations on assessing, arranging and confirming capacity and capability.

Principal Investigator Suitability

This confirms whether the sponsor position on whether a PI, LC or neither should be in place is correct for each type of participating NHS organisation in England and the minimum expectations for education, training and experience that PIs should meet (where applicable).

A Principal Investigator should be appointed at study sites.

GCP training is not a generic training expectation, in line with the HRA statement on training expectations.
HR Good Practice Resource Pack Expectations

This confirms the HR Good Practice Resource Pack expectations for the study and the pre-engagement checks that should and should not be undertaken.

If members of the external research team will be attending NHS sites to conduct the study activities detailed at IRAS A18 and A19 they should obtain a Letter of Access for this purpose. This would be on the basis of a Research Passport or an NHS to NHS confirmation of pre-engagement checks letter (if NHS employed). Pre-engagement checks should confirm standard DBS checks, appropriate barred list checks, and occupational health clearance.

Other Information to Aid Study Set-up

This details any other information that may be helpful to sponsors and participating NHS organisations in England to aid study set-up.

The applicant has indicated that they do not intend to apply for inclusion on the NIHR CRN Portfolio.
Appendix 8. Ethical Approval: University of Surrey Sponsorship

Miss Sophie Bates
School of Psychology
Faculty of Health and Medical Sciences

17 May 2017

Confirmation of sponsorship by the University of Surrey

Dear Sophie,

Study title: Exploring the understanding and experience of cognitive difficulties in people with an opiate-use disorder.

University of Surrey reference: SPON/2016/028/FHMS

I am writing to confirm that the above study has satisfied the requirements of the University of Surrey Research Integrity and Governance Office. We are pleased to confirm that the University of Surrey, as a recognised Sponsor under the Department of Health’s Research Governance Framework for Health and Social Care, agrees to act as a Sponsor for your study on the basis of the documentation listed below:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copies of advertisement materials for research participants [Poster]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Sponsor insurance]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Interview schedules or topic guides for participants [Interview Schedule]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>IRAS Application Form [IRAS_Form_08022017]</td>
<td></td>
<td>08 February 2017</td>
</tr>
<tr>
<td>Notice of Substantial Amendment (non-CTIMP) [Notice of substantial amendment.pdf]</td>
<td>1 (AM01)</td>
<td>12 March 2017</td>
</tr>
<tr>
<td>Other [HRA Schedule of Events]</td>
<td>1</td>
<td>09 March 2017</td>
</tr>
<tr>
<td>Other [HRA Statement of Activities]</td>
<td>1</td>
<td>09 March 2017</td>
</tr>
<tr>
<td>Other [Memory Management Tips]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Other [Non-disclosure agreement for transcriber]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Participant consent form [Consent Form V3.docx]</td>
<td>3</td>
<td>08 March 2017</td>
</tr>
<tr>
<td>Participant consent form [Consent form tracked changes.docx]</td>
<td>3</td>
<td>08 March 2017</td>
</tr>
<tr>
<td>Document Description</td>
<td>Pages</td>
<td>Date</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
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</tr>
<tr>
<td>Participant information sheet (PIS) [Participant+Information+Sheet tracked changes.docx]</td>
<td>3</td>
<td>12 March 2017</td>
</tr>
<tr>
<td>Participant information sheet (PIS) [PIS with HRA amendments.docx]</td>
<td>3</td>
<td>12 March 2017</td>
</tr>
<tr>
<td>Research protocol or project proposal [Research protocol]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Summary CV for Chief Investigator (CI) [Chief Investigator CV]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Summary CV for student [Principal Investigator CV]</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>Summary CV for supervisor (student research)</td>
<td>1</td>
<td>10 January 2017</td>
</tr>
<tr>
<td>[Collaborator/external supervisor CV]</td>
<td></td>
<td></td>
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</tbody>
</table>

Your study does not require review by the University of Surrey Ethics Committee and you have permission from the University of Surrey to commence recruitment once the necessary approvals have been obtained from the relevant Research and Development offices. Should the existing protocol undergo any changes you must complete the self-assessment form to determine whether the requirement for ethical review will change.

Please also ensure that you and your supervisors are familiar and act in accordance with the University of Surrey’s Code on Good Research Practice and the Ethical Principles and Procedures for Teaching and Research.

Yours sincerely,

Andrew McClave
Clinical Research and Governance Officer

Copy to. Dr Paul Davis, Dr Robert Patton
Appendix 9. R&D Expression of Interest Form

<table>
<thead>
<tr>
<th>Name:</th>
<th>Consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>23/5/17</td>
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</table>

<table>
<thead>
<tr>
<th>Name:</th>
<th>Consultant</th>
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<tbody>
<tr>
<td>Date:</td>
<td>23/5/17</td>
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<table>
<thead>
<tr>
<th>Name:</th>
<th>Service Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>23/5/17</td>
</tr>
</tbody>
</table>

Project supported by the Responsible Care Professional(s) in the relevant clinical area(s), if applicable:

<table>
<thead>
<tr>
<th>Name:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td></td>
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</tbody>
</table>

Name(s) of other members of the Research team, if relevant. Student research will typically be conducted by the student only. Please note that the identified field supervisor does not act as a member of the research team:

<table>
<thead>
<tr>
<th>Name:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Project Please give a brief summary only as all study documentation should be submitted electronically in parallel to the IRAS application (if relevant) to avoid delays in gaining approval

Background to the proposal: (what in-service development, professional development or other factors prompt you to want to do this research)

<table>
<thead>
<tr>
<th>Research Context:</th>
<th>Research Question to be addressed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baidacchio et al. (2012: 2017) completed a systematic review and meta-analysis of the research on cognitive impairment in opiate-users in treatment for opiate-substitution. These reviews found significant and robust cognitive impairment in this population across a number of cognitive domains. These studies emphasised the importance to understand more about the impact of this impairment on these individuals and their ability to engage with and adhere to treatment.</td>
<td></td>
</tr>
<tr>
<td>This study aims to gather information from people attending an opiate-substitution service, who have been with the service for over 5 years, who self-identify as having memory and thinking difficulties. The study hopes to further our understanding of how this population make sense of their cognitive difficulties, with regard to how it impacts their life, their sense of self, their relationships, and how they cope.</td>
<td></td>
</tr>
</tbody>
</table>

Planned Methodology:

- Qualitative Methodology - Interpretative Phenomenological Analysis (IPA)

The interviews will be audio-recorded and transcribed and analysed using IPA.

All research carried out within the Trust requires Trust approval. Please notify the R&D office at the earliest opportunity of your proposed project. All researchers are required to complete the IRAS application. HRA Research Ethics approval, if applicable, should be applied for in parallel to Trust R&D approval. Higher Education Institutes (HEIs) may grant their own internal ethics; however, the HRA Research Ethics Committees is a separate entity, and is accessed through the IRAS application system and may still apply. 

https://www.myresearchproject.org.uk/

Check list – You may need to include the following when submitting to the Trust:

- if unsure, contact the R&D office for clarification

Expression of interest form – (electronic and signed hard copy)

Full or outline proposal / project (electronic, if possible)

Study documentation: All attachments, appendices, letters of consent, questionnaires etc (electronic)

IRAS application including the NHS SSI Form, if a multi-site study (in electronic XML and pdf format

Research Passport or other relevant contract as requirement for external researchers who wish to undertake research in our Trust

A Research Project Agreement will be issued ahead of or with the letter of approval. The researcher must obtain the necessary signatures and return a copy to the R&D office as a condition of approval.
Appendix 10. Process of analysis

Single-case analysis

On first reading of the transcript, initial responses and thoughts about the data were made in one column, including any associations or connections, or notes of significance. The transcripts were then re-read and the initial responses were translated into emergent themes in another margin. Emergent themes were of a higher more abstract order, and aimed to capture the essence of what had been said by the participant.

Identification of emergent themes

Identifying emergent themes for each case was an iterative process. Identifying superordinate themes across participants was a further iterative process. Themes were selected on their relevance to the research question, richness of the material, and the level of importance for the participant. Interpretations were continually checked to ensure they reflected the participants’ actual words, and a number of themes and interpretations were dropped along the process, as they lacked credibility.

Alterations made to improve readability of extracts

Square brackets represent missing material and were used to ensure the inclusion of relevant information and to make the quotes more manageable sizes. Information within square brackets indicates added material which clarifies what a participant is referring to. Dotted lines indicates a pause in the participants’ parlance. Minor hesitations and utterances ("umms") have been removed when they are not considered to impact the meaning.
Appendix 11. Yardley’s framework: ensuring quality and validity

Sensitivity to context

The literature review outlined existing quantitative data in the area of cognitive impairment, whilst highlighting a lack of qualitative research relating to cognitive impairment and substance misuse. Further information from Public Health England and Department of Health documents highlighted the importance of carrying out such research and its potential impact on clinical contexts. The researcher remained sensitive to the participants’ experience of sharing personal information, using a non-judgmental, empathic, and validating response. Data was analysed in-depth and the voice of each participant was represented using verbatim extracts.

Commitment and rigour

I showed commitment to the research by immersing myself in the topic, including reading published literature in scientific journals, keeping up to date with current affairs in the area (news stories, public health, policies etc), watching documentaries about the participant group, and meeting with current or abstinent drug-users outside of the research study and service environment. I chose to complete all transcriptions to further immerse myself in the data and support the process of in-depth analysis. As a beginner I was motivated to utilise every opportunity for further teaching and supervision in qualitative and IPA methods. I attended lectures on IPA as part of my clinical training, reading relevant books and articles about the approach and its methodology, and immersing myself in existing IPA literature. I attended all specialist IPA workshops that were offered as an optional extra at university, which supported the development of the interview schedule, learning about researcher stances, and the analysis process. On two occasions I sought further support from an IPA expert to check the credibility of my analysis and interpretation, which led to the development of themes and the analytic story. I completed credibility checks in a number of
ways, including comparing line-by-line analysis of part of a transcript with a peer, presenting
an initial and preliminary diagram of emergent themes for participant to a group of peers and
an IPA expert. I also checked the validity of chosen quotes with a peer, who was able to
challenge my interpretations and support the development of credible themes. I continually
sought the expertise of my supervisor to guide me through the process.

**Transparency and coherence**

The methods section of the project clearly outlines the research and analysis process.
Furthermore, utilising Yardley’s framework has enabled me to show how I have worked to
ensure quality and validity in the work. I have provided examples of analysis to support an
audit trail, reflecting how the themes and interpretations have developed and changed over
time. I have also shared reflexive thoughts highlighting how my personal assumptions and
experiences interacted with the participant group and influenced the study process. Teaching,
reading, and supervision ensured the project was in line with IPA’s underlying theoretical
assumptions at all stages.

**Impact and importance**

The introduction and discussion talks at length about the useful applications of the knowledge
gained from this research project, in particular noting the clinical implications of the findings.
Appendix 12. Self-reflexivity

From inception to completion of the research project, a reflexive journal was kept to support the researcher in creating distance from the immediate context of the research, supporting awareness of one’s own assumptions and biases, and how these have impacted the research. Considerations of how the institutional context of the project influenced the research process were also made. I have chosen to share my reflexive experiences in the context of the participants, noting the relationship is one of reciprocity and shared influence.

Reflexivity and the impact of difference on the study

I am a 26 year old white British female currently training to be a Clinical Psychologist. I have experience working with adults with complex mental health difficulties and who use illicit substances as a way to cope and manage. I am experienced in using formulation to make sense of an individual’s difficulties, and I am aware of the importance of considering a multitude of biopsychosocial factors. I have personal experience of family members struggling with drug addiction and have noticed the impact of drug use on their cognitive functioning. I am also aware of the stigma related to drug use in society, perceiving it as a life choice rather than an outcome of extremely adverse circumstance. These experiences influenced the assumptions I had before I began the study, such that a drug-using population experience a wide-range of difficulties, often associated with mental health, and adequate support is not widely available. Prior to this study, I had not been in contact with chronic illicit opiate-users. I noticed my trepidation in starting the research project, and particularly felt anxious about my role as a researcher, compared to my more primary professional identity (with which I feel more comfortable), as a psychologist.

The power in the researcher-participant relationship was of particular importance, potentially impacting what information was shared and what was further explored. The relationship was partly informed by my professional status as ‘researcher’, for example aligning with other
members of staff in the service, and placing myself in staff offices, rather than communal areas for service users. However it was further impacted by other differences between myself as a middle-class, highly-educated, and employed individual, and the participants who identified as working class, poorly educated, and all unemployed. As a result a powerful power-imbalance existed, with myself holding more power than the participants. However, I reflected on my own ethnographic position; that of an outsider who wanted to get inside a particular group. In this case I perceived that the participants held some level of power over the ‘desired’ information, wanted by the researcher and held by the participant. And in fact many participants who met the inclusion/exclusion criteria, chose not to take part. I wonder whether I was perceived as an intruder, wanting access to personal and private information, potentially loaded with feelings of shame and stigma.

In spite of this, when meeting with participants it was clear that I was both positioned as, and behaved in a way that reflected the professional with greater levels of power, organising and structuring the meeting, controlling the questions, and choosing to explore, or not explore, certain areas. Across the interviews, the disparity between the researcher’s aims and the participants’ needs/aims were clear. The researcher was primarily focused on gathering information about an individual’s experience of cognitive impairment. However, participants often chose to share a fuller and more complete narrative of their life experiences. Although I had predicted complexity in the participants, I had assumed that participants would be able to compartmentalise their experience of cognitive impairment, for example from their experience of addiction. In the earlier interviews I noticed myself struggling to manage the interview space. I had emphasised to participants that I would like them to lead the interviews as much as me, and to share what was of importance to them. I had not predicted that the conversations would deviate so much from the topic of cognitive impairment.
I was aware that as the researcher I held the power to close down areas of inquiry, and open up others. However, identifying primarily as a trainee clinical psychologist, who embodies empathy, recognition, and validation, I felt conflicted over what control I ‘should’ have over the interviews. Furthermore, there were expectations from the institutions providing ethical approval for the study, that the researcher would behave sympathetically and supportively towards participants. I noticed that my ability to actively listen to the sharing of distressing experiences, and contain the expression of distressing emotions, may have served to reinforce and increase the level of disclosure. Even when directing conversations back to cognitive impairment, I noted that the conversation could frequently meander away from this area.

I reflected on the context of the interviews; in a drug service. This may have provided a powerful marker for participants to interpret what the interviews were about, priming them to talk more broadly about their experiences of addiction and recovery. For the latter interviews, I had better developed my identity as a researcher, and felt better able to balance the need for support and validation with the research aims. This experience highlighted the importance of reflecting on differences between the researcher and participants, and recognising how they might impact the interview process, as we all come with different experiences, contexts, and aims.

These experiences in the interviews consequently impacted the process of analysis and reporting. In line with the project objectives, I was required to attempt to separate out experiences of cognitive impairment from other experiences, such as drug addiction. This was challenging, and at times I felt I was doing the participants a disservice, not reflecting the fullness of their experiences. It is therefore important to note that an alternative research project could be born out of the existing data, if the focus were to move away from cognitive impairment, and toward participants’ life experiences and addiction. Existing research does
explore such areas (Larkin & Griffiths, 2002), and therefore was not chosen as the focus of the current report.

When I first came to analyse the data, I was influenced by my assumptions of cognitive impairment and the impact it is likely to have on people’s lives. I found myself struggling to synthesise and assimilate data that did not fit with this view. In particular, one participant differed from the others in the way in which they experienced and made sense of memory and thinking difficulties. I was initially concerned about how this contrasting data would impact the conclusions of the study, and resultantly the clinical implications. However throughout the analysis process I learned how these differences, both from my assumptions and other participant experiences, added to the richness of the data. Highlighting such nuances in light of contextual information was used to support and elaborate the interpretative process. This experience highlighted the importance of following leads that might not fit, and exploring things further when it challenges assumptions.
Appendix 13. Audit Trail

The following audit trails reflect the stages of analysis, from exploratory comments, to emergent themes, to superordinate theme (participant specific), to initial master theme (across the group), to the revised master theme for the group.

Table 3. Extract from Jack’s interview

<table>
<thead>
<tr>
<th>Exploratory comments</th>
<th>Interview extract</th>
<th>Emergent themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty getting point across – trying to communicate extent of impairment</td>
<td>P: If I went from 1-10 I said how difficulties with me if I gave a number, 2 or 3, you know if I want to give a number… it makes it so hard for me, because always even for my medication I don’t take it, most often my wife she have to remind me, to take my medication, even sometimes you know, ok you want to take it, todays a Thursday, you have to get medication from your GP, from the pharmacist, tomorrow is Tuesday, don’t forget your appointment there. Always she needs to remember me you know every time to, even you know when something happen in future, I forgot, you know I won’t attend my appointment, most the times I forgot, she has to remind me. I think if I take this medication, my brain is blocked</td>
<td>Big impact on life</td>
</tr>
<tr>
<td>Reliant on wife to take medication</td>
<td></td>
<td>Reliance on wife to engage/function in life</td>
</tr>
<tr>
<td>Reliant on wife for appointments</td>
<td></td>
<td>Complete reliance on wife</td>
</tr>
<tr>
<td>‘Always’, ‘everything’</td>
<td></td>
<td>Couldn’t cope alone</td>
</tr>
<tr>
<td>Blocked brain</td>
<td></td>
<td>Prospective memory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impairment as a result of medication</td>
</tr>
</tbody>
</table>

Transformation of the theme over time:
1. Emergent theme – Reliance on wife, cannot rely on myself
2. Superordinate theme – Unable to manage condition independently
3. Initial master theme - Low self-efficacy, lack of agency
4. Revised master theme – Perceptions of the self as spoiled: perceived changes in dependence and independence

The revision of the master theme was supported by checking the theme in supervision. My supervisor challenged the language I used for the initial master theme, as it was informed by psychological constructs. They wondered whether it truly reflected what participants had said. I therefore went back to the data and ensured the theme title better reflected participants’ comments, rather than being influenced by what I wanted to see.
Table 4.  
Extract from John’s interview

<table>
<thead>
<tr>
<th>Exploratory comments</th>
<th>Interview extract</th>
<th>Emergent themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working memory – holding things in mind</td>
<td>I: yeah so holding those sort of multiple bits of information in your mind is difficult for you P: yeah, yeah, really difficult I: yeah and in a situation like that do you ever do anything to sort of i guess try and manage that to try and support your memory? P: um (pause) not really, i dont know what you mean by that I: i guess like some people might write a list down, do you? P: yeah sure yeah. Sometimes i do yeh, i do now i do a lot now, i never used to I: oh ok yeah P: cus of obviously um i didnt realise how bad my memory was getting how bad it was getting you know but I: and i guess with that sometimes certainly with memory sometimes its other people that sort of notice it before you notice it yourself. would did that happen for you, were other people sort of saying things to you? P: my my partner noticed it all the time, you've forgotten to do this you've forgotten to do that, i've asked you to do this you didnt do that, and it'd be like oh god, do you know what i mean I: so she was like one of the first sort of people to notice it P: yeh I: yeah and how i guess how thinking about those sorts of memory difficulties how is it impacting your life, sort of since theyve been present? P: um it hasnst been too bad, ive learnt to er cope and adjust and yeh i write notes and um if i've got things coming up i have to keep like um especially from like appointments for here i have texts</td>
<td>Significant difficulty holding information in mind</td>
</tr>
<tr>
<td>Do you do anything to cope? Confusion – due to lack of coping strategies or misunderstood question?</td>
<td></td>
<td>Memory strategies</td>
</tr>
<tr>
<td>Writing lists to support memory</td>
<td></td>
<td>Change – not who he used to be</td>
</tr>
<tr>
<td>Partner more aware of memory difficulties than myself</td>
<td></td>
<td>Lack of insight into memory difficulties</td>
</tr>
<tr>
<td>Proactive use of strategies – writing note, reminders for appointments, repetition</td>
<td></td>
<td>Burden</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of awareness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proactive use of memory aids – reduces impact of difficulties on life</td>
</tr>
<tr>
<td>Exploratory comments</td>
<td>Interview extract</td>
<td>Emergent themes</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>on my phone i have to keep going over the texts like right so thats on the 15th, do you know what i mean? you know and just sort of keep trying to</td>
<td>Don’t give up</td>
<td></td>
</tr>
<tr>
<td>I: sort of repetition of that information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P: yeah, yeah, yeah, and just keep going on</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Transformation of the theme over time:**
1. Emergent theme – Need to be aware of impairment to do anything about it
2. Superordinate theme – Awareness leads to acceptance leads to coping
3. Initial master theme – Coping with what I can no longer do – coping strategies
4. Revised master theme – Coping with a lesser self: acceptance and adaptation
Appendix 14. Credibility Checks

Throughout the research project I completed a range of credibility checks to determine whether supervisors and peers agreed with my interpretations of the data. These processes supported my analysis and resulted in a number of amendments, to ensure the analysis best reflected the data, remaining credible and valid.

1. Comparing line by line analysis and emergent themes

This task was completed early on in the analytic process, when I initially analysed the first transcript. Being aware of the potential impact of confirmation bias, I chose to begin with line-by-line analysis, reducing the chances of cherry picking data of interest which may have been based on my assumptions and hypotheses. A peer also completed line-by-line analysis on a section of the transcript (see table 5). In bold I have highlighted areas of disparity between my analysis and my peer’s analysis. My peer had interpreted the use of the word ‘laugh’ as evidence of the participant using humour to cope. Whereas I had interpreted this as him describing others laughing at him. For this participant, English was his second language, and this disparity highlighted how much of the meaning was shared in the room using facial expressions and body language, rather than just relying on words. It also highlighted how I had used knowledge from the rest of the transcript to support my interpretation when meanings were more ambiguous. My peer also interpreted his comments as stubborn or obstinate, whereas I believed the participant was emphasising his lack of control over the situation “I don’t want to do something purposely”. Again I was using information from the rest of the transcript; for this participant his sense of lack of control was evident throughout. This process reflects the importance of the hermeneutic circle, which states “to understand any given part, you look to the whole; to understand the whole, you look to the parts” (Smith et al., 2009). When I discussed this with my peer, and showed other examples in the transcript, we agreed that I had established the most accurate meaning of this data. However it indicated how useful it would have been to check my meaning with the participant in the moment to ensure I had understood him correctly.

Table 5.
Line by line analysis by the researcher and a peer using IPA

<table>
<thead>
<tr>
<th>Interview extract</th>
<th>Line-by-line analysis (main researcher)</th>
<th>Line-by-line analysis (peer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P: You know the memory difficulties for me you know if for example I leave something somewhere, I completely, too many times I forgot, that things is the biggest problems, and like er if I speak with someone, or you speak with me now, even I speak with somebody, like I speak with you, I completely forgot you know what did I say, and the conversation completely, it stops, and my mind goes completely a different way, I don’t know what is with my mind, if I back again with this conversation, after If I come back you know, if I you know ….. nothing to me, there are things, I made fun of</td>
<td>Forgetting where something is – big problem</td>
<td>Forgetting where he’s left stuff – biggest concern</td>
</tr>
<tr>
<td></td>
<td>Can’t keep conversation going</td>
<td>Forgetting conversations and his involvement</td>
</tr>
<tr>
<td></td>
<td>Can’t remember what talking about</td>
<td>Tangential mind</td>
</tr>
<tr>
<td></td>
<td>Distracted – by internal or external stimuli?</td>
<td>Confused about own mind</td>
</tr>
<tr>
<td></td>
<td>Made fun of</td>
<td>Coming back – meaning lost</td>
</tr>
</tbody>
</table>
### Interview extract

make something for the fun, or maybe they are laughing at me, like for example I don’t respect them, they think like this, I don’t want to do something purposely, but they think like this, or if like or if somebody speak with me, or if they speak with me my mind is going a different way, completely losing everything said

### Line-by-line analysis

<table>
<thead>
<tr>
<th>Main researcher</th>
<th>Peer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People think negatively of me</strong>&lt;br&gt;Not my fault&lt;br&gt;No control</td>
<td>Mind is distracted, can’t control mind/thought processes</td>
</tr>
<tr>
<td><strong>Coping and humour</strong>&lt;br&gt;Unsure of place/identity in conversation&lt;br&gt;Being stubborn/obstinate</td>
<td>Sometimes has control over not listening&lt;br&gt;Mind not focusing, losing new information</td>
</tr>
</tbody>
</table>

### Summary of a presentation of initial themes for one participant

During a university qualitative research workshop, I presented the diagram below (figure 1) to a group of peers also undertaking IPA, and an IPA expert. I was able to talk through the analytic story, explaining how aspects of the participants experience linked together, and what particular psychological concepts were triggered in my mind. Feedback from the group helped me to think about the initial theme titles, which at this stage were much more categorical. I was supported to go back to the participants’ data and use their words to develop more appropriate titles that better reflected the data. Feedback also supported me in considering how contextual information about Jack could help make sense of the data. For example I began to see that how Jack made sense of his impairment (medication side effects, trauma), impacted his emotional experience (sadness, loss, anger). Furthermore it was interesting to note that Jack’s sense of lack of control over the causes (trauma) were also associated with a lack of control over the impairment and its management (not on purpose).
Figure 1.

Initial themes for Jack
PART 2: RESEARCH – LITERATURE REVIEW

Cognitive impairment in opiate-dependent populations receiving an opiate-substitution: A literature review.

Abstract

Introduction: Existing literature suggests chronic opioid use is associated with lasting cognitive impairment. However the focus has been on finding a causal mechanism between opiates and impairment. Existing reviews have therefore excluded studies and participants on the basis of complicating factors such as polydrug use, mental health diagnoses, and brain trauma. However, these factors are very common in opiate-using groups, and current reviews may be underestimating the level of cognitive impairment in these populations.

Method: A systematic review of the literature on cognitive impairment in opiate-dependent populations receiving opiate substitution was completed. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines were used.

Results: This literature review indicated that few studies exist which investigated cognitive impairment in typical opiate-dependent populations receiving opiate substitutions. A large proportion of available research excluded participants if they reported other drug use, alcohol use, mental health diagnoses, head injury, and overdoses. However despite these stringent exclusion criteria, studies still reported a significant level of cognitive impairment across a broad range of cognitive domains.

Discussion: Methodological differences and limitations affected the conclusions that could be drawn. More research is needed to investigate the level of cognitive impairment in more typical opiate-dependent populations who also report concurrent mental health difficulties, polydrug use, and experiences of overdose and head injury.
1.1 Introduction

1.1.1 Opiate-use disorder and cognitive impairment

The aetiology and nature of cognitive impairment is varied (Lezak et al., 2012). Specialist services exist to both diagnose and offer support for individuals with cognitive impairment, for example memory clinics and rehabilitation services for head injuries. These services recognise that an individual with a significant cognitive impairment requires specialised support tailored to their needs. One group of individuals who may experience significant cognitive impairment are individuals with a substance use disorder. Cognitive deficits have been reported across a range of different substances with a range of abuse durations. Animal and human studies have revealed neural mechanisms underlying changes in cognition and behaviour as a result of drug intoxication. Research indicates that ketamine administration results in a broad range of cognitive impairment (Curran & Morgan, 2000), and the negative impact of benzodiazepines on memory is well-documented (Curran, 1991). In addition the negative neuropsychological effects of cocaine have long been reported, together with the impact of polydrug use (Rosselli & Ardila, 1996). However these changes are transient and cease within hours to days. On the other hand, cognitive impairment associated with long-term alcohol use is well-researched and widely understood. Damage to the mammillary bodies in the brain results in irreversible cognitive impairment, such as amnesia also known as Wernicke-Korsakoff syndrome (Stavro et al., 2013; Thomson & Marshall, 2006). Less is understood about the neural mechanisms which may underlie the long-term effects of illicit drugs with relation to cognitive functioning. However research does indicate that long-lasting effects do exist in a range of illicit drugs (Mittenberg & Motta, 1993; Rogers & Robbins, 2001).

Heroin is a highly addictive illicit substance, and therefore is widely associated with chronic and dependent use as compared to recreational use (Gable, 2006). Public Health England (PHE) most recently estimated 293,879 opiate-users in England in 2014/15 (PHE, 2015). In 2017,
further data gathered reported 146,536 (60%) people with a primary diagnosis of opiate-use disorder were in treatment (PHE, 2017). Although laboratory tests with animals indicate that pharmaceutical diamorphine (heroin) has no neurotoxic effect (Power et al., 1991), research indicates that cognitive impairment could be caused by life-style factors associated with heroin use (Darke et al., 2000). Non-fatal overdose can cause anoxia; research suggests there is a poor response to overdose in heroin which increases the likelihood of long-lasting brain damage as a result of starving the brain of oxygen. Concomitant alcohol abuse is high in illicit drug users (with 20% of opiate-dependent users also having an alcohol dependence) and can result in alcohol related brain injury (PHE, 2017). Furthermore, traumatic head injury can result from a lifestyle of crime, aggression and antisocial behaviour, as people with heroin dependence usually develop a tolerance through daily use, which can result in an expensive addiction and a motivation to commit crime (Darke et al., 2000; Department of Health, 2017). Consequently this population is of importance when considering cognitive impairment associated with chronic drug use.

A large body of research has been dedicated to exploring the extent of cognitive impairment in long term opiate-users (Ersche & Sahakian, 2007; Ornstein et al., 2000). Participants have often been recruited from drug treatment services as these individuals are a relatively accessible group, and represent the largest substance group in treatment (22% more than alcohol services) (PHE, 2017). Replacing illicit opiates with another prescribed opiate drug, such as methadone or buprenorphine is a common treatment approach for opiate addiction in the UK (Wang et al., 2013). The use of opiate-substitution therapy is considered to be safe and effective due to their different pharmacological characteristics, which make them easier to detoxify from, and are associated with fewer complications (Department of Health, 2007). Opiate substitutions are more slowly absorbed and have a much longer half-life before elimination. Consequently they are associated with reducing mortality and improving quality of life (Connock, et al., 2007). In
addition, treatment can provide stability to support lifestyle changes associated with recovery, for example employment (Mintzer & Stitzer, 2002). However treatment completion rates are currently the lowest of all substance groups at 26% and it is important to consider factors that may have an impact on this (PHE, 2017).

Research to date suggests that long term opiate-use impacts an individual’s cognitive functioning, most likely caused by factors associated with illicit drug use, such as concomitant alcohol misuse, non-fatal overdose, and traumatic brain injury (Darke et al, 2000). However results vary with regard to the aetiology and extent of impairment. In addition, methodological differences across studies limit the ability to conclusively determine the impact of opiate-use on cognition. For example, studies vary regarding the homogeneity of participant samples and may include or exclude on the basis of polydrug use. Furthermore, studies use a range of different psychometric tests and different terms to describe the same cognitive function. These methodological differences indicate the importance of reviews and meta-analyses to help make sense of the available literature.

In 2012, Baldacchino and colleagues completed a meta-analysis to establish the extent of cognitive impairment in chronic opiate-users (Baldacchino et al., 2012). Their findings suggested that significant and reliable impairment was found in three cognitive domains; verbal working memory, cognitive impulsivity, and cognitive flexibility. A more recent meta-analysis by Baldacchino and colleagues (published during the completion of this literature review) further investigated cognitive impairment in chronic methadone users (Baldacchino et al., 2017). Conclusions reported significant and reliable global cognitive impairment in many cognitive domains, including cognitive impulsivity and flexibility, attention, short term memory, and long term memory. These results expand on the three impaired cognitive domains reported in the 2012 meta-analysis, suggesting a significant level of impairment in people in treatment. However these meta-analyses focused on establishing the causal role of opiate-use
alone on cognitive functioning. As a result they excluded a number of studies on the basis of the complexity of participants, to minimise possible confounding variables. For example studies were excluded if they investigated cognition in people with past or present alcohol use/dependence and polydrug use. The authors recognised this as a limitation in their paper, commenting on the difficulties controlling for complex drug-taking histories that are typical in opiate-dependent populations.

Many of the existing literature reviews seek to determine whether chronic opiate-use alone can cause lasting cognitive impairment. These studies have developed our understanding of the damaging impact of chronic opiate-use on cognitive functioning. However it is important to consider the heterogeneity of an opiate-dependent population. Figures from Public Health England in 2017 estimated that a significant proportion of opiate-users in treatment also present with other drug dependencies, including 42% with crack cocaine, 20% with alcohol, 18% with cannabis, and 11% with benzodiazepines (PHE, 2017). Excluding these individuals from research and reviews may result in an underestimation of impairment reported in people with an opiate-use disorder. In fact, cognitive impairment in opiate-users is likely to be multi-factorial, with research suggesting that high rates of alcohol dependence, head injury, and heroin overdose best explain cognitive impairment (Darke et al., 2000). These factors identify the need for a review of the literature which investigates cognitive impairment in a typical sample of chronic opiate-users in treatment, including individuals with polydrug use, alcohol misuse, and mental health disorders.

1.1.2 The impact of cognitive impairment on treatment

Recognising the extent of cognitive impairment in a typical opiate-dependent population attending a drug and alcohol service could identify a need for such deficits to be considered in the treatment programmes. Cognitive impairment may impact an individual’s ability to engage and benefit from treatment. For example, deficits in verbal working memory may make it
difficult to understand instructions and impair the ability to learn and remember information; consequences may include missed appointments. Executive dysfunction, such as cognitive impulsivity may result in poor problem solving and risk taking behaviours. Research has highlighted that substance dependent individuals have difficulties anticipating and considering negative long term consequences (Barry & Petry, 2008) including hazardous risk taking (Passetti, 2011). These are integral processes that facilitate recovery. Structured and concrete management approaches may be appropriate for helping individuals with the above difficulties (Baldacchino et al., 2012). Help with the management of cognitive impairments could improve the chances of recovery across a number of areas including problem solving, learning strategies for relapse prevention, and managing impulsive decision taking, to name but a few.

Chronic drug use is associated with low employment rates (French et al., 2001), and substance dependent individuals report a poorer quality of life when compared to the general population (De Maeyer et al., 2010). There is a need for effective treatment approaches that take into consideration the potential impact of cognitive impairment. Recently there has been recognition that cognitive impairment in schizophrenia is a reliable and distinct aspect of the illness which predicts functional outcomes and disability (Gold, 2004; Harvey & Strassnig, 2012). Consequently these deficits limit the effectiveness of psychological treatments for schizophrenia (Green et al., 2000) and it is possible this may also be the case with substance misusers.

1.2 Objectives

This literature review aimed to identify, review, critically appraise and synthesise empirical evidence which explores the extent of cognitive impairment in a typically heterogeneous population of opiate-dependent individuals receiving opiate-substitution. The review included studies that have investigated cognitive impairment in a chronic opiate-dependent population
who were attending a service for opiate-substitution treatment (methadone, buprenorphine). Studies were included if participants had other drug dependencies, i.e. alcohol, benzodiazepines, and other illicit drugs. Studies were also included if participants had diagnosed mental health difficulties. Studies that excluded participants due to the above factors were also included in the literature review, as these formed a large part of the available literature. Studies were included when a population of opioid naïve healthy controls were used as a comparison group.

The question guiding the review was; are there studies which explore the presence and extent of cognitive impairment in a typical heterogeneous population of chronic opiate-users attending an opiate-substitution service, which were not included in Baldacchino’s current meta-analyses which employed strict inclusion criteria and highly controlled participants (2012; 2017)? It is anticipated that such studies do exist, and they may provide evidence of the true extent of cognitive impairment in the more typical, heterogeneous population of opiate-users in treatment.

2.1 Method

2.1.1 Search strategy

Primarily an electronic search strategy was used. Psych Cross Search (1806-March 2017) was used to access PsycINFO, PsycARTICLES, PsycBOOKs, Medline and the Psychology & Behavioral Sciences Collection, enabling a search of over 500 journals. Web of Science (1900-March 2017), provided by the Web of Knowledge Service for UK Education was also used to identify studies. In addition a hand based search strategy was used to locate any important articles that had not been identified in the search, but had been found in relevant systematic reviews and meta-analyses carried out in the field of cognitive impairment in opiate-users.
The search terms included a combination of thesaurus terms for the categories of ‘cognitive’, ‘function’, and ‘opiate’, and a Boolean search strategy was used. The first search string was as follows; $TI\ (\text{cogniti}^* \text{ OR neurobehavioural OR neuropsychological}) \text{ AND } TI\ (\text{deficit}^* \text{ OR abilit}^* \text{ OR effect}^* \text{ OR function}^* \text{ OR dysfunction}^* \text{ OR impairment}^*) \text{ AND } TI\ (\text{opiate}^* \text{ OR methadone OR buprenorphine OR opioid}^* \text{ OR heroin})$. The second and third search terms replaced ‘cognitive’ with different terms for a range of cognitive domains, as follows; $TI\ (\text{opiate}^* \text{ OR methadone OR buprenorphine OR opioid}^* \text{ OR heroin}) \text{ AND } TI\ (\text{working memory OR episodic memory OR visuospatial OR executive function}^* \text{ OR verbal fluency OR digit symbol substitution OR intelligence OR reaction time OR attention OR short term memory OR long term memory})$, and, $TI\ (\text{opiate}^* \text{ OR methadone OR buprenorphine OR opioid}^* \text{ OR heroin}) \text{ AND } TI\ (\text{decision making OR decision-making OR impulsiv}^* \text{ OR flexibility})$. All three search strings were entered separately into both Psych Cross Search and Web of Science, and titles only were searched, with no language restrictions being applied.

2.1.2 Study Selection

The first stage was to screen all articles for their relevance to the current literature review, based on their title with further information gathered from the abstract if necessary. Studies were excluded at this stage if they were deemed ‘not relevant to search’. This often included studies investigating the effects of opiates in chronic pain settings, or the impact of opiates in utero. In addition animal studies and theoretical reviews were excluded at this stage. Studies were then assessed in further detail through examining the abstracts and methodologies, and chosen based on the following inclusion and exclusion criteria.

2.1.2 Inclusion and exclusion criteria

Experimental studies including randomised controlled trials and cross-sectional designs were included. Longitudinal studies were included only if data from one chosen time-point was analysed. Quantitative studies which only used self-report measures of cognitive functioning
were not included as these measures do not have comparable reliability and validity to psychometric measures. Therefore it would have been challenging to compare and contrast results from studies using only self-report measures and studies using only psychometric measures; and this is not the primary focus of this literature review.

Research papers were required to meet the following criteria to be included in this review;

1) participants must be aged 18 or over
2) drug group must meet DSM-V (American Psychiatric Association, 2013) criteria for a diagnosis of opiate-use disorder and have had the diagnosis for over 6 months
3) drug group must be attending a substance misuse service receiving an opiate-substitution, such as methadone or buprenorphine
4) drug group must not be acutely intoxicated or in withdrawal at time of testing
5) comparison group must be an opioid naive healthy\(^2\) participant group
6) psychometric tests were used, i.e. not self-report measures
7) published after 1985

This literature review employed less stringent exclusion criteria based on the characteristics of the drug groups, which is in contrast to existing reviews discussed earlier. Therefore studies were included if participants in the drug group were polydrug users of licit or illicit drugs, including other opiates, benzodiazepines, amphetamines, cannabis, alcohol, and tobacco. Studies were also included if participants in the drug group had co-morbid mental health diagnoses, and a history of head injury, as these are common experiences in a drug-using population (Darke et al., 2000; Harvard et al., 2006). Studies were further excluded based on the quality of the paper and these factors are discussed below.

\(^2\) Healthy refers to participants who had no current or past diagnosis of any alcohol or drug use disorder, no psychotic disorders, and no neurological conditions.
2.1.3 Study review

A number of the studies included multiple participant groups which included opiate-substitution users, abstinent users, and healthy controls. In these instances only the relevant group comparisons were examined; opiate-substitution group vs. healthy control group. In some cases, groups were defined based on the type of opiate substitution used. Only group comparisons between each opiate substitution group and the healthy control group were examined. Data were examined and included separately if within the same study comparisons were made between buprenorphine vs. control and methadone vs. control. Therefore comparisons between the opiate-substitution group and abstinent groups, or, a methadone group and a buprenorphine group were disregarded. In all cases the comparison group was the healthy control group. As a result, only studies that reported the necessary post-hoc statistics of these group analyses (healthy control vs. opiate substitution group only) were included. Studies that only reported overall F-statistics indicating group differences between i.e. healthy control group and all drug groups (opiate-substitution users and abstinent users) had to be excluded. Therefore in some cases studies were excluded on the basis of there not being enough detail in the analysis to meet the current literature review’s aims.

2.1.4 Cognitive Domains

Throughout the literature cognitive domains are often given varying labels, for example, problem solving vs non-planning impulsivity; inhibition vs motor impulsivity. In addition there are a large number of psychometric tests that can be used to assess functioning in a particular domain, for example cognitive flexibility can be assessed using the Wisconsin Card Sorting Task (WCST), or the Trails Making Test (TMT), or a measure of verbal fluency such as the Controlled Oral Word Association Test (COWAT). Previous meta-analyses published by Baldacchino and colleagues (2012; 2017) employed a system in which all psychometric tests were coded into one of seven cognitive domains (Ersche & Sahakian, 2007). To ensure this
literature review could be compared to existing reviews, this current review used the same coding system. Table 1 indicates the seven cognitive domains, alternative names for these domains, and their associated psychometric tests that appear in this literature review. This coding system is informed by existing factor analyses (Goldstein, 2004; Passolunghi & Mammarella, 2010) and ensured an objective and consistent approach was maintained across the literature when evaluating cognitive functioning.

Table 1

The seven cognitive domains and their associated neuropsychological tests

<table>
<thead>
<tr>
<th>Cognitive Domain</th>
<th>Alternative Names</th>
<th>Definition</th>
<th>Psychometric Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention and Information Processing</td>
<td>Arousal/Alertness</td>
<td>Ability for individuals to hold information in mind and process, or process tasks simultaneously</td>
<td>DSST, WAIS Digit Symbol, WAIS Symbol Search, WAIS Digit Span, MTT, SDMT</td>
</tr>
<tr>
<td></td>
<td>Attentional Capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Focused Attention/</td>
<td>Ability to reject irrelevant information while attending to relevant input</td>
<td>CT-I, ST, ACT, CRT, SS, RSA, SSST PASAT, ACPT, CPT, ACT,</td>
</tr>
<tr>
<td></td>
<td>Selective Attention</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sustained Attention</td>
<td>Readiness to detect rarely and unpredictable occurring signals over long periods of time</td>
<td></td>
</tr>
<tr>
<td>Short Term Memory</td>
<td>Verbal Working Memory</td>
<td>Reproduction, recognition or recall of information directly or sometime after presentation</td>
<td>RAVLT, CVLT, WAIS Digit Span, WMS LNS, 2BT, HVL-R PAL, BVRT, WMS, ROCFT, CCDT, 3D-BCM, WAIS Block Design, Object Assembly, BVMT-R</td>
</tr>
<tr>
<td></td>
<td>Visuospatial (non verbal) Working Memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Domain</td>
<td>Alternative Names</td>
<td>Definition</td>
<td>Psychometric Tests</td>
</tr>
<tr>
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</tr>
<tr>
<td>Longer Term Memory</td>
<td>Autobiographical, episodic, event</td>
<td>Records details salient to individual’s life</td>
<td>SOMT, WSLT, BVRT, CVLT, RAVLT, ROCFT, WMS-R</td>
</tr>
<tr>
<td></td>
<td>Semantic</td>
<td>“Knowing that”, meanings of words and concepts, or facts</td>
<td>ROCFT, RRLET, SAVF, WMS-R</td>
</tr>
<tr>
<td></td>
<td>Prospective Memory</td>
<td>The ability to perform intended actions in the future</td>
<td>Virtual Week</td>
</tr>
<tr>
<td>Cognitive Impulsivity</td>
<td>Delay Discounting/ Risk Taking</td>
<td>Ability to opt for larger delayed rewards over smaller more immediate rewards</td>
<td>IGT, CGT, GT, DDT</td>
</tr>
<tr>
<td></td>
<td>Cognitive Inhibition</td>
<td>Process required to suppress a salient but conflicting stimulus while identifying a less salient one</td>
<td>ST</td>
</tr>
<tr>
<td>Motor Impulsivity</td>
<td>Inhibitory Control</td>
<td>Ability to suppress emotional, cognitive, and behavioural responses</td>
<td>Go/NoGo, SS, ST</td>
</tr>
<tr>
<td>Non-Planning Impulsivity</td>
<td>Problem Solving Reasoning Strategic Planning</td>
<td>Ability to think ahead and actively search for an appropriate solution</td>
<td>SOC, ROCFT, PMQS, MT, Matrix Reasoning, BADS</td>
</tr>
<tr>
<td>Cognitive Flexibility</td>
<td>Perseveration</td>
<td>Ability to realign a behavioural disposition to altered contingencies</td>
<td>WCST, TMT-B, CT II</td>
</tr>
<tr>
<td></td>
<td>Verbal Fluency</td>
<td>Requires the intrinsic generation of responses or alternatives</td>
<td>COWAT, FAS, BNT, HSC, CLFT</td>
</tr>
</tbody>
</table>

2BT=Two Back Task; 3D-BCM=Three Dimensional Block Construction Model; ACPT=Auditory Continuous Performance Task; ACT=Attentional Capture Task; BADS=Behavioural Assessment of Dysexecutive Syndrome; BNT=Boston Naming Test; BVMT-R=Brief Visual Memory Test-Revised; BVRT=Benton Visual Retention Test; CCDT=Colour Change Detection Task; CGT=Cambridge Gambling Task; CLFT=Category and Letter Fluency Task; COWAT=Controlled Oral Association Word Test; CPT=Continuous Performance Task; CT I&II=Colour Trails Test; CRT=Choice Reaction Time; CVLT=California Verbal Learning Test; DDT=Delay Discounting Task; DSST=Digit Symbol Substitution Test; FAS=Phonological Fluency Test; GT=Gambling Task; HSC=Hayling Sentence Completion; HVLT-R=Hopkins Verbal Learning Test-Revised; IGT=Iowa Gambling Task; LNS=Letter Number Sequencing; MT=Maze Test; MTT=Motor Tapping Test PAL=Paired Associate Learning; PASAT=Paced Auditory Serial Addition Task; PM=Porteus Maze Test; RAVLT=Rey Auditory Verbal Learning Test; ROCFT=Rey-Osterreith Complex Figures Test; RRLET=Remote and Recent Life Event Test; RSA=Ruff 2&7 Selective Attention Test; SAVF=Semantic Association of Verbal Fluency; SDMT=Symbol Digits Modalities Test; SOC=Stockings of Cambridge; SOMT=Six Object Memory Test; SS=Stop Signal; SSST=Serial Seven Subtraction Task; ST=Stroop Test; TAP=Test for Attentional Performance; TMT
2.1.5 Assessment of study quality

The quality of all articles included in the final literature review were assessed using guidance from the Effective Public Health Practice Project (EPHPP) quality assessment checklist (Armijo-Olivo et al., 2012), a tool used in existing systematic reviews in the field of substance misuse and cognitive impairment. The following criteria were considered:

1) Selection of study participants and a clear explanation of inclusion/exclusion criteria
2) Psychometric tests are clearly described and have fair reliability and validity
3) Confounding variables – consideration for what other factors may contribute to the study results and the extent to which these were controlled for
4) Statistical analysis clearly describes all primary outcomes, as stated in the aims, and provide adequate detail
5) The extent to which the study’s conclusions reflect the results

It is important to consider that there is a considerable publication bias in the literature, meaning that studies which find significant results are more likely to be published than studies that do not (Fanelli, 2012). It is therefore likely that studies which found no significant differences in cognitive functioning between opiate-substitution users and healthy controls are underrepresented in this literature review.

3.1 Results

3.1.1 Study Selection

Figure 1 uses a flow diagram developed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to illustrate the number of articles that were identified, screened, and included in the literature review (Moher et al. 2009). A total of 677 records were identified using electronic and hand searching. After duplicates were removed 439 were
initially screened to determine their relevance to the literature review. At this stage 292 were considered not relevant to the search, 31 were animal studies, and 6 were theoretical reviews. Following this 110 were assessed for eligibility based on inclusion and exclusion criteria. Studies were excluded if they only investigated acute/toxic effects of opiates (n=2), where the drug group were abstinent users or not taking an opiate substitution (n=16), where there was no appropriate healthy control group (n=15), where no psychometric tests were used (n=11), if the full articles were not accessible\(^3\) (n=30), and if the paper was published before 1985 (n=5). Following this, 31 articles were fully examined for eligibility, and further studies were excluded based on the quality of the study. Six studies were excluded due to lack of detail in the publication, for example information was missing with regard to inclusion/exclusion criteria, information about participants, procedure, and necessary group comparisons and statistics. This lack of information made it challenging to assess the quality of the study and/or evaluate group differences. A further five studies were excluded based on their choice of psychometric tests; for example three studies only included tests focused on ‘driving aptitude’ such as visual orientation and reaction times (functions which were not tested in remaining studies). One article was excluded based on the low quality of the journal, decided on the basis of incorrect and non-existent DOI links, and all studies in the journal coming from one university only.

**Figure 1**

*A flow diagram to illustrate the number of articles that were identified, screened, and included in the literature review taken from the PRISMA 2009 guidelines (Moher et al., 2009).*

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\(^3\) Full articles were often not available in cases where a published abstract had not been followed up with a published study. Furthermore abstracts were often discovered in the form of a conference presentation only. Finally, if full articles were not accessible via the internet, researchers were contacted via email to request the full article.
A total of 19 research studies were included in this literature review, 18 of which were non-randomised cross-sectional studies. One longitudinal study was included (Rapeli et al., 2011), and results from T1 only were reported in this review. No qualitative studies investigating cognitive functioning in opiate-users were found in the search process. The majority of studies tested participants taking methadone only (n=14). In addition, one study investigated participants taking buprenorphine only (Messinis et al., 2009), and two studies tested participants on varying opiate-substitutions but categorised them into the same “drug group” (McDonald et al., 2012; Terrett et al., 2014). Two studies compared cognitive functioning between a methadone group, a buprenorphine group, and a control group (Pirastu et al., 2006; Rapeli et al., 2011).

The final 19 studies tested a total of 915 individuals who at the time of testing were receiving an opiate-substitution for an opiate-use disorder (see table 1 for full study details). Across these 915 participants, 77.3% were male, with an average age of 36.0 years, undertaking an average of 10.8 years in education (one study did not report years in education, Tolomeo et al., 2016), with an average estimated pre-morbid Full Scale IQ of 97.8 (reported in nine studies; four further studies measured pre-morbid IQ but did not report a Full Scale IQ score). On average participants in the opiate-substitution groups had used opiates for 12.4 years. 828 participants were taking methadone, with an average daily dose of 66.6mg, however three studies did not report the daily dose (Gupta et al., 2014; Mehrjerdi et al., 2011; Zeng et al., 2016). There were a total of 84 participants taking buprenorphine with an average daily dose of 10.1mg. One study included three individuals taking suboxone in combination with buprenorphine, with an average daily dose of 8mg (Terrett et al., 2014). Overall, 839 healthy control participants were tested. Across these participants, 70.7% were male, with an average age of 32.5 years, and undertaking an average of 12.1 years in education. Of the nine studies which used measures to
gather a standardised score of IQ (where 100=average), the control participants had an average IQ of 104.8, compared to an average IQ of 97.8 in the healthy control participants.
Table 1

Characteristics of studies included in the literature review (n=19)

<table>
<thead>
<tr>
<th>Study</th>
<th>Opiate-substitution group</th>
<th>Mean/Mean/Min years of</th>
<th>Substitution</th>
<th>Mean/Mean/Min years of</th>
<th>Mean daily dose of</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darke et al., 2000</td>
<td>158</td>
<td>30</td>
<td>35.8</td>
<td>60</td>
<td>11.2</td>
<td>91.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male %</td>
<td>Age in years</td>
<td>n/a</td>
<td>Methadone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30.0</td>
<td>38.0</td>
<td>11.2</td>
<td></td>
<td>78.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60.0</td>
<td>11.2</td>
<td></td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60.0</td>
<td>11.2</td>
<td></td>
<td>92.6</td>
</tr>
<tr>
<td>Mintzer &amp; Stitzer, 2002</td>
<td>135</td>
<td>18</td>
<td>37.6</td>
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<td>Male %</td>
<td>Age in years</td>
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* WAIS-III Vocabulary subtest
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<th>Age Years</th>
<th>Gender % Male</th>
<th>Mean years in education</th>
<th>Mean estimated IQ</th>
<th>Mean/Mean years of opiate-use</th>
<th>Substitution</th>
<th>Mean years of substitutio</th>
<th>Mean daily dose of substitutio</th>
<th>Control</th>
<th>Age Years</th>
<th>Gender % Male</th>
<th>Mean years in education</th>
<th>Mean estimated IQ</th>
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^5 Spot the real word – accuracy (IntegNeuro, Brain Resource Company, Australia)
^6 Raven’s Progressive Matrices subtest
3.1.3 Study inclusion/exclusion criteria

Existing systematic reviews of the literature define stringent inclusion and exclusion criteria to ensure the sample of participants are homogeneous, therefore aiding their ability to make conclusions about the effects of opiates alone on cognitive functioning (Baldacchino et al., 2012; 2017). However, people in treatment services for opiate-use disorders represent a heterogeneous group, and commonly have a range of other licit and illicit drug dependencies, and additional mental health diagnoses (PHE, 2017). Therefore a primary aim of this literature review was to consider studies that have included participants with poly drug use and mental health diagnoses. Of the 19 studies included in this literature review, 12 were also included in at least one of Baldacchino’s reviews (2012; 2017). Therefore only a further seven studies were included which had not been considered in Baldacchino’s reviews, highlighting the paucity of research including a typical and heterogeneous sample of opiate-users.

Within the available literature, the majority of studies applied stringent inclusion/exclusion criteria (see table 2 for full details). Only seven studies clearly stated that they allowed participants to take part if they also had other drug dependencies or concurrently used other drugs (Darke et al., 2000; Liao et al., 2014; Mintzer & Stitzer, 2002; Rapeli et al., 2011; Terrett et al., 2014; Wang et al., 2014; Zeng et al., 2016). One of these studies however only included people using benzodiazepines and cannabis, and excluded participants on the basis of any other drug use (Rapeli et al., 2011). Only two studies included participants who also reported current heavy alcohol use or an alcohol dependency (Darke et al., 2000; Zeng et al., 2016). Excluding such individuals’ from the research reduces the generalisability of the literature, as the participants do not represent a typical opiate-using population.

All studies only included participants in the drug group if they had a diagnosed opiate-use disorder. However concurrent mental health diagnoses were also considered as an important eligibility criteria in many studies. Of the 19 studies, nine excluded anybody with an Axis I
diagnosis, which included depression and anxiety. A further seven studies excluded participants if they had what was named as a ‘major psychiatric disorder’, such as psychosis or post-traumatic stress disorder. Seven studies also excluded people if they had a personality disorder diagnosis (including personality disorder as a major psychopathology/psychiatric condition). Consequently, it is possible that eight studies included people with a mental health diagnosis such as depression or anxiety (Baldacchino et al., 2015; Darke et al., 2000; Gupta et al., 2014; Liao et al., 2014; Mehrjerdi et al., 2011; Messinis et al., 2009; Tolomeo et al., 2016; Zeng et al., 2016), although this was not explicitly stated in all the methodologies. However it is important to note that although these studies, in theory, allowed such people to take part, it does not necessarily mean that people with mental health diagnoses formed part of the final participant group.

Other factors that have been commonly reported in people in treatment for an opiate-use disorder are head injuries and drug overdoses. Of the 15 studies that explicitly reported head injury as an eligibility criteria, only two studies included such participants (Darke et al., 2000; McDonald et al., 2012). History of overdose was less commonly stated as an eligibility criteria, however two of the four studies that did report it excluded participants with a history of overdose (Baldacchino et al., 2015; Tolomeo et al., 2016), and two included them (Darke et al., 2000; McDonald et al., 2012). It was unclear whether the remaining 15 studies included participants with a history of drug overdose, however it could be assumed that studies that did not report it, did not assess for it, and therefore may have included participants, whether knowingly or not, with a history of overdose. All studies excluded participants if they had any neurological disorders.

**Table 2**

*Inclusion and exclusion criteria as reported in the 19 studies for the opiate-dependent groups.*
<table>
<thead>
<tr>
<th>Studies</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darke et al., 2000</td>
<td>History of overdose; Head injury; Alcohol dependence; Other drug use; Mental health diagnoses</td>
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</tr>
<tr>
<td>Mintzer &amp; Stitzer, 2002</td>
<td>Other drug use</td>
<td>Axis I disorder; Recent Benzodiazepine use; Current Alcohol dependence</td>
</tr>
<tr>
<td>Pirastu et al., 2006</td>
<td>Not stated</td>
<td>Axis I disorder; Head injury; Other past/present drug/ alcohol dependencies</td>
</tr>
<tr>
<td>Prosser et al., 2006</td>
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<td>Current other illicit drug use; Current/historical Axis I&amp;II; Head trauma; Alcohol &gt;15 drinks/week</td>
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<tr>
<td>Prosser et al., 2009</td>
<td>Not stated</td>
<td>Other illicit drug use (past 18m); Current/historical Axis I disorder; Head trauma; Current alcohol use</td>
</tr>
<tr>
<td>Messinis et al., 2009</td>
<td>Not stated</td>
<td>Current other illicit drug use; Major psychopathology; Head trauma; Alcohol/drug dependencies 6 months pre treatment</td>
</tr>
<tr>
<td>Fadardi &amp; Ziae, 2010</td>
<td>Not stated</td>
<td>Not stated</td>
</tr>
<tr>
<td>Mehrjerdi et al., 2011</td>
<td>Not stated</td>
<td>History of drug injection; Polydrug use in past 12m; Current/historical psychiatric condition affecting cognition</td>
</tr>
<tr>
<td>Rapeli et al., 2011</td>
<td>Benzodiazepine dependency; Recent alcohol/ cannabis abuse</td>
<td>Uncontrolled polysubstance abuse; Acute alcohol abuse; Acute Axis I</td>
</tr>
<tr>
<td>Lin et al., 2012</td>
<td>12 months illicit drug free; Heroin-induced depression</td>
<td>Current/historical Axis I disorder; Head trauma; Alcohol&gt;15 drinks/week; Current Benzodiazepine use; Current/historical other dependencies</td>
</tr>
<tr>
<td>McDonald et al., 2012</td>
<td>Head injuries; Historical drinking; Overdoses</td>
<td>Not stated</td>
</tr>
<tr>
<td>Anderson et al., 2013</td>
<td>Not stated</td>
<td>Past 3m other illicit drug use; Axis I diagnosis; Alcohol dependence</td>
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<tr>
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<td>Other illicit drug use</td>
<td>Axis I &amp; II diagnosis; Head trauma</td>
</tr>
<tr>
<td>Terrett et al., 2014</td>
<td>Other illicit drug use; Alcohol use</td>
<td>Heavy alcohol use; Psychiatric disorder; Acquired Brain Injury</td>
</tr>
<tr>
<td>Gupta et al., 2014</td>
<td>Hepatitis C</td>
<td>Psychosis; Head injury; Current substance use disorders</td>
</tr>
<tr>
<td>Liao et al., 2014</td>
<td>Other Axis I or II diagnosis; Other substance use</td>
<td>Current/historical psychotic disorder; Head injury</td>
</tr>
<tr>
<td>Baldacchino et al., 2015</td>
<td>Not stated</td>
<td>Current/historical psychosis, PTSD, Personality Disorder; Head injuries; Overdoses; Other substance dependencies; 6 month previous illicit drug use</td>
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<tr>
<td>Tolomeo et al., 2016</td>
<td>Not stated</td>
<td>Current/historical psychosis, PTSD, Personality Disorder’ Head injury; Overdose; Current other drug/alcohol dependencies; 6 month illicit drug use</td>
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<td>Zeng et al., 2016</td>
<td>Other dependencies; 24 hour abstinence</td>
<td>Current/historical major psychiatric disorder Serious head injury</td>
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3.2 Study findings

A range of psychometric tests were used to assess a range of different cognitive domains (see table 3). As described in the method, these were categorised according to existing literature and factor analyses.

Table 3

Psychometric tests used for each study (n=19)

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<th>Cognitive domain</th>
<th>Psychometric Test</th>
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<td>WAIS-II Digit Symbol and Symbol Search WAIS-II</td>
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<td>Attention</td>
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<tr>
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<td>WMS-R VR I &amp; II; ROCFT</td>
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<td></td>
<td>Verbal Memory</td>
<td>WMS-R PAL I &amp; II; CVLT</td>
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<td>COWAT; WCST</td>
</tr>
<tr>
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<td>DSST</td>
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<td>Selective Attention</td>
<td>ST</td>
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<td>Time Perception</td>
<td>Time estimation</td>
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<td>2BT</td>
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<td>Recognition memory and free recall</td>
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<td>TMT</td>
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<td>GT</td>
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<td>Visual Perception &amp; Memory</td>
<td>BVRT</td>
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<td>Cognitive Flexibility</td>
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2BT=Two Back Task; 3D-BCM=Three Dimensional Block Construction Model; ACPT=Auditory Continuous Performance Task; ACT=Attentional Capture Task; BADS=Behavioural Assessment of Dysexecutive Syndrome; BNT=Boston Naming Test; BVRT=Brief Visual Memory Test-Revised; CCDT=Colour Change Detection Task; CGT=Cambridge Gambling Task; CLFT=Category and Letter Fluency Task; COWAT=Controlled Oral Association Word Test; CPT=Continuous Performance Task; CT I&II=Colour Trails Test; CRT=Choice Reaction Time; CVLT=California Verbal Learning Test; DDT=Delay Discounting Task; DSS=Digit Symbol Substitution Test; FAS=Phonological Fluency Test; GT=Gambling Task; HSC=Hayling Sentence Completion; HVLT-R=Hopkins Verbal Learning Test-Revised; IGT=Iowa Gambling Task; LNS=Letter Number Sequencing; MT=Maze Test; MTT=Motor Tapping Test PAL=Paired Associate Learning; PASAT=Paced Auditory Serial Addition Task; PM=Porteus Maze Test; RAVLT=Rey Auditory Verbal Learning Test; ROCFT= Rey Osterreith Complex Figures Test; RRLET=Remote and Recent Life Event Test; RSA=Ruff 2&7 Selective Attention Test; SAVF=Semantic Association of Verbal Fluency; SDMT=Symbol Digits Modalities Test; SOC=Stockings of Cambridge; SOMT=Six Object Memory Test; SS=Stop.
Below, the findings of each study are reported in regard to whether significant differences between the opiate-dependent groups and control groups were found. Findings are considered for each cognitive domain. On a number of occasions studies used more than one psychometric test to assess a cognitive function which is categorised within the same cognitive domain. Therefore in some cases, studies reported significant group differences on one psychometric test, but not on another, within the same cognitive domain. Studies also commonly reported significant differences on one cognitive domain, and non-significant differences on another cognitive domain.

3.2.1 Attention and Information Processing

A total of 12 studies investigated ‘attention and information processing’ using a range of 17 different neuropsychological tests. Eight studies reported significant group differences, with the opiate substitution group performing significantly worse on the studies chosen measures of attention and information processing (Anderson et al., 2013; Darke et al., 2000; Fadardi & Ziaee, 2010; McDonald et al., 2012; Messinis et al., 2009; Mintzer & Stitzer, 2002; Prosser et al., 2009; Rapeli et al., 2011). Rapeli and colleagues (2011) reported group differences between the methadone and control group, but not the buprenorphine and control group on the TAP. Messinis and colleagues (2009) reported mixed results, with the opiate substitution group performing significantly worse than the control group on one measure (SDMT), but not on another measure (CTT-I). Four further studies found no significant group differences (Gupta et al., 2014; Liao et al., 2014; Mehrjerdi et al., 2011; Wang et al., 2014).

3.2.2 Short Term Memory

A total of 11 studies investigated ‘short term memory’ using a range of 17 different psychometric tests. Nine studies reported significant group differences, with the opiate substitution group performing significantly worse on the studies chosen measures of short term
memory, including both verbal and visual working memory (Anderson et al., 2013; Darke et al., 2000; Lin et al., 2012; McDonald et al., 2012; Messinis et al., 2009; Mintzer & Stitzer, 2002; Pirastu et al., 2006; Prosser et al., 2006; Rapeli et al., 2011). However, two of these studies also reported non-significant group differences on certain measures of short term memory (Lin et al., 2012; McDonald et al., 2012). Two studies reported no significant group differences (Gupta et al., 2014; Wang et al., 2014).

3.2.3 Longer Term Memory
A total of 10 studies investigated ‘longer term memory’ using a range of 10 different psychometric tests. Seven studies reported significant group differences, with the opiate substitution group performing significantly worse on the studies chosen measures of long term memory (Darke et al., 2000; McDonald et al., 2012; Messinis et al., 2009; Pirastu et al., 2006; Prosser et al., 2006; Rapeli et al., 2011; Terrett et al., 2014). However McDonald and colleagues (2012) reported mixed results, as they also found no significant group differences on two measures of long term memory. Three further studies reported no significant group differences on tests of longer term memory (Mintzer & Stitzer, 2002; Lin et al., 2012; Wang et al., 2014).

3.2.4 Cognitive Impulsivity
A total of eight studies investigated ‘cognitive impulsivity’ using a range of five different psychometric tests. All studies reported significant group differences with the opiate substitution group performing significantly worse on the studies chosen measures of cognitive impulsivity (Baldacchino et al., 2015; Fadardi & Ziaee, 2010; Gupta et al., 2014; Mintzer & Stitzer, 2002; Pirastu et al., 2006; Prosser et al., 2006; Tolomeo et al., 2016; Zeng et al., 2016). However in two studies, significant differences were only reported on certain variables of a particular test, whilst no significant group differences were found on other variables within the same test (Tolomeo et al., 2016; Zeng et al., 2016).
3.2.5 Motor Impulsivity

A total of three studies investigated ‘motor impulsivity’ using a range of three different psychometric tests. Only one study reported significant group differences, with the opiate substitution group performing significantly worse on the IGT (Zeng et al., 2016). Two studies reported no significant group differences (Baldacchino et al., 2015; Rapeli et al., 2011), although Baldacchino and colleagues (2015) reported a trend towards significance, with the opiate-substitution group performing worse than the control group.

3.2.6 Non-Planning Impulsivity

A total of five studies investigated ‘non-planning impulsivity’ using a range of five different psychometric tests. Four studies reported significant group differences, with the opiate substitution group performing significantly worse on the studies chosen measures of non-planning impulsivity. However Wang and colleagues (2014) reported no significant group differences on Maze Test.

3.2.7 Cognitive Flexibility

A total of 11 studies investigated ‘cognitive flexibility’ using a range of eight different psychometric tests. Five studies reported significant group differences, with the opiate substitution group performing significantly worse than the control group on certain tests of cognitive flexibility, including both perseveration and verbal fluency (Darke et al., 2000; Gupta et al., 2014; McDonald et al., 2012; Messinis et al., 2009; Pirastu et al., 2006; Terrett et al., 2014). Three of these studies reported mixed findings, as they also found no significant group differences on alternative measures of cognitive flexibility (McDonald et al., 2012; Messinis et al., 2009; Terrett et al., 2014). Four further studies only reported no significant groups differences on their chosen measures of cognitive flexibility (Mehrjerdi et al., 2011; Mintzer & Stitzer, 2002; Prosser et al., 2006; Wang et al., 2014). Gupta and colleagues (2014) reported
significant group differences on a test of verbal fluency, but no significant differences on a test of perseveration.

4.1 Discussion

4.1.1 Summary of findings

Of the 19 studies that were reviewed, 17 studies reported that people in treatment for opiate-use disorder performed significantly worse than healthy controls when tested on a variety of psychometric tests across a broad range of cognitive domains (attention and information processing, short and longer term memory, cognitive impulsivity, non-planning impulsivity, and cognitive impulsivity). However, of these 17 studies, 12 also reported no significant group differences on particular psychometric tests and/or particular cognitive domains. A final two studies reported no significant group differences across any of their psychometric tests (Liao et al., 2014; Wang et al., 2014). These findings reflect the complexity of assessing cognitive impairment, with a plethora of psychometric tests available to assess the same cognitive domain. Only five studies reported significant group differences on all of their psychometric tests; the more usual pattern was complex with studies finding significant group differences within certain cognitive domains, but not in others.

These findings are comparable to existing reviews and meta-analyses that report broad cognitive impairment across a range of domains in people under methadone maintenance treatment when compared to healthy controls (Baldacchino et al., 2012; 2017; Wang et al., 2014). In 2017, Baldacchino and colleagues meta-analysis reported significant group differences with medium-large effect sizes (d=0.41-1.38) on all seven cognitive domains. The statistical analyses indicated that across the 21 studies included in their review, overall the methadone maintenance groups performed significantly worse on all cognitive domains when compared to a healthy control group. No reviews exist which include alternative substitution
drugs such as buprenorphine. The current literature review suggests that people with an opiate-use disorder taking buprenorphine also show cognitive impairment across a range of domains. However fewer primary studies and therefore a smaller sample size contributed to this finding, meaning it is not possible to make conclusive statements.

As this review is not quantitative it was not possible to directly compare these findings to that of existing meta-analyses. However it is interesting to note this review included 12 studies that were also included in Baldacchino’s 2017 review. It does not seem that these seven studies were those which have less stringent inclusion/exclusion criteria, and the pattern of results across these studies appear no different to the pattern of results across the other 12 studies. Furthermore, in contrast to Baldacchino’s claims, eight studies included in the 2017 review, also included in this review, may have included participants with other drug dependencies or use, mental health diagnoses such as anxiety or depression, and a history of overdose (Baldacchino et al., 2015; Darke et al., 2000; Gupta et al., 2014; Liao et al., 2014; McDonald et al., 2012; Tolomeo et al., 2016; Wang et al., 2014;). More research is needed to investigate the level of cognitive impairment in a typical opiate-dependent population in treatment for opiate-substitution. The question remains as to whether these people would be more severely impaired than the people most often included as participants in existing studies.

4.1.2 Strengths and Limitations

All data in this literature review are gathered from cross-sectional, uncontrolled, and non-randomised study designs. Unfortunately these investigations do not lend themselves to randomised controlled trials, and therefore the generalisability of these studies are limited. Sampling biases can mean that people who take part in research studies may not be sufficiently representative of a particular group of individuals. Opiate-using populations can be difficult to engage and it is possible that the participating individuals in these studies consist of a more motivated group who are fully engaged with their treatment (Ornstein et al., 2000). Therefore
individuals with the greatest cognitive impairment may not be included in these studies, resulting in a possible underestimation of the severity of cognitive impairment.

All primary studies are of mixed methodological quality. These factors have a direct impact on the interpretability of this review’s findings. Despite best efforts many studies had difficulty matching drug and control groups on variables such as age, education, and IQ. There is ongoing concern that cognitive impairment reported in opiate-using populations actually reflects pre-existing differences in ability and achievement. In fact, research suggests that lower IQ could be a risk factor for drug abuse (Block et al., 2002). Of the 19 studies reviewed, the opiate-dependent groups completed an average of 10.8 years in education, 1.6 years less than the control group (12.4 years). Out of the 18 studies that reported years in education, only seven studies matched the drug and control groups on this variable (Darke et al., 2000; Gupta et al., 2014; Liao et al., 2014; Messinis et al., 2009; Mehjerdi et al., 2011; Mintzer & Stitzer, 2002; Terrett et al., 2014). Eleven studies reported that the control group completed significantly more years in education than the drug groups, with one study reporting a difference of 5.1 years (Lin et al., 2012). Furthermore 13 of the 19 studies generated an estimated pre-morbid IQ score using a range of well-validated measures (WAIS; NART; WTAR). Approximately half of these studies (6) found that the healthy controls had a significantly higher estimated pre-morbid IQ. It is important to note that although some of these studies consequently included IQ as a covariate in their analyses, to control for these differences (Baldacchino et al., 2015; McDonald et al., 2012; Prosser et al., 2006; Tolomeo et al., 2016), others failed to (Pirastu et al., 2006; Prosser et al., 2009). Therefore it is possible that the studies which showed significant group differences in years in education and/or IQ, and did not subsequently control for these differences in the analysis, have ignored the influence of pre-existing differences on performance. It may be that the significant group differences reported by Pirastu and colleagues
(2006), and Prosser and colleagues (2009), are better explained by pre-morbid functioning, rather than a consequence of opiate-use.

Many of the studies carried out a large number of group comparisons across a range of psychometric test variables. However, few studies reported appropriate Bonferroni corrections to control for family-wise error (Baldacchino et al., 2015; Gupta et al., 2014; Liao et al., 2014; Wang et al., 2014). Consequently, studies that did not employ necessary corrections are at risk of incorrectly rejecting the null hypothesis (type I error), stating there are significant group differences in cognitive functioning, when in fact there are not. Although some studies reported results with highly significant p-values (p<0.001) (Darke et al., 2000), others interpreted p-values of 0.03-0.05 as significant, despite performing multiple tests (Messinis et al., 2009).

However, when reviewing significance levels it is also important to consider sample sizes. The larger the sample size the better the probability of detecting a real effect (power). Studies with small sample sizes have low power and therefore poor sensitivity to detect group differences that may be present. Small sample size studies are therefore at risk of underreporting group differences as they may not reach significance. Therefore the use of effect sizes can be a more appropriate method of reporting group differences as it does not confound with sample size. However, only nine studies in this review reported effect sizes in their results.

In addition to the varying methodological limitations of the studies, it was important to question whether inconsistent findings may be unsurprising, considering the heterogeneity in an opiate-dependent population (Ersche & Sahakian, 2007). Individuals meeting the criteria for an opiate-use disorder with a duration of illicit drug use at 6 months may be less impaired than individuals using for over 10 years. Some research suggests a correlation between length of previous heroin abuse and cognitive impairment, with abuse longer than a year being associated with short term memory and learning deficits (Mitrovic et al., 2011). In contrast, however, studies included in this literature review reported no correlation between cognitive impairment
and years of heroin abuse (Darke et al., 2000; Prosser et al., 2006). As many participants reported very long heroin abuse duration (overall mean=12.4 years), it is possible that these studies may be observing a ceiling effect which may mask any slight differences in impairment. Research shows there is an acute sedative effect of methadone, in particular on psychomotor performance, which resultantly impacts performance on cognitive testing (Darke et al., 2000; Lombardo et al., 1976). The majority of primary studies carefully considered these acute sedative effects by ensuring participants were both in treatment for a minimum amount of time (i.e. 3-6 months), and were adequately stabilised on their dose (i.e. for at least 1 month). However four studies lacked the necessary information to determine whether participants were stabilised on the opiate-substitution (Fadardi & Ziaee, 2010; Gupta et al., 2014; Mehrjerdi et al., 2011; Zeng et al., 2016). Furthermore, participants in Mehrjerdi and colleagues’ (2011) study had only been in treatment for 17 days. It is possible that cognitive impairment reported in these studies could have been influenced by poor psychomotor speed caused by the sedative effects of the substitution drug, rather than reflecting a more stable impairment.

4.1.3 Typical treatment seeking opiate-dependent populations
This literature review aimed to include studies which recruited a typical and heterogeneous group of people in treatment for opiate-use disorder. It was not concerned with determining a causal relationship between specific factors (i.e. opiate-use alone) and cognitive impairment. Notably, there was a substantial lack of studies which included participants who reported factors that are commonly occurring in opiate-using populations, such as other drug use, alcohol use, head trauma, overdoses, and other mental health diagnoses. Research suggests high rates of poly drug use in opiate-using populations (PHE, 2017) and high rates of co-morbid depression in people in methadone maintenance treatment (Harvard et al., 2006). Importantly these presentations have a direct impact on treatment outcomes, as people with concurrent mental health diagnoses have poorer psychosocial functioning (Kennedy & Paykel, 2004), and
experience more relapses (Trivedi et al., 2008). Furthermore, Verdejo and colleagues (2005) reported that a significant proportion of people receiving methadone substitution for an opiate addiction also report a history of alcohol abuse, use of other illicit drugs, and overdoses (Verdejo et al., 2005). Notably, eight studies used urine analysis to objectively confirm that participants had been abstaining from other illicit drugs for long periods of time (3-18 months) before testing. The remaining studies either used urine analysis only to confirm abstinence at time of testing (n=4), or used clinician opinion at time of testing (n=3), or made no statement about confirming abstinence/drug use (n=4). The studies which used urine analysis to identify a successfully drug abstinent population could be underestimating the level of cognitive impairment that may be present in a more typical treatment seeking drug using population.

Finally, it is important to emphasise that the data included in this review are limited by what is made available in the published studies. A number of studies lacked detail in the write-up with regard to describing their participant population, describing methods for statistical analysis, and displaying details of the results. Nonetheless, studies which did adequately define their inclusion and exclusion criteria did not necessarily then describe their participant group with regard to these. For example studies which included head trauma did not always state how many participants actually reported head trauma. This missing information made it even more difficult to determine whether the studies with less stringent inclusion/exclusion criteria actually recruited a typical drug-taking population, or whether issues such as sampling bias limited the likelihood of factors such as polydrug use, head trauma, overdose, and other mental health diagnoses being present in their drug-taking participant groups.

**4.1.4 Implications**

Deficits on particular cognitive domains are likely to have profound consequences for individuals engaging in drug addiction treatment. Slower processing speed results in difficulties performing learnt tasks. This can have an impact on an individual’s pace, which
can consequently impact everyday routines such as arriving at appointments on time, to completing tasks outlined in treatment. This could lead to frustration and disengagement if services do not take into account these deficits and make necessary adaptations. Deficits in verbal memory and learning may make it difficult to understand complex instructions as well as impairing the ability to learn and remember this information over delayed periods, an integral aspect of facilitating change during treatment. Furthermore, McDonald and colleagues (2012) reported a significant relationship between poor cognitive function and poor social cognition. Such deficits may directly impact an individual’s social communication and interaction skills, making it more difficult to engage with professionals and services.

Executive dysfunction, such as impulsivity may result in poor problem solving and risk taking behaviours. Indeed, Barry and Petry, (2008) discussed difficulties anticipating and considering negative long term consequences in substance dependent individuals which are integral processes that facilitate recovery. Furthermore, prospective memory impairment is likely to have real world consequences, for example forgetting to attend appointments, taking medication, or paying bills on time (Terrett et al., 2014). People attending drug services for opiate addiction may therefore benefit from wide-ranging support, including personal effectiveness programs and adult daily living skills (Prosser et al., 2006).

It is also necessary to consider the impact of co-occurring factors, such as mental health diagnoses and alcohol use, on treatment engagement and efficacy in opiate-dependent populations. The high frequency of concomitant alcohol use in opiate-dependent populations (Verdejo-Garcia et al., 2005), and its known impact on cognitive functioning is an important factor for services to consider. Darke and colleagues (2000) suggest that a lifetime diagnosis of alcohol dependence could be routinely screened for if trying to determine the likelihood of cognitive impairment. In addition, McDonald and colleagues (2012) reported that the majority of their opiate-substitution participant (total n=125) group reported a history of overdose.
Overdose can lead to hypoxia which can starve the brain of oxygen and consequently result in permanent damage to the brain. There is also research to show that people with a diagnosis of depression in treatment for opiate-dependence are more likely to use other illicit drugs (Compton et al., 2003). All of these factors may reduce both treatment engagement and efficacy, and should be considered by all involved in an individual’s treatment in services treating opiate-use disorder.

4.2 Conclusions

The paucity of studies which include opiate-dependent participants who also reported factors such as polydrug and alcohol use, history of overdose or head trauma, and other mental health diagnoses, highlights the need for more studies to investigate cognitive impairment in a typical treatment seeking opiate-dependent population. Until then it is not possible to confidently report on the level of cognitive impairment in this population. However the results of this review, and of existing reviews, indicate significant levels of impairment across a broad range of cognitive domains in people attending services for opiate-use disorder. These findings are in spite of stringent inclusion and exclusion criteria and it could be hypothesised that there is an underestimation of cognitive impairment in a population who are much more heterogeneous and complex, with regard to their drug-taking patterns and experience of other significant difficulties, such as mental health.
6. References


PART 3: CLINICAL EXPERIENCE

Year 1

Adult Community Mental Health Recovery Service
I worked with adults aged 18-65 years old, presenting with a range of moderate to severe mental health difficulties, in a community setting. I worked with people with a range of mental health diagnoses and difficulties including: depression, anxiety, OCD, psychosis, emotionally unstable personality disorder, post-traumatic stress disorder, bipolar disorder, a history of traumatic experiences (child abuse, neglect), self-harm and suicidal behaviours.
I worked on an individual basis with a number of people, providing assessment and interventions. Therapeutic models which informed my work included Cognitive Behaviour Therapy (CBT), Dialectical Behavioural Therapy (DBT e.g. distress tolerance), Mindfulness, and Attachment theory. I also worked with my supervisor in delivering Family Intervention for Psychosis with a family of 2 adults and 2 children.
I co-facilitated two groups whilst on placement. I facilitated a psycho-educational CBT group with another trainee clinical psychologist, and other members of the MDT when appropriate, i.e. OT. The group was a 6 week programme offered on a rolling basis and covered the basics of CBT; the link between thoughts, feelings, behaviours, and physiological sensations, behavioural experiments, and the importance of self-care. I also facilitated a therapeutic group for people with a diagnosis of bipolar disorder, with a clinical psychologist. This was an 8 week programme which included psycho-education, mindfulness techniques, and strategies to manage difficulties associated with the diagnosis, i.e. lows and highs.
I also conducted a service-related project on this placement, evaluating the effectiveness of a hoarding group, run in partnership with a charity.
I completed two neuropsychological assessments; the first was to produce a cognitive profile for an individual who had recently experienced a head injury. The second was a memory assessment of an adult with a diagnosis of Bipolar Disorder reporting memory difficulties.
As part of my teaching and training competencies, I delivered a presentation to the service user and carer group within the service, on offering a psychological perspective to mental health difficulties, and understanding what psychology can offer. I also delivered a presentation in a team meeting regarding the STEPPS group and referral process.
I attended and contributed to different meetings including Multi Disciplinary Team (MDT) meetings, psychology team meetings, psychology locality meetings, complex case discussions, and business meetings.

Year 2

Child and Adolescent Mental Health Service (CAMHS) Tier three and a Pupil Referral Unit Tier Two
On my CAMHS placement I worked with children and young people aged 10-17 years old and their families. Difficulties experienced by the children and young people I worked with included moderate to severe mental health difficulties including, anxiety (panic disorder, generalised anxiety disorder, social anxiety), obsessive compulsive disorder (OCD), low mood, low self-esteem, self-harm, gender identity difficulties, anger management, and Autism Spectrum Disorder (ASD). I used a range of models to inform my assessments and interventions including CBT, narrative therapy, parenting approaches, attachment theory, and systemic theory. My interventions consisted of individual, family-based and parent work.
I led the development of a new 6-week yoga group for teenagers struggling with low mood and anxiety, which was evaluated using pre- and post- measures. I co-facilitated this group with a qualified yoga teacher. I delivered a presentation about this new project at a CAMHS learning event to service leads.
At the Pupil Referral Unit I completed two neuropsychological assessments of two primary school aged children to determine cognitive profiles of their strengths and difficulties in light of
educational attainment difficulties, and in the context of neurodevelopmental difficulties such as ASD and ADHD. These assessments involved making contact with hard-to-reach families to gather developmental histories, completing school observations, and gathering information from teaching staff and SENCOs. These assessments were fed back to the PRU and mainstream schools, and further consultation was offered to schools. I also supported the development of a reflective practice group for the school teachers at the PRU.

**Older People’s Memory Assessment Service**
I worked with older people from the age of 65 to 90, who had received a diagnosis of dementia, including Alzheimer’s Disease, Vascular dementia, and Lewy Body dementia. People struggled with difficulties including adjustment to the dementia, physical health issues, relationship and familial difficulties, and further mental health difficulties such as depression. I carried out two comprehensive neuropsychological assessments to determine the presence of a dementia, including differential diagnosis (dementia vs. depression), and determining the type of dementia. This involved gathering information from the individual and informants, and offering feedback and making onward referrals to appropriate services. I led and co-facilitated the running of a 10-week group with a nurse ‘Living well with dementia’. I adapted materials to ensure they were effectively tailored to the participants in the group. This group explored what the diagnosis meant, both medically and to the individual. We looked at strategies that could support people to cope, and live alongside dementia. We explored the difficult emotions often associated with receiving a diagnosis, and what this meant for the future. The group was evaluated using pre- and post- measures, and qualitative feedback was gathered from the individual and family members in the final session. I worked both individually and with couples supporting the adaptation to a recent diagnosis of dementia. My work was informed primarily by systemic theory, narrative approaches, and solution-focused techniques. My practice was also informed by attachment theory, CBT, ACT, mindfulness, and health psychology models. I co-facilitated a reflective practice group for dementia support workers to offer a space to explore the emotional impact of the role, informed by a solution-focused approach, building on the skills and knowledge of colleagues to work through difficulties. I attended MDT meetings, journal club sessions, and I presented to the team on the use of a dementia screening tool. I co-facilitated an information and support session with a clinical psychologist and OT for individuals who had recently received a diagnosis of dementia, and their family members. I supervised the work of a graduate psychology student completing a service evaluation; I offered support on the design of focus groups and gathering feedback, the use of quantitative and qualitative evaluation methods, and qualitative analysis methods.

**Year 3**

**Specialist Placement – Paediatric Psychology Service**
On my specialist placement, I worked in a paediatric psychology service for children and young people with physical health difficulties. I worked with children and families ranging between the ages of 2 and 12 years with a range of difficulties including; Sickle Cell Disease and pain, Cerebral Palsy, medically unexplained symptoms, procedural anxiety, behavioural difficulties, toileting difficulties and ASD, adjustment issues, and cognitive impairment. I also worked with parents experiencing emotional distress and anxiety regarding their child’s illness and relationship difficulties in the context of their child’s diagnosis and treatment. I carried out assessment and interventions on an outpatient basis, working with children individually, parents separately, and I also worked with families together. Interventions were tailored to the individual needs of the child and their families based on working formulations. The main models applied on this placement were systemic family therapy, narrative, brief solution focused, CBT, ACT, and behavioural approaches, alongside psycho-education and basic
therapeutic skills/interventions involving validation and listening. Much of my work also included liaising with other services and organisations such as schools and CAMHS. I organised and facilitated TAC meetings, and supported schools in better supporting their pupil.

I carried out two neuropsychological assessments for children; one who had Sickle Cell Disease, and another where there were concerns about cognitive difficulties in light of toileting issues and ADHD. Based on the assessments, I provided feedback to families and schools regarding underlying cognitive abilities, memory, concentration and attention (executive functioning) issues. I delivered a presentation to the psychology team about the new Power Threat Meaning Framework in their service development meeting. I also attended the team away day where considerable thought was given to service development and the future of the service.

I attended in-house training on a number of topics including; motivational interviewing, paediatric intensive care – death and dying; constipation, obesity, anxiety and autism, complicated grief, tree of life, functional neurological disorders, and ethics. I attended weekly psychology team meetings, and also attended the neurology and neurosurgery MDT.

I developed a number of tailored therapeutic materials, including resources, social stories, and accessible cognitive assessment summaries. I also wrote systemic therapeutic letters to the children I worked with.

**Community Mental Health Team for People with Learning Disabilities**

I worked with adults aged 18-65 years of age who had a recognised Learning Disability, and a Mental Health diagnosis. People had diagnoses of psychosis/schizophrenia, anxiety, depression, and PTSD. People had difficulties associated with identity, managing transitions, anger difficulties, self-harm, suicidal ideation and behaviours, relationship difficulties, and behaviour that challenges. I also worked with people with ASD and an LD. I worked with people with a high level of risk, to themselves, to others, and from others. I worked with people with criminal histories. Risk assessment and management formed a significant proportion of my work.

I worked therapeutically with people with mental health difficulties (such as those mentioned above). Assessments and interventions were tailored and adapted to individual needs, taking into consideration the learning disability, communication difficulties and sensory difficulties. I carried out both individual and indirect (family, carers, staff) interventions using CBT, DBT and systemic based approaches, incorporating attachment theory and narrative approaches. I worked individually, as well as with a person’s support worker. I also worked with a family of a man with a diagnosis of Schizophrenia and LD, who was refusing their medication. We supported the family throughout the person’s deterioration in mental health, inpatient admission, and discharge.

A significant proportion of my work involved joint working with other members of the MDT, including nurses, psychiatrists, Occupational Therapists and Speech and Language Therapists. My work also included assessment, formulation, training and consultation to care home staff regarding risk management and challenging behaviour, using functional assessments and the Positive Behaviour Support (PBS) model. I delivered 3 training sessions to care home managers on PBS, and developed a PBS plan for one of our clients.

I carried out two neuropsychological assessments; one eligibility assessment for an 18 year old man with ASD. I also used the BPVS, a test of receptive vocabulary, to identify a client’s communication abilities, and used this information to inform a PBS plan.

I facilitated 3 groups for a community service for people with learning disabilities, to people with a range of presenting difficulties and abilities. The groups were on friendships and relationships, and anxiety and relaxation.

I delivered a presentation to the psychology team about the new Power Threat Meaning Framework in their service development meeting. This helped help promote psychological thinking and formulation within the MDT. I also attended several MDT meetings, and local and countywide faculty meetings. I learned about the perspectives and experiences of people with learning disabilities and their carers by attending several day centres.
## Table of Assessments Completed During Training

### Year I Assessments

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<tr>
<th>ASSESSMENT</th>
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<tr>
<td>WAIS</td>
<td>WAIS Interpretation (online assessment)</td>
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<tr>
<td>Practice Report of Clinical Activity</td>
<td>Assessment and formulation of Max, a white British male in his early thirties experiencing psychosis.</td>
</tr>
<tr>
<td>Audio Recording of Clinical Activity with Critical Appraisal</td>
<td>Audio recording and critical appraisal of an individual CBT session with a female in her mid-thirties presenting with obsessional worries and avoidance behaviours.</td>
</tr>
<tr>
<td>Report of Clinical Activity N=1</td>
<td>Cognitive Behaviour Therapy with a British woman in her mid-thirties presenting with obsessional difficulties and avoidance behaviours.</td>
</tr>
<tr>
<td>Major Research Project Proposal</td>
<td>Exploring the experience of cognitive impairment in opiate-dependent populations.</td>
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### Year II Assessments

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<th>ASSESSMENT</th>
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<tr>
<td>PPLD Process Account</td>
<td>A reflective account of the process of attending a personal and professional group.</td>
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### Year III Assessments

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<th>ASSESSMENT</th>
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<tr>
<td>Presentation of Clinical Activity</td>
<td>A presentation of an integrative psychological intervention with a 10 year old boy with a diagnosis of obsessive-compulsive disorder attending a Child and Adolescent Mental Health Service</td>
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<tr>
<td>Major Research Project Literature Review</td>
<td>Cognitive impairment in opiate-dependent populations receiving an opiate-substitution: A literature review.</td>
</tr>
<tr>
<td>Final Reflective Account</td>
<td>On becoming a clinical psychologist: A retrospective, developmental, reflective account of the experience of training</td>
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