

**EYE MOVEMENT DESENSITISATION AND REPROCESSING
THERAPY IN THE TREATMENT OF SUGARS ADDICTION (A
DERIVATE OF HEROIN): GAINING CONTROL OVER CUE
REACTIVITY AND CRAVINGS**

Submitted in fulfilment for the degree

Doctor of Philosophy (Psychology)

By

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DECLARATION

I hereby declare that this is my own work and all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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ABSTRACT

Eye movement desensitization and reprocessing therapy (EMDR) developed by Francine Shapiro is an integrative psychotherapeutic approach that has been described as one of the most well researched forms of psychological treatment, however there are few empirical studies investigating the effects of EMDR therapy on addiction. The purpose of this study was to investigate the effects of EMDR therapy on cravings and cue reactivity in sugars “heroin based” addicted persons and to determine whether the EMDR therapy process is useful in reducing or extinguishing the psycho physiologic intensity of a craving. This research attempted to fill the hiatus in the literature related to EMDR therapy in craving management, as well as a clearer understanding and management of the sugars scourge in KwaZulu-Natal.

A quasi-experimental study with a control and experimental arm was conducted and supported with clinical interviews over different time periods. Seventy participants from the two inpatient rehabilitation facilities in KwaZulu-Natal were assigned to one of two therapeutic conditions, viz. EMDR therapy and relaxation training, of which 35 participants from one of the rehabilitation facilities received two sessions of EMDR therapy (experimental group) and 35 participants from an alternate facility received two sessions of relaxation training (control group). Non-parametrical statistics were used to analyse and compare the craving experiences of the experimental and control groups.

The superiority of one treatment over the other could not be demonstrated suggesting that EMDR therapy and relaxation training tend to be equally efficacious in managing cue reactivity in sugars addicted persons. Whilst there were no statistical differences between the experimental and control group, the clinical interviews revealed that the EMDR therapy group participants were more confident about their recovery and more knowledgeable about the addictive processes that encouraged their continued use of sugars. Further research is needed with larger and varied samples to determine the superiority of the one treatment over the other. Whilst the findings of the present study cannot be generalized due to the small sample size, it has important clinical implications for craving management. It is hoped that the study will not only contribute to a greater understanding of the effects of the therapeutic processes in the treatment and management of cravings in sugars addicted persons but will also stimulate further research in this field.

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CHAPTER 1

INTRODUCTION

1.1 MOTIVATION FOR STUDY

The United Nations estimates that 35 million people globally are affected by drug use problems of which only 1 in 7 people receive treatment and the annual number of drug related deaths in 2017 was estimated at 585 000 (UN Office of Drugs and Crime, 2019). Global estimates suggest that addiction is one of the major challenges for humankind and one of the leading contributors to preventable death in the current millennium, thus necessitating a need for effective prevention and rehabilitative interventions for people affected by drug usage. Clients with addiction often have great difficulty in maintaining sobriety and the prevalence towards relapse has been found to be much greater than the prevalence towards abstinence (Blum et al., 2014). In an attempt to understand the high rate of recidivism, researchers have concluded that the addiction treatment methods that are most widely used today lack scientific evidence of effectiveness (Edwards & Rawson, 2010; Fletcher, 2013), and the knowledge gained from addiction studies has not yet been translated into better treatments (Ersche et al., 2013). Given that the dominant treatment paradigms have little or no scientific basis, there is much evidence that treatment is proving to be ineffective and that relapse remains the single most destructive dynamic to the recovery process. Therefore, relapse prevention has become a core focus in addiction treatment and treatments that control and minimise risk situations and diminish the intensity of cravings have been gaining efficacy (Huhn et al., 2019).

Cravings which are defined as an intense desire to use a drug are not only involved in the initiation and maintenance of addiction but is also a central part of the relapse process (Ekhtiari & Paulus, 2016). Treatments focussing on diminishing and extinguishing cravings have been found to be controversial in the field of drug addiction (Martin & Rehm, 2012). Treatment approaches and modalities that emphasise relapse prevention focus on improving the patient's capability to withstand cravings (Albers, 2010), and treatments that fail to reduce cravings have been associated with a higher rate of relapse than treatments that are successful in the reduction

of cravings (Galaj et al., 2016). These findings have been supported by treatment effect studies that have demonstrated a positive association between craving and relapse (Galaj et al., 2016), and by researchers who believe that an individual's potential for relapse can be predicted by measuring their craving (Kavanagh et al., 2013), suggesting that a major strategy in drug addiction treatments should be to diminish cravings. Other studies with a clear positive effect on relapse prevention could not confirm corresponding decreases in the levels of craving (Martin & Rehm, 2012), thereby suggesting that cravings should not be considered an integral element in addiction treatment.

The construct of craving remains poorly understood and has limited our understanding of determinants and consequences of cravings, as well as the development of craving measures (May et al., 2014). There is no unique and completely accepted definition of craving although many approaches have tried to conceptualise a craving. However, many addiction theories assume that a craving is associated with the activation of an emotional state that motivates drug seeking behaviour. May et al. (2014) provided a cognitive account of craving, suggesting that the information pertaining to drug use resides in memory networks and when presented with drug cues, these networks activate specific information related to drug use such as the expected outcomes of substance use and the emotions associated with such use. Behavioural and Conditioning models have emphasised the role of environmental cues, as well as conditioned and unconditioned responses in eliciting cravings (Thompson et al., 2019). The Elaborated Intrusion (EI) Theory, which has been gaining support in the field of addiction views cravings or desires as affectively laden cognitive events, where an object, activity, associated pleasure or relief becomes the focal attention (Kavanagh et al., 2013). EI theory proposes that cravings may occur following elaboration of intrusive mental images and/or thoughts about regularly using substances and distinguishes cravings from intrusive or elaborated thoughts of drug using that are driven by automatic processes, whereas cravings involve conscious processes. The aforementioned explanations suggest that cravings have a multidimensional and complex nature that are underpinned by behavioural, cognitive and emotional aspects. Based on the abovementioned conceptualisations, the general expectation is that a positive correlation exists between cravings and relapse and although it has not been conclusively demonstrated that cravings are directly related to drug addiction and relapse, it should be considered a cue element when developing and testing the efficacy of treatment programmes for substance use disorders.

The cue reactivity paradigm has important implications for understanding neurobiological processes linked with craving, reward and motivation to consume drugs (Hill-Bowen et al., 2020). The basis of the cue reactivity paradigm is that previously associated cues to a drug can under certain conditions evoke the urge to use drugs. Research on cue reactivity has demonstrated that cravings and substance intake are mostly cue controlled (Albers, 2010; Bossert et al., 2013; Venegas & Ray, 2019). The number of conditioned stimuli, which can evoke cue reactivity includes exteroceptive stimuli (e.g., sight and smell of the drug), interoceptive stimuli (physical states, emotions and cognitions) and withdrawal symptoms (Maarefvand et al., 2013). A patient who is experiencing a craving whilst being prevented from engaging in the habitual response of using a substance, can demonstrate a reduction in cue reactivity when the cue and substance intake bond is interrupted. As a result, the learned association between substances related cues and the subjective substance related experience will diminish, resulting in the conditioned cue losing its predictive value and no longer evoking cue reactivity (Torregrossa & Taylor, 2016). The literature on addiction therefore suggests that an understanding of important factors related to cravings and its impact on the recovery process is paramount to understanding the addictive process, developing craving measures and in improving current treatment modalities.

The scourge of addiction is not only perpetuated by ineffective treatment methods and a lack of understanding of the addictive process, but also by a lack of treatment options that are available to people who are unable to afford rehabilitation costs (USAID, 2016). This study was motivated by the challenges and consequences associated with the continued use of a popular heroin-based drug, commonly known as “sugars” in the lower socio-economic communities in KwaZulu-Natal. Heroin users often enter and struggle with a repetitive cycle of rehabilitation and relapse (USAID, 2016), resulting in significant negative consequences for individuals, families and communities. There has been a dearth of information and a huge gap in the treatment and research literature on sugars addiction and appropriate treatment interventions, which has resulted in a poor understanding of factors that maintain and perpetuate sugars usage, as well as the lack of effective and targeted treatment interventions for this population. Anecdotal evidence suggests that cravings and withdrawals for sugars are the biggest hurdles that recovering sugars users’ experience, which challenges their ability to remain sober (Indianspice, 2014). The current study therefore hopes to fill the hiatus in the research literature by providing a better understanding of the variables that influence cravings

and the role of cravings in maintaining sugars addiction, as well as direction into targeted interventions that would have long term benefits.

1.2 AIM

The aim of this study was to investigate the effects of EMDR therapy on cue reactivity, and to establish whether there will be any changes in craving symptoms in a sample of sugars dependent persons after receiving EMDR therapy. The information from the study provides useful insights as to whether rehabilitation programmes should consider cue reactivity and the management of cravings as an integral part of recovery in sugars addicted persons.

1.3 RESEARCH QUESTIONS

The research questions for the study outlines the quantitative and qualitative aspects that were evaluated, as well as guided the methodology that was used to conduct the study.

1.3.1 Phase 1 – Quasi-Experimental (Pre-test & Post-test) Quantitative Study

- a) What are the changes observed from the EMDR therapy experience?
- b) Is EMDR therapy useful in reducing or extinguishing the psychophysiologic intensity of a craving experience?
- c) Are there differences between the EMDR therapy group and the relaxation group (control group) post treatment?

1.3.2 Phase 2 - Qualitative Study

- a) Does reprocessing of a craving allow for other issues to surface that may be contributing to the addiction?
- b) What are the factors that contribute to confidence in recovery following EMDR therapy?
- c) Are observed EMDR therapy treatment effects maintained at follow up?
- d) Should rehabilitation programs consider cue reactivity to be an integral part of the recovery process?

1.4 THEORETICAL FRAMEWORK

Advances in addiction research states that drug cravings are a neurocognitive, emotional response to a wide range of cues (Ekhtiari & Paulus, 2016), therefore the current study is rooted in models that provide an understanding of learning and memory processes associated with addiction and specifically cravings. In keeping with the motivation and objectives of the study, the Eye Movement Desensitisation and Reprocessing Therapy (EMDR) model and the Addiction Memory concept will provide the framework for this research.

1.4.1. Eye Movement Desensitisation and Reprocessing Therapy (EMDR)

EMDR therapy developed by Francine Shapiro is a comprehensive, structured eight phase integrative therapeutic approach that has the ability to combine cognitive, body – oriented, emotional and experiential matter into a single treatment protocol. EMDR therapy has received approval as an efficacious Post Traumatic Stress Disorder treatment by several major clinical bodies (Department of Veteran Affairs and Defence, 2017; WHO, 2013), and has been effectively utilised with a variety of clinical presentations related to anxiety and other forms of psychopathology (Shapiro, 2018). The research literature is relatively sparse in documenting the use of EMDR therapy for clients with drug and alcohol addictions, although Shapiro reported on the use of EMDR therapy in the treatment of addictions early in its development (Shapiro et al., 1994). The theory currently used to explain EMDR therapy is called the adaptive information processing (AIP) model. The AIP model was developed to explain the rapid change towards positive resolution by three processes viz, 1) accessing dysfunctional stored memories, 2) then stimulating the information processing systems in a dynamic way using bilateral stimulation, 3) finally to move the information to an adaptive resolution in order to solve the presenting problem. A major outcome of EMDR therapy is the physiological reconsolidation of memory (Shapiro, 2014), where the memory is changed through the associative processes and stored in its altered state within an appropriate contextual memory network (Eley & Kindt, 2017). EMDR therapy has been shown in controlled studies to reduce affect, increase attentional flexibility and facilitate the retrieval of the episodic memory (Muller, 2013; Amano & Toichi, 2016). Research conducted by Marich (2010) and Hase et al. (2008), concluded that EMDR therapy can form an important component in addiction care processes that can facilitate perspective shifts and help individuals cope with recovery.

1.4.2. Addiction Memory

The addiction memory concept has gained growing acceptance in the field of addiction research and treatment (Torregrossa & Taylor, 2016). An addiction memory is considered to be a hidden, long lasting and almost unchangeable modification of memory circuits that manifests as loss of control and an obsessive compulsive craving for the drug (Boening, 2001). This explanation was further supported by Sorg (2012), who stated that an addiction memory contains a general memory of loss of control and a specific memory of drug effects, which if activated results in drug usage. Wolffgram et al. (2000) states that this memory is due to the imprinting process and is almost inextinguishable under normal circumstances and conditions. Therefore, the successful treatment of addictive conditions may require an approach that addresses neurobiological changes to learning and memory systems that occur due to the addictive process. Bossert et al. (2013), stated that internal or external cues can activate the memory network and remembering and recalling drug effects may be represented in consciousness as a craving. It is presumed that the addiction memory is an episodic type of memory (Muller, 2013), and its cue reactivity resembles the maladaptive traumatic memory formation at the core of PTSD (van der Kolk, 2014), which is similar to Shapiro's Adaptive Information Processing model. Therefore, if the addiction memory qualifies as a maladaptive memory within the Adaptive Information Processing model, reprocessing the addiction memory should result in measurable changes of addiction or craving symptoms. Hase et al. (2008), in a randomised controlled study on EMDR therapy and its effect on the addiction memory, concluded that patients who received EMDR therapy had significantly reduced levels of craving in comparison to the control group. He further concluded that participants that received EMDR therapy had fewer relapses and a decrease in depressive symptoms, suggesting that EMDR therapy facilitates and enhances the recovery process by altering the addiction memory.

1.5 STRUCTURE OF THESIS

Chapter one highlights the rationale and motivation for the study. It presents the aims and critical questions that motivated the study, research design and an outline of the theoretical frameworks that directed the study.

Chapter two provides a broad overview of addiction and related concepts that are involved in predisposing, precipitating and maintaining an addiction, particularly heroin addiction. Heroin

addiction will be reviewed in relation to the relevant literature and research studies given that the sample comprised of “sugars” addicted persons, a drug which is a cheaper derivative of heroin. The composition, bio psychosocial effects and consequences of “sugars” addiction will also be discussed in chapter two.

Chapter three presents the theoretical frameworks adopted in this study, namely the EMDR therapy model and the Addiction memory concept.

Chapter four presents a detailed research methodology plan which includes the aim of the study, research design and procedure, data collection instruments and data collection methods.

Chapter five will provide a quantitative and qualitative analysis of the obtained data. Participant’s demographics and information from the intake interview that is related to previous and current experiences of their addiction are presented as frequencies. The statistical analysis of data relating to pre and post treatment measures will also be presented for the control and experimental groups. A qualitative in group analysis of the EMDR therapy experience and the interviews with the experimental group will be presented as psychologically recognisable themes in conjunction with the researcher’s observations of the processes and changes in the EMDR therapy and relaxation therapy groups.

Chapter six provides an in – depth discussion of the results of the analysed data in relation to the effects of EMDR therapy and relaxation therapy on participant’s cravings for sugars.

Chapter seven outlines the conclusions drawn from the study, the contributions made by the research study, limitations and future directions for research.

1.6 SUMMARY

This chapter outlined the introduction to the research study investigating the effects of EMDR therapy and relaxation therapy on cue reactivity. The motivation, aims and the organisation of the study were discussed, which provided a broad outline of the research processes and the remaining chapters. The following chapter will provide an overview of addiction, as well as heroin addiction which is the drug of choice in the sample population.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Addiction is a major global problem that continues to pose a significant public health concern worldwide. The global estimates in 2016 revealed that around 164 million people had an alcohol and drug use disorder (Hannah & Roser, 2018) with a 60 percent increase being noted in drug associated deaths between 2000 and 2015 (World Drug Report, 2018). To add to the global burden of addiction, international drug markets have been expanding, with cocaine and opium production being extremely high and posing multiple challenges on various fronts (World Drug Report, 2018). Statistics have shown that almost 20% of South Africans, which amounts to one out of every five adults are abusing mind altering substances and the steady increase in drug use figures suggests that South Africa is losing the war against drugs (Zikali, 2018), which is being further compounded by the lack of rehabilitation interventions in South Africa (Ramphele, 2018). An increase in admissions for treatment has been reflected in South African Community Epidemiology Network on Drug Use (SACENDU) data, where the number of persons admitted to treatment increased from 8787 in 2016 to 10047 in 2017 across 80 centres (Dada et al., 2017).

Addiction is a difficult phenomenon to study and treat because there is considerable disagreement in the literature on the definition and theories of addiction, therefore important constructs related to an addiction and processes that undergird an addiction remain open to interpretation. In order to have a comprehensive understanding of the various aspects of the addictive process and the use of therapeutic interventions in treating addictions, this chapter will focus on some of the disparities in definition and propose the best possible working definition of addiction and associated constructs. This chapter will also provide an in depth understanding of the theories of addiction, constructs related to addictive behaviour, determinants of recovery, comorbidities and addictive phenomenon such as cravings that perpetuate an addiction.

2.1.1 Definition of Addiction

There are many definitions of addiction, each being informed by the specific model that is used to conceptualise it, where for some addiction is conceptualised as a disease and for others it is a state of mind or a moral issue. Historically, one of the challenges faced in defining addiction has been a considerable misunderstanding relating to the relationship between a physical dependence and addiction, as the architects of the early models of addiction used what are commonly known as “hard drugs” e.g., morphine and heroin as the basis for constructing addiction models (Leshner, 1997; Solomon, 1977; Wikler, 1948). The early conceptualisations included concepts such as “tolerance” and “withdrawals” as central tenets in their definition, and the assumption that a person must present with physical withdrawal symptoms in order to be diagnosed as drug dependent, however in recent years, there has been a shift to broaden this definition (Kopetz et al., 2013). Health professionals in the field use the terms “substance use” and “addiction” interchangeably, based on their personal preference and their understanding of the condition. The diagnosis in the Diagnostic and Statistical Manual of Mental Disorders 5 (American Psychiatric Association, 2013), in labelling an addiction to chemicals avoids the use of the term “addiction” or “dependence”, in favour of the seemingly more scientific term “substance use disorder”. The current Diagnostic and Statistical Manual of Mental Disorders (DSM 5) has redefined the definition of an addiction to include both substance abuse and dependence that occur along a continuum from mild to severe (APA, 2013).

The DSM 5 (APA, 2013), which is a reference point for most health professionals, highlights the essential characteristic of substance use disorder as a cluster of cognitive, behavioural and physiological symptoms, which encourages the use of a particular substance despite substance related problems. Heroin which will be discussed in detail later in this chapter is an opioid drug made from morphine, a natural substance taken from the seed pod of the various opium poppy plants (NIDA, 2019). According to the DSM 5 Opioid use criteria, a minimum of 2-3 criteria is required for a diagnosis of a mild substance use disorder, while 4-5 is moderate and 6-7 is severe (APA, 2013). In order for a diagnosis of opioid use disorder to be made, a patient has to present with at least two of the eleven symptoms of the diagnostic criteria for the condition. The formal criteria for an opioid use disorder are listed in the table below:

Table 1 Diagnostic & Statistical Manual of Mental Disorders 5 Criteria for Opioid use disorder

<ol style="list-style-type: none">1. Taking the opioid in larger amounts and for longer than intended.2. Wanting to cut down or quit but not being able to do it.3. Spending a lot of time obtaining the opioid4. Craving or a strong desire to use opioids5. Repeatedly unable to carry out major obligations at work, school or home due to opioid use.6. Consistent use of opioids despite acknowledgement of persistent and recurrent physical and psychological difficulties from using opioids7. Tolerance as either defined by a need for markedly increased amounts to achieve intoxication or desired effect or markedly diminished effect with continued use of the same amount.8. Withdrawal manifesting as either characteristic syndrome or the substance is used to avoid withdrawal.
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Note. Data for the criteria of Opioid use disorder from the Diagnostic and Statistical Manual of Mental Disorders -5 (2013)

For everyday social usage and for the purposes of this study, the term “addiction” is preferred over “substance use disorder”, therefore the term addiction rather than substance use disorder will be used in the literature review. Addiction, which comes from the Latin word “addictus” meaning “to be assigned to or forming something”, is a broad sweeping cultural term that can be used to describe both chemical and behavioural manifestations (Kopetz et al., 2013). Medical and psychotherapeutic professionals often use the term addiction rather than substance dependency or substance use disorder to refer to the phenomenon of continuing to do something over and over, even when it causes repeated pain and consequences (Marich, 2011).

Apart from the DSM V criteria, various models of addiction have been proposed which influences the conceptualisation and treatment of the condition. The following models have dominated the field of addiction and have been used for many years to conceptualise and treat addiction. The moral model, which is the oldest model used globally to explain an addiction is still being adopted by many faith-based programs. The moral model suggested that addicts are

weak willed and their consumption was tantamount to sinful behaviour, and that their only hope for cure was meaningful religious conversion (Lassiter & Spivey, 2018). Thereafter, since 1939, a model pioneered by Silkworth known as the “disease model of addiction” was applied to alcohol dependence and given much recognition in the field of addiction and widely used by medical and psychotherapeutic professions to develop treatment programmes (McCrary & Epstein, 2013). This model purports that addiction is a primary disease with a predictable cause and has symptoms that are chronic, progressive, and fatal if left untreated (Leshner, 1997). This model further suggests that as with other diseases, the causes of addiction can be multifarious and influenced by a genetic predisposition (Heather et al., 2018). The early models provided a foundation for addiction studies and treatment modalities until the emergence of George Engels “biopsychosocial” model (Engels, 1978), which expanded on the concept of addiction by including individual experiences, perceptions, stressors as mediating factors in the development and maintenance of an addiction. Following the early conceptualisations of addiction, other behavioural and socio-cognitive paradigms emerged to explain the addictive process which included concepts such as habit and pleasure, operant and classical conditioning processes and socio-cognitive factors (Edwards & Koob, 2012; Marlatt & Gordon, 1985; May et al., 2015).

In trying to provide a holistic definition of addiction, Carnes (1992) proposed an excellent definition of addiction that includes aspects of various models and is now widely accepted by the scientific community and people in recovery (Marich, 2011). He stated that addiction refers to the entire pattern of maladaptive behaviours, cognitions, belief systems, consequences and affects, not just the behaviour as in compulsivity. Based on this definition, addiction is more than just a behaviour gone out of control, there are many other factors encouraging it (e.g. cognitions, effects of trauma) and many more factors affected by it (e.g. global functioning of the individual, impact on family and societies). Carnes’s expanded definition provides a holistic conception of addiction and draws attention to the biopsychosocial components in its causation and consequences, allowing for the application of various treatment methodologies to a much broader range of problem behaviours relating to an addiction.

A similar explanation to that of Carnes that encompasses various aspects of the client's addiction experience has been proposed by Hunt (2014), where she describes addiction as a complex progressive behaviour having biological, psychological, social and behavioural components. In trying to understand addiction and associated phenomenon, increasing reference is being made to the term "biopsychosocial" disease, which appears to be the most concise definition thus far, as it encompasses all the primary elements of the disorder in one word. The definition addresses the biological aspects of the disorder, such as the deterioration of the physical body and the habituation of the drug, which usually results in physical withdrawal symptoms and related aspects of the body's response to regular exposure to a drug. It further includes the psychological consequences of addiction such as stress, emotional dependence and other coping behaviours, as well as the social problems encountered due to the deterioration of the person's inner and outer worlds (Hunt, 2014). The biopsychosocial conceptualisation of an addiction provides support for developing models of addiction that offers a more substantive explanation of the relationship between the various factors that contribute to an addiction (Alonso, 2004; Hunt, 2014).

2.1.2 Theories of Addiction

Hunt (2014) contended that in explaining addictive behaviours, different models tend to develop over time and independently of each other, even though they share a common aim in trying to investigate the causes of addiction and contribute to more effective treatment options. There exists a range of theoretical explanations for addiction, which proposes an understanding of mechanisms that underlie the development and maintenance of an addiction, however the most prominent models are derived from the psychosocial and biomedical sciences. The biological models (genetic and neurobiological), psychological models (learning and behavioural models and personality theories) and socio-cognitive models will be discussed in an attempt to provide an understanding and holistic view of the various mechanisms that are involved in the development and maintenance of an addiction.

2.1.2.1 Biological Models

In exploring the biological characteristics that underlie addiction, two kinds of explanations need to be examined viz; one which focuses on individual predisposing factors to addiction such as genetics and the other which accounts for addiction in terms of changes that occur in the brain due to chronic drug use (Ekhtiari & Paulus, 2016). There has been an increasing number of genetic and neuroimaging studies of addiction in recent years, however the most extensively examined genetic and neuroimaging research to date have concentrated on alcohol and nicotine dependence (Károly et al., 2013).

2.1.2.1.1 Genetics

There is growing evidence that individuals may inherit increased vulnerability to develop an addiction, with many studies suggesting that addiction has a genetic component in families. Juli and Juli (2015) have stated that epidemiological studies strongly support the role of genetic factors in contributing to the various stages of an addiction, which include vulnerability to an addiction, continued use, and the propensity to become dependent. Numerous family, adoption and twin studies have identified the significant role of heritable influences on addiction (Agrawal et al., 2012), and have found that the first degree relatives of alcoholics were more than twice as likely to be diagnosed with an alcohol disorder as compared to relatives of non-abusing control group patients (Emmelkamp & Vedel, 2006). In another widely published study, a twofold increased genetic risk of alcohol dependence was found, where adoptees raised by non-alcoholic foster parents whose biological fathers were alcoholics were just as much at risk of becoming alcoholics as compared to boys who were raised by biological father's that were alcoholic (Nurnberger et al., 2004). Twin studies have substantiated the role of genetics in addiction, yielding heritability estimates of 30 to 70% for addiction across various substances (Agrawal et al., 2012), thereby supporting the role of genetics as a contributing factor in addictions. Two large scale studies that examined heritability estimates for opioid addiction reported heritability estimates of 23% in men (Kendler et al., 2003) and a considerably higher estimate of 54% in Vietnam Era twins (Tsuang et al., 2001), thereby providing evidence of heritable influences on opioid addictions.

Twin and family studies have provided substantial evidence that addiction has a genetic component, however even with technological advances, patterns of inheritance cannot be explained by simple genetic mechanisms (Juli & Juli, 2015; Vassoler & Sadri-Vakili, 2014). The genetic influence for addictions is not due to a contribution of a single gene but rather an interaction of different genes, which together with environmental factors influences the onset and progression of an addiction (Juli & Juli, 2015). Kendler et al. (2003) have been unable to link addiction to heritability but have found that environmental experiences unique to an individual such as culture, environmental position and substance availability predisposes an individual to drug use. In describing addiction as a heritable condition, many theories have investigated and proposed what exactly is inherited: such as substance sensitivity, heritable personality traits (e.g., novelty seeking, low harm avoidance, impulsivity), vulnerability of substance – induced damage to the brain and deficits in brain neurotransmitters (e.g. serotonin, dopamine), which motivates not just usage but also loss of control (Ekhtiari & Paulus, 2016). Hurley and Edenberg (2012) have provided evidence that the genetic influence may not be limited to addiction, but rather to the genetic transmission of comorbid psychiatric disorders which contributes to risk taking. Advances in genetic research have also found that carriers of the DRD2 A1 allele are both at risk for poor cognition and relapse (Blum et al., 2014).

The multifactorial nature of an addiction and more specifically environmental influences have recently identified “epigenetic factors” as mechanisms that contribute to addiction vulnerability. It has been demonstrated that epigenetic factors may provide the link between environmental stimuli and genetic heritability and contribute to the heritability of addictive disorders (Vassoler & Sadri-Vakili, 2014). Epigenetic changes are experience – dependent chemical alterations to chromosomes that affect gene expression. Epigenetic mechanisms have been found to contribute to drug induced structural, synaptic and behavioural plasticity, which according to Vassoler and Sadri - Vakili (2014) provides a molecular mechanism for drugs to influence the genetic events that are involved in the development of an addiction and its heritability to future generations.

An understanding of genetic and heritable influences on addiction not only provides a better understanding of the etiology of an addiction, but also provides promising leads for more

effective and targeted interventions for affected individuals (Karoly et al., 2013). Critics argue that researching and focussing on genetic factors are of minimal benefit, as research on genetic variants have small effect sizes as compared to environmental factors, which have a stronger influence and are easier to identify and modify (Agrawal et al., 2012). This view overlooks the goal of genetic research, which is to identify and provide improved treatment alternatives for individuals who despite receiving intensive treatment regimens remain addicted to drugs and to provide preventative programmes to high risk communities (Agrawal et al., 2012).

2.1.2.1.2 Neurobiological Processes

Neurobiological and physiological factors play a significant role in the etiology and progression of addictions, therefore an increase in neuroimaging studies over the past few years has been driven by a pressing need for more effective treatments for addicted individuals. Factor, such as intrauterine exposure to substances use, biological mechanisms involved in drug tolerance and withdrawals, and the neurological effects of different substances on brain activity play a significant role in the onset and progression of an addiction. There is substantial evidence that drug usage changes the chemistry and synaptic transmission of the brain (Karoly et al., 2013). The concept of “neuroadaptation”, which refers to changes in the chemistry of the brain due to repeated use of a drug has been used to explain concepts such as tolerance to drug effects and withdrawal symptoms upon cessation of the drug. These neurobiological changes disrupt the brains homeostasis, which in turn increases sensitivity to negative physical and emotional stimuli that impacts on the drug user’s ability to remain abstinent (Muller, 2013). Therefore, proponents of the genetic and physiological explanations of addiction have used physiological signs as critical indicators that addictions are biological entities, suggesting that an addiction should be conceptualised and treated as a medical condition (Barnett & Fry, 2015; Karoly et al., 2013).

In understanding the neurobiological mechanisms underlying an addiction, there is a general agreement as to which neurotransmitter systems and brain regions are involved in the addictive process. Dopamine and the mesocorticolimbic ‘reward’ circuitry have been a primary focus for neuroscience research on addiction (Jasinka et al., 2014). Drug usage sensitizes the mesocorticolimbic dopamine pathway (pleasure pathway), which is known as the centre of

psychoactive drug activation in the brain (Hunt, 2014). There is substantive evidence that the hippocampus involved in learning and memory, the amygdala (for emotion regulation), and the frontal cortical areas of the brain that assist with focussing and concentration are affected by substance use (Ersche et al., 2013). The orbitofrontal cortex and the anterior cingulated gyrus are the frontal cortical areas that are neuroanatomically connected with limbic structures that regulate the motivation and rewards systems. Neuroimaging evidence shows that these structures are activated in addicted persons during intoxication, craving, and bingeing, and deactivated during the withdrawal process (Wang et al., 2012). Neuroimaging studies in drug dependent individuals consistently report a grey matter decline in the prefrontal cortex region which is associated with self-regulation and self - awareness, and more specifically in the regulation of emotions, cognitions and behavioural responses (Ersche et al., 2013). The abovementioned studies provide a plausible anatomical profile given that the core clinical symptoms of addiction, such as loss of control and the compulsive nature of drug use are controlled by fronto - striatal neural networks (Ekhtiari & Paulus, 2016).

Drugs such as cocaine and heroin can either directly or indirectly increase dopamine transmission (Karoly et al., 2013), which is associated with an increase in feelings of pleasure and reward. The chemicals released as a direct result of drug use are rewarding and interpreted as intrinsically positive by the brain, allowing for the behaviours associated with these rewards to be repeated (Thompson et al., 2019). The neurobiological alterations in the reward circuitry allows for individuals to become more responsive to dopaminergic increases produced by drug usage and less responsive to increases in dopamine by naturally rewarding reinforcers (Karoly et al., 2013). This leads to an overvaluation of drug related rewards and persistent drug seeking behaviour. Long-term substance usage has also been found to reduce the brain's ability to produce its own dopamine, allowing addicted persons to become reliant on the drug to experience feelings of pleasure (Murphy et al., 2012).

Neurotransmitters such as endorphins and serotonin are also involved in addiction as some neurotransmitters are sensitive to particular drugs, for example, cocaine affects the dopamine system, and heroin the opioid system. There have been a few studies that have investigated the neurobiological basis of cue reactivity, however there is some evidence from both human and

animal studies that demonstrate increased mesolimbic dopaminergic activity in cue -reactive individuals (Jasinka et al., 2014). Recent advances in addiction research have shown that changes in the neurochemistry of the brain resulting from chronic or heavy substance use may cause anxiety or depression, which then reinforces the need for the drug to relieve the negative emotional state (Ekhtiari & Paulus, 2016). Recent studies also suggest that the continuous intake of a drug can “rewrite” the epigenetics of brain cells, by remodelling the long - term memory processes and by altering gene expression, which maintains the addiction (Juli & Juli, 2015). It is not yet clear whether changes in the neurochemistry of the brain are permanent or reversible, however scientific evidence has demonstrated that such alterations in neurochemistry may persist for years, impacting on an individual’s emotional and behavioural functioning (Ersche et al., 2013).

There has been increasing support for the brain disease model of drug addiction and advances in neuroscience and neuroimaging has resulted in addiction being defined as a primary, chronic disease of brain reward, motivation, memory and related circuitry (Barnett & Fry, 2015). An increased understanding of neuropathology underlying the clinical symptoms of an addiction is useful in identifying new targets for interventions and for the development of more effective treatments. Despite increasing support for the brain disease model of addiction, the extent to which the model may clinically affect addiction treatment and client behaviour remains unclear. Furthermore, the brain disease model ignores key social, psychological and environmental factors that are important for successful treatment. Ersche et al. (2013), stated that human addiction research makes it difficult to determine whether the neurobiological abnormalities observed in addicted individuals reflect a predisposing cause for addiction, or are due to long term exposure to neurotoxic drugs. The combination of genetic and neuroimaging studies has allowed for a deeper understanding of the basis of an addiction disorder and improved psychopharmacological treatments. However, the biological models absolve an addicted individual from accepting responsibility for their behaviour, as it suggests that the choice to use a drug remains outside the control of an addicted person.

2.1.2.2 Psychological Models

There are a variety of psychological approaches that explain the onset and maintenance of an addiction, more specifically these approaches emphasise impaired control over drug use and continued use despite adverse consequences. Psychological approaches that explain addiction include behavioural models (conditioning and learning) and personality theories.

2.1.2.2.1 Conditioning

Drug addiction is characterised by an increase in drug usage over time and compulsive drug seeking behaviour. The behavioural principle of reinforcement has remained a central feature in trying to explain the compulsive use of addictive substances, the psychological processes that separate initial drug use from the eventual development of addiction, and the clarification of specific psychological elements (e.g., positive and negative reinforcement) within the addictive framework.

Behavioural analysis as a quantitative science emerged in the early 1930s by Skinner, where operant conditioning principles were used to study response rate as a dependent variable. Since then, operant conditioning protocols relating to multiple elements of the addiction process and timeline (including drug administration, intake escalation, and reinstatement of drug seeking) have been developed (Edwards, 2016). In keeping with operant conditioning principles, addictive behaviours are viewed as learned habits that are reinforced by rewards, whereby a motivational stimulus strengthens a particular behavioural response (Edwards, 2016). Animal models of protracted and excessive exposure to drugs that display a high construct and predictive validity for the human condition have been extensively investigated and have demonstrated significant associations between somatic and motivational aspects of addictive phenomenon and persistent drug seeking (Ahmed et al., 2000; Edwards & Koob, 2012).

Addictive substances stimulate the pleasure centres in the brain (Edwards, 2016), thus providing positive reinforcement for substance use, e.g., the euphoric effect of cocaine or the

sleep-inducing effects of heroin. It is important to differentiate between the psychological constructs of reward and reinforcement, and although the antecedent stimulus is generally described as rewarding or positive to the user, the stimuli is not automatically reinforcing. The stimuli that strengthen the responses are also known as reinforcers, which may produce an increase in frequency or duration of responding, or a decrease in latency to respond. Negative reinforcement is associated with a behavioural response that terminates an aversive stimulus and occurs when substance use is reinforced in an attempt to alleviate unpleasant feelings. In relation to drug addiction, this phenomenon has been observed in humans, whereby the drug usage cycle is perpetuated to offset the negative experience of withdrawals (Ekhtiari & Paulus, 2016). Therefore, both positive and negative reinforcement leads to an increase in addictive behaviours, and the associations between stimulus and response is further complicated by timing and contingency (Thompson et al., 2019).

An important aspect of reinforcement that is relevant to the relapse process is ‘secondary reinforcement’, which is explained by the classical conditioning theory (Ekhtiari & Paulus, 2016). In relation to drug addiction, cues and contexts that are consistently associated with drug use often become reinforced, allowing for addiction to be conceptualised as a disorder of reward learning and memory (Hyman et al., 2006). Therefore, conditioned reinforcers may precipitate or magnify cravings or unpleasant withdrawal states which may subconsciously trigger the relapse process. The above-mentioned explanations are in keeping with Robinson and Berridge’s “incentive-sensitisation theory” (1993) of addiction that is based on preconscious sensitization of neural systems, which posits that the incentive value and attractive nature of secondary reinforcement processes, together with primary reinforcers persist and become sensitised over time, allowing for the development of an addiction. Re exposure to secondary reinforcing cues and contexts can trigger cravings that can elicit initial drug reactions and lead to the resumption of the addictive behaviour (Ekhtiari & Paulus, 2016), thereby creating a need for the development of therapeutic strategies that also target secondary reinforcement mechanisms associated with an addiction. Conditioned reinforcers provide support for the use of extinction therapy as a behavioural strategy in relapse prevention, therefore medical interventions for addiction need to factor the inextricable link between the addiction process and maladaptive changes that underlie positive and negative reinforcement. However, it is unclear whether reinforcement processes caused by early drug use are similar to

what is experienced in the addicted state, or whether there is a separate set of additional reinforcement elements that underlie the addictive process.

Edwards and Koob (2012) stated that behavioural methodologies that study reinforcement and addiction in animals represent the most valid preclinical model of any psychiatric disorder available to neuroscientists, thereby providing significant evidence for the role of conditioning and reinforcement effects in the addictive process. There is significant evidence for the role of conditioning and reinforcement effects in the addictive process, however these models disregard the effects of psychological, social and cultural factors in the development and maintenance of an addiction (Edwards, 2016). Furthermore, conditioning models have underscored the notion that both cravings and withdrawals represent dynamic states that are characterised by neuroadaptations, or other factors that perpetuate the addictive process (van Lier et al., 2018)

2.1.2.2.2 Personality Theories

Addiction has been associated with the existence of an addictive personality, a view that goes back to the psychodynamic proposition of the oral personality. Despite scepticism regarding the existence of an “addictive personality”, there is clear association between addiction and certain personality traits. Studies have found that addicted individuals are characterised by specific personality traits: such as low self-esteem, high novelty seeking, impulsiveness, high emotionality, and antisocial traits (Emmelkamp & Vedel, 2006). Clinical studies have found that the trait known as neuroticism or negative emotionality is associated with addiction, and although the mechanisms underlying the association are not well defined, they are thought to be associated with high sensitivity to stress (Ersche et al., 2013). The “externalising” phenotype is another personality trait that is associated with addiction, which is characterised by novelty and sensation seeking behaviour, extreme sensitivity to rewards and insensitivity to punishment (Hicks et al., 2013). The evidence from animal models and human studies suggests that the sensation-seeking trait increases the risk of initiating and continuing with drug use (Ersche et al., 2013). The strongest evidence for the association between addiction and personality traits is based on trait impulsivity, which is also known as disinhibition or lack of constraint. Human and animal studies have demonstrated that the transition to compulsive drug use is affected by

impulsivity, providing evidence for the association between trait impulsivity and addiction (Verdejo – Garcia et al., 2008). Cue reactivity is another addiction – related trait that has been associated with relapse, in which studies have found that individuals who attain motivational value from cues are at a higher risk for relapse than individuals who do not derive any motivation from drug related cues (Ekhtiari & Paulus, 2016).

A meta - analysis that investigated the relationship between personality traits and cannabis abuse, suggested that negative affect and emotionality play a direct role in the etiology and addiction to marijuana (Holahan et al., 2003). The different personality traits have not only been associated with the different stages of the addictive process, but also affects choice of drug e.g. heroin users tend to be more anxious (Alim et al., 2017). Studies have found a strong correlation between substance abusing personality types and addiction (Ekhtiari & Paulus, 2016), however there are many individuals with the same personality traits that do not become addicted, making it difficult to make predictions based on personality traits as to who will become addicted or not. Based on the studies that have investigated the addictive personality, it is difficult to determine whether certain personality traits predispose an individual to a particular phase of addiction or type of drug, or whether it is the neurobiological effects of the drug that results in the manifestation of certain behavioural traits.

2.1.2.3 Social Cognitive Theory

Social cognitive theory emerged as an extension of Bandura’s (1997) social learning theory which was confined mainly to the study of environmental influences in understanding human behaviour. Social learning theory had previously ignored the fact that an individual may also influence the environment, thus cognitive processing was included to the theory which posits that the individual, environment and behaviour interact simultaneously, affecting all aspects of the individual’s reality. The two basic cognitive elements of social cognitive theory that influence a person’s behaviour are “self - efficacy” and “outcome expectancies” and the key social factors that impact on self - efficacy and outcome expectancies are environmental stimuli (stressors), modelling of substance use and coping skills (Emmelkamp & Vedel, 2006).

Outcome expectancies refer to a person's belief that their involvement in certain behaviours will result in a desired outcome. Outcome expectancies are formed either through the person's experience of a certain behaviour or through observations of other people's experiences, which constitutes the main principle of social cognitive theory. The social cognitive theory in relation to addiction, states that a person develops positive expectancies and attitudes towards substances through the process of observing or imitating attitudes and behaviours of dominant role models such as family, peers or famous people (Giovazolias & Themeli, 2014). There is a growing body of literature focussing on how expectations about the effects of a drug are related to use, abuse and addiction, and that the decision to use a drug may be influenced by desirable or undesirable consequences such as "relaxed feeling", "tension relief" or "escapism" (Blume & Guttu, 2015; Giovazolias & Themeli, 2014; Jester et al., 2015).

Research has demonstrated that people's beliefs about the effects of drugs on behaviour, mood and emotions predict substance abuse in adolescents and adults (Noel & Thomson, 2012). Multiple environmental factors influence the development of expectancies prior to usage such as familial modelling (Jester et al., 2015), biological and genetic predispositions (Juli & Juli, 2015), social and media influences (Hanewinkel & Sargent, 2007) and belonging to a social group (Zamboanga et al., 2011). These factors when taken together, highlights the complex nature under which expectancies develop across childhood and adolescence, and expectancy formation in the early years are crucial because they predict both the intention to use a substance and the onset of use (Jester et al., 2015). Several longitudinal studies (Giovazolias & Themeli, 2014; Jester et al., 2015; Zamboanga et al., 2011), have found that when individuals are favourably predisposed towards substances, they believe that the use of these substances will bring positive outcomes and are more inclined to use a substance. Jester et al. (2015), in a nine-year longitudinal study on alcohol usage in youth found a reciprocal feedback loop, where positive social and relaxation expectancies for alcohol predicted increased alcohol usage in later years and positive expectancies remained latent even after long periods of abstinence

There is substantial evidence suggesting that positive expectancies are positively correlated to addictions (Blume & Guttu, 2015; Monk & Heim, 2013), however little is known of the mechanisms underlying this association. Expectancies, which has been used to explain the

desired changes in affective states, is considered to be one of the central mechanisms underlying the social cognitive theory. However almost all theories of addiction include components of affective reinforcement (e.g., stress reduction, pleasurable feelings etc). Bandura (1997) stated that the adoption of behaviours through imitating and modelling is a major source of an individual's learning and development, which is used to explain the onset and maintenance of drug use in social cognitive theory. It is short sighted to solely attribute the concept of modelling to shaping addictive behaviours, as this view describes individuals as incapable of thinking for themselves and governed by what others do, thereby disregarding important constructs such as human drive and learning, personal motives and self - efficacy.

“Self-efficacy” is the other central concept in social cognitive theory which is based on the principle of perceived behavioural control and is described as a cognitive - motivational force that determines the individuals' coping level under pressure. Self - efficacy refers to an individual's conception regarding their ability to accomplish a task, such as controlling substance use or coping with a high-risk situation (Nikmanesh et al., 2017). Two types of self-efficacy are related to substance use: self-efficacy regarding use which relates to a person's belief in their ability to obtain and use a substance and self - efficacy regarding resistance which is related to the persons' belief in their ability to resist social pressure to use a drug. Nikmanesh et al. (2017) stated that several studies have demonstrated that self - efficacy plays a significant role in predicting treatment outcomes and improvements in the recovery process of addicted persons. Addicted persons are often characterised by low self - efficacy in drug using situations, and low self- efficacy in turn is related to lack of control and continued drug usage (Ibrahim et al., 2011). The findings by Abdollahi et al. (2014), are consistent with the above - mentioned studies thereby confirming a relationship between relapse and self - efficacy and between self - efficacy and age of first drug use. A large number of studies measuring self - efficacy have reported that the construct is associated with outcome measures, making it difficult to determine whether the mechanism of behaviour change is treatment driven or due to an increase in self efficacy (Kadden & Litt, 2011). Based on the abovementioned findings, one has to question whether self - efficacy is truly a mechanism of behaviour change or merely an epiphenomenon of behaviour change that has already taken place.

Several studies have demonstrated that cognitive factors such as self - efficacy and outcome expectancies demonstrate significant effects in decreasing the risk of addiction and play a key role in successful treatment (Ibrahim et al., 2011; Kadden et al., 2011; Nikmanesh et al., 2017). Combined interventions that aim at outcome expectancies, self - efficacy, self- confidence and perceived peer norms might be more effective and have proven to be successful in preventing substance abuse compared to interventions that focus solely on one aspect (Giovazolias & Themeli, 2014). The general social learning constructs have been adopted in specific, integrative models, one of the widely used models being Marlatt and Gordon's (1985) relapse model. This relapse model is based on the assumption that addiction is a habitual, maladaptive way of coping with stress. Marlatt and Gordon's (1985) model proposes that high risk situations and lack of social support threaten an individual's sense of control and increases the risk of relapse. Therefore, if the individual does not have adequate coping responses, they will experience a decrease in self - efficacy and an increase in positive outcome expectancies in using a drug. This cycle then increases the likelihood of additional drug usage and perpetuates the addictive cycle in trying to cope with the negative emotional state. This process is known as "abstinence violation effect", in which minor transgressions are viewed as giving into the old habit and perpetuating the addictive cycle.

The theories discussed above suggests that addiction is a multi - dimensional phenomenon, related to biological, psychological, cognitive and social characteristics. The interactive, dynamic relationship between environmental, biological and individual behaviour necessitates viewing addiction as a multifactorial phenomenon which should be used as a basis for developing multi modal intervention strategies that could be significantly effective in addiction treatment. Apart from having a thorough understanding of mechanisms that underlie the development and maintenance of an addiction, it is imperative to have an understanding of specific constructs related to addictive behaviour.

2.1.3 Addiction Concepts

There are many constructs related to addictive behaviour that impacts and is crucial in understanding and managing the condition. These core elements conceptualise the process and

provide an understanding of the relationship between these constructs and their role in actively reinforcing an addiction.

- *Recovery*

In order for any therapy or treatment plan to be integrated into the recovery process, it is crucial to examine the concept of recovery. However, the field of addiction treatment lacks a universally accepted and clearly defined clinical definition of recovery (Dodge et al., 2010), which could be attributed to various theoretical models that conceptualise an addiction. The early conceptions of recovery were based on the Alcoholics Anonymous 12 step model, which defined recovery as complete abstinence from an addict's drug of choice, complete abstinence from any potentially addictive substance or inconsequential moderate use of any drug (Kaskutas et al., 2014). In later years, views on recovery became less rigid and current conceptualisations tend to focus more on the experiential processes that are involved in recovery. A comprehensive definition of recovery has been proposed by El Gluebally (2012), "Recovery is the experience through which individuals, families, and communities impacted by severe alcohol and drug problems (AOD) utilise internal and external resources to voluntarily resolve those problems, heal the wounds inflicted by AOD- related problem and actively manage their continued vulnerability to such problems, and develop a healthy, productive and meaningful life" (p. 3). This description includes various domains of recovery such as abstinence, physical wellbeing, psychological wellbeing and re – integration into society.

- *Loss of Control*

"Loss of control" is a term that is central to addiction, which relates to the process where drug use becomes a compulsive activity (Griffiths, 2013). The early stages of drug usage is characterised by intermittent use, however drug usage later progresses to loss of control at every use. Griffiths (2013) highlighted three distinct aspects of "loss of control". The first is where the drug user experiences an inability to control the amount or time period of compulsive usage once they have started, the second aspect is where the person experiences loss of control over when he or she is going to use or engage in the compulsive activity and the third aspect is

the loss of ability to choose between a range of behavioural options. Therefore, loss of control can be understood in terms of “predictability”, where the user is unable to predict when or how much of the drug he or she will use, and it is this inability that differentiates addictive use from social use.

- *Denial*

Denial can be seen as the “capstone” of the addictive process, where it prevents people from feeling pain or looking at a difficult situation differently, thus holding the entire distorted system together. Denial remains a poorly conceptualised construct as empirical investigations that address denial have been limited. Beebe (1990) describes denial as an unconscious process that includes suppression, repression, projection and rationalisation. These are strategies that an addicted person uses to promote a belief that addiction is not a problem and that their lives are normal. Gorski and Miller (1986) explained the process of denial by outlining three stages in its development viz, the addicted person is able to deny the existence of the addiction as there are no physical and behavioural problems in the early stage, in the middle stage problems are not associated with drug usage, and in the chronic stage thinking is impaired and judgement is distorted.

- *Tolerance*

A key feature in addiction is tolerance which manifests when the body requires a greater amount of the substance over time to achieve the desired effect (Hunt, 2014). Repeated administration of some drugs results in a progressive decrease in some of the effects of the drug e.g., repeated usage of opiates results in a decrease in analgesia and euphoria experienced through previous administrations (Hafajee, 2014). Due to biological adaptations of the drug, people addicted to drugs are required to increase their dosage to produce the same effects, thus leading to increased exposure to the drug and greater frequency of administration (Hafajee, 2014). In cases of severe addiction, tolerance is described as a stage of addiction where no matter what the dosage of the drug, the user will not experience the euphoric effect at all.

- *Withdrawal*

Withdrawal is a physiological state of distress induced by the sudden absence of a substance in the tissue or blood of a long-time drug user who has developed tolerance to the drug (Ekhtiari & Paulus, 2016). This state of distress encourages addicted individuals to maintain a certain level of drug in their system to avoid the discomfort associated with withdrawals. Withdrawal effects can be unpleasant feeling states and/or physical effects that occur when a person is unable to engage in drug usage. The discontinuation of opiates results in observable unpleasant physiological withdrawal effects such as stomach cramps, hot or cold flushes and severe body aches and paranoia (Amato et al., 2013). Despite the discomfort associated with withdrawals, the way in which withdrawals maintain addictive behaviour remains far from clear, however many addicts believe that the discomfort associated with withdrawals is the reason for their continued use of the drug.

- *Relapse*

Relapse has been described as the single most destructive dynamic to the recovery process and remains the primary problem in treating addictions (Melemis, 2015). The prevalence towards relapse has been found to be much greater than the prevalence towards sustained abstinence, with many researchers describing alcoholism and drug addictions as a chronic relapsing condition (Heydari et al., 2014). In defining the concept of relapse, it cannot be separated from the parent process of addiction and the perception of relapse as it relates to an addiction is crucial in determining how it should be dealt with. Relapse can be defined as a negative end point when a person returns to addictive behaviours (Emmelkamp & Vedel, 2006). Broadly speaking relapse refers to the inability to maintain behavioural changes over time, however, “behavioural changes” can mean different things to different people. Thus relapse, may be defined as one time use of a potentially addictive substance, out of control dependency of the addict’s drug of choice, or out of control dependency on any potentially addictive substance. Most researchers do not view relapse as a negative end point, but a transitional process from “lapse” to “relapse”, and it is often seen as a process that can be interrupted (Melemis, 2015).

- *Drug Addiction*

The current Diagnostic and Statistical Manual of Mental Disorders (APA, 2013) has redefined addiction to include both substance abuse and dependence that occur along a natural continuum from mild to severe. It is important to recognise that the DSM - 5 (APA, 2013) conceptualisation of “substance use disorder”, recognises the presence of behavioural and psychological symptoms but neglects the aspect of compulsion and repetitive behaviour, which is central to an addiction. The term addiction according to the National Institute of Drug Abuse (2013), indicates compulsive use of a substance despite harmful consequences, such as failure to fulfil social, work or family responsibilities, and an inability to stop using the substances on one’s own accord. Hunt (2014) contended that once an addiction manifests, it is actively reinforced by the relationship between three essential factors: a) impaired neurological mechanisms; b) unmet psychological needs; and c) dysfunctional behaviour, the combination of which results in the compulsive act of the phenomenon. Addiction can therefore be described “as a highly complex behavioural phenomenon involving multiple components including behavioural, emotional, cognitive and physiological symptoms which causes a person to lose control over drug usage” (Ekhtiari & Paulus, 2016, p. 9).

2.1.4 Course

Substance use evolves over time, usually starting with alcohol, progressing to cannabis and then hallucinogens in early adulthood. General population studies in South Africa show a steady increase in the use of alcohol and other substances, with prevalence rates for alcohol and illicit drugs ranging from 6% to 16% between 2002 and 2008, and 12% of South African learners reporting using at least one illegal drug such as heroin, mandrax or cocaine (Reddy et al., 2011). Most adolescents who use alcohol or illicit drugs at some point and experience substance related problems, do not necessarily progress to abuse or dependence. Adolescents who have positive expectations regarding alcohol and drug usage are likely to increase their consumption of it (Jester et al., 2015), and cross sectional and longitudinal research has found that early cannabis use provides a gateway for future mental health symptoms and disorders in later years (Pederson et al., 2015).

The predictive basis for later substance abuse for most people is established by the time they finish high school, and those that continue to use illicit drugs do so less often than when they were younger (Sussman & Arnett, 2014). Substance use levels amongst young adults have also been found to be high which may in part be due to the period between 18 and 30 years of age being characterised by role exploration, high accessibility of psychoactive substances and high tolerance of addictive behaviours (Sussman & Arnett, 2014). Life transitions such as marriage and parenthood and the accompanying stress have a strong effect on the levels and incidence of substance use. A study between at risk twins and co twins found that early alcohol and cannabis use was associated with years of education after controlling for familial contribution to educational attainment (Grant et al., 2012). It is difficult to specify a typical course for substance dependence as age of onset varies, however there has been research to demonstrate that persons who initiate drug use before age 14 are at a greater risk for developing substance dependency and have a 34% prevalence rate of lifetime substance dependence (Substance Abuse and Mental Health Services Administration, 2014). These findings have been substantiated by research that have demonstrated that even brief exposure to cocaine in adolescence can promote the formation of habits later in life (Hinton et al., 2014). Addictions tend to develop over time, and periods of problematic use and associated impairments continue for many years after the criteria of an addiction have been established. Alcohol and drug use have been found to be high in young adults, particularly because the period between 18 and 30 years of age is characterised by role formation and associated stressors (Pederson et al., 2015). There is evidence that in most individuals the course of substance abuse and addiction is not progressive, and that periods of heavy use are alternated with periods of relative abstinence or controlled use, even in persons with a history of addiction (McKay & Weiss, 2001).

2.1.5 Associated Problems

Apart from an addiction or an intense need for the drug, people who are addicted to psychoactive substances often experience other problems related to their drug usage, and long term usage can have devastating effects on many areas of a person's life. Drug usage affects many lifetime milestones such as marriage, parenthood and employment (Sussman & Arnett, 2014; Timko et al., 2015) and is associated with a host of psychiatric, medical, legal, social, emotional, relationship, educational and employment problems (Haysom et al., 2018; Melchior et al., 2015; NIDA, 2013). Often, those that seek inpatient or outpatient treatment do so because

of financial, social and medical complications rather than the addiction itself (Emmelkamp & Vedel, 2006).

Unemployment levels have been found to be especially high in persons with addictions which impacts of their quality of living and psychosocial functioning. A large community- based study of 1125 young adults in France found a strong association between unemployment and substance use, particularly in young adults with lower educational attainment (Melchior et al., 2015). The study also concluded that patterns of substance use in relation to unemployment varied according to the participant's level of education and the choice of drug was associated with employment and socio-economic status. The relationship between unemployment and substance use may be bidirectional, where on the one hand unemployment and the associated stressors may impact on substance use as a means of coping and the other hand substance use and associated disturbances may result in the loss of employment (Compton et al., 2014).

Substance use is associated with interpersonal and more specifically marital problems, and the relationship between drug use and relationship difficulties has been well established (McHugh et al., 2010). Research has differentiated families of alcoholics from healthier controls in that the former manifest poor communication, organization, problem solving, conflict management and affect regulation processes (Lauder et al., 2013), and psychosocial vulnerabilities such as social deprivation and childhood adversity have been found to increase the liability for addiction in adulthood (Redonnet et al., 2012). Research has associated drug usage with impaired parenting and empirical evidence has demonstrated that substance abusing mothers show less maternal affection, are less responsive to their children's needs, emotionally distant and sometimes violent towards their children (Lauder et al., 2013).

Drug addictions are associated with several types of criminal behaviour. Social problems experienced by a drug dependency are devastating, as the lives of most addicted persons and poly drug users are centred on obtaining and using the drugs. Desperation for drugs, results in the user lying and resorting to criminal behaviour to obtain the drug even in the absence of pre-morbid antisocial personality traits (Rafajee et al., 2013). Some even become dealers themselves or resort to prostitution to support their addiction (Greenwald, 2007). The use of

drugs has important implications for public health, where the consumption of drugs increases the likelihood of injury and or death. Heavy illicit drug use is associated with many negative effects and poor health outcomes, including greater likelihood of injury, illness, poor health, increased risk of suicide and overdose. More than 90 % of drug overdose victims survive after receiving emergency medical care, but if hypoxia is prolonged, neurological and other physical effects of overdose become apparent (McKenna, 2007).

Studies that investigated the extent of drug use on educational attainment demonstrated that drug use is a marker of lower educational attainment and impacts on non-progression to formal education (Grant et al., 2012; Silins et al., 2015). A longitudinal research study in Australia on the effects of adolescent alcohol use on school performance concluded that alcohol use is strongly linked to poor academic achievement and adverse school consequences such as suspensions, poor commitment and academic failure (Hemphill et al., 2014). Apart from drug use being correlated with poor educational attainment, treatment centre outcome data demonstrated that the level of education is a significant predictor of relapse and abstinence (Blum et al., 2014). The investigations by Blum et al. (2014) further revealed that the level of academic achievement and attainment of higher education had an overall impact on relapse prevention, where a lower level of academic achievement was found to have a positive correlation with relapses. Over the past decade, clinical case studies and cognitive assessments have shown that a substantial number of drug users suffer from impairments across various cognitive domains (Cadet et al., 2014), and although drug induced damage is reduced after detoxification and on abstinence, little is known about the extent and rate of cognitive changes in recovery. Therefore, future research efforts should focus on the gaps in knowledge relating to clinically relevant cognitive improvements following cessation of drug usage.

2.1.6 Comorbid Psychiatric Disorders

The presence of a comorbid psychiatric disorder in addicted persons is being increasingly recognised. Psychiatric comorbidity, often referred to as a “dual diagnosis” refers to any psychiatric problem the individual may experience in addition to the addiction. The dual disorder has increasingly become a source of interest over the last two decades, due to the negative influence that comorbidities have on the onset and prognosis of substance use disorders. A complex set of psychological and social factors related to mental illness creates a

vulnerability for addiction, where individuals with mental illness appear to be at a higher risk for developing an addictive disorder (DiClemente, 2018). Dual diagnosis of mental and substance use disorders is common in clinical studies (Carney et al., 2017) and community samples (Collizi et al., 2016) and is very prevalent among specific populations such as inmates and the homeless. In the general population, substance use disorders are especially prevalent in adults with antisocial personality disorders, mood disorders, schizophrenia, and to a lesser degree in persons with depression and anxiety disorders (Carney et al., 2017). Generally, patients with both substance use disorder and other mental health disorders have behavioural and emotional presentations that are more persistent and severe (Collizi et al., 2016), and have less positive treatment outcomes and a poor prognosis in comparison to patients with one disorder. There is evidence to state that individuals with both psychiatric conditions and addictions tend to have poor treatment outcomes and are at a higher risk of relapse than people without an additional psychiatric diagnosis (Morisano et al., 2017).

There is substantial research linking cannabis use that begins in adolescence with symptoms and a diagnosis of depression and anxiety in young adulthood (Kedzior & Laeber, 2014), and adolescents diagnosed with a mood disorder display increased cannabis usage when faced with a high degree of distress (Scott et al., 2014). Drugs and alcohol may be used as a way of dealing with negative emotions and thoughts in depressed people, and when untreated these negative emotions may become triggers for relapse (Kedzior & Laeber, 2014). Therefore, an important challenge in relapse prevention is that recovering persons must learn new ways of coping with feelings of anxiety and depression without relying on a drug for relief or to regulate one's mood. It is also important to note that withdrawal symptoms sometimes mimic symptoms of depression, anxiety and psychotic disorders (Edwards & Koob, 2012), making it important to distinguish between an actual psychiatric disorder and a transitory withdrawal symptom.

The efficacy of existing treatment programs and interventions to treat a dual diagnosis in a specific and comprehensive manner has not been clearly proven (McHugo et al., 2006), however recent evidence has found that medications can be effective for comorbid psychiatric conditions and treatment of substance use disorder (Machielsen, 2014). Therapeutically, patients with a dual diagnosis are a challenge in treatment, therefore a better understanding of

the link between psychiatric symptoms and relapse could be useful in developing therapeutic interventions that target the symptoms that trigger cravings for drugs.

2.1.7 Determinants of Recovery

In understanding addiction and the process of recovery, it is imperative to identify key influences that promote change and abstinence amongst recovering persons. Recovering persons can be classified as those persons that have made some type of decision to change their behaviour, as compared to those that may have entered treatment without a firm commitment to change their behaviour. Critical factors that are relevant to the process of change are factors such as readiness to change, decisional balance and motivation which influences an individual's decision to action and maintain changes, voluntarily or under duress.

2.1.7.1 Readiness to Change

The “stages of change model”, also known as the “transtheoretical model” (Prochaska & DiClemente, 1984) is an extremely popular concept in addiction research and has been widely adapted in clinical settings as a heuristic for understanding motivation and more specifically, “readiness to change”. The Transtheoretical model (TTM) “attempts to bring together divergent perspectives by focusing on how individuals change behaviour and by identifying key dimensions involved in the process” (DiClemente, 2003, p. 19). Two distinct but related aspects of readiness should be considered when evaluating the process of change viz, readiness to change and readiness for treatment. Readiness to change has been conceptualised as a combination of the patient's perceived importance of the problem and confidence in his or her ability to change. Readiness for treatment focuses on motivation to seek help, motivation to engage in treatment activities and their impact on treatment attendance, compliance and outcome.

An individual's readiness to change their addictive behaviours has often been viewed as an outcome rather than a process, and this limited view overlooks some of the challenges and difficulties that recovering persons experience through the process of change and recovery. The Transtheoretical model of change has provided a useful and dynamic framework showing that addicted persons in recovery are in different stages of what is known as the “cycle of change”.

The basic tenet of TTM involves transitioning through a series of stages known as; pre – contemplation (no intention to change their behaviour in the foreseeable future), contemplation (considering change in the foreseeable future), preparation (intending to change in the foreseeable future and have plans to change the intended behaviour), action (actively engaging in changing the behaviour) and maintenance (sustaining the change and preventing relapses) (Prochaska et al., 1992). The model provides an indication as to what stage the individual may be in with regards to readiness to change and the type of intervention that is effective at each stage. Another pragmatic aspect of this model is that it provides possible explanations as to why people experience reversals in their resolution to change. Recovering persons in a treatment programme may be categorised as pre - contemplators, contemplators or actioners. In terms of the stages of change model, some patients referred to treatment centres are likely to be “pre-contemplators” or ‘contemplators”, who may be prompted into recovery based on various reasons. In the case of actioners, a resolution to change has been made and put into practice. Therefore, from the perspective of the “cycle of change” model, an understanding of addiction and recovery calls for a careful examination of the contemplation and action stages.

The Transtheoretical model operates on the assumption that people do not change behaviours quickly and decisively, and that change in habitual behaviours occur continuously through a cyclical process. Progress from one stage to another is not linear but cyclical, allowing for people to re - enter the cycle at any point, therefore back and forth movement should be looked at positively as it allows individuals to continuously redo the tasks at various stages, allowing for a level of competence that would support sustained change. Therefore, the TTM has contributed to our understanding of addiction and recovery as a dynamic interactive process between person and environment. The TTM has intuitive and heuristic appeal but it lacks in that it does not provide a meta - theoretical framework that accommodates all the previous perspectives into an integrative framework (West, 2005), and human functioning is too versatile and multidimensional to be categorised into discrete stages. Furthermore, a critical review of studies that focussed on the scientific status of the “stages of change”, demonstrated several major conceptual difficulties related to the internal and external validity of the model (Bunton et al., 2000). An interesting study by Stimson and Oppenheimer (1982), supports the view that initiating change is about making a decision to stop, where they found that the initial decision-making stage or readiness to change was crucial in a group of heroin users and determined whether an individual would stop using the drug. Many studies have been

conducted on the stages of change, but there is a paucity of studies that have matched psychotherapy outcomes to the patient's stage of change in recovery (Bunton et al., 2000) and studies that appeared to use outcome measures were mostly concerned with examining the structure of the model (Isenhart, 1997; Prochaska et al., 1993).

2.1.7.2 Decision Making

The decision to change is a significant factor in instituting behaviour change and includes considerations of the pros and cons of changing behaviour. Janis and Mann (1977) proposed a descriptive cognitive assessment model of the decision-making process which stated that decision making involves five stages viz; appraising the challenge, surveying alternate behaviour, weighing the alternatives, deliberation and commitment, and adherence to the decision to alter the behaviour. An important concept, derived from Janis and Mann's (1977) model is decisional balance, which reflects an individual's weighting of the pros and cons of changing behaviour. The process of making a decision and then adhering to it, is based on careful consideration of the instrumental gains and anticipated losses for the individual who wants to make changes.

According to Janis and Mann (1977), individuals reach decisions by a number of routes such as; a) "unconflicted adherence", where an individual follows any advice or recommendation on adopting a new behaviour without any reflection or difficulty, b) "defensive avoidance", where in a state of conflict the individual procrastinates, passes responsibility to others and rationalises the most desirable course of action, c) "Hyper vigilance" is characterised by an impulsive decision making style usually taken to avoid conflict, d) "vigilance" involves a careful weighing up of information on alternative ways of dealing with the problem. "Vigilant information processing" in changing behaviours has been highlighted by Kadam et al. (2017), who in comparing alcohol and opioid relapsers to non relapsers concluded that "cognitive vigilance" is an important characteristic of abstainers.

The relationship between decision making and emotional states in addiction treatment has received much attention over the past few years. Murphy, Taylor and Elliot (2012), who reviewed several studies on the relationship between emotional states and decision making,

concluded that addiction is influenced by both trait and state affective processes. High levels of negative affect, anxiety, stress sensitivity and sensation seeking in addicted persons are predictive of poor decision making. Studies have shown that stress affects decision making in opiate users in favour of immediate rewards as compared to long term abstinent goals, and that stress reactivity increases relapse susceptibility (Sinha et al., 2009), however other studies have been unable to demonstrate the relationship between stress and decision making in addicted persons (Koob, 2008). The above-mentioned studies suggest that future research efforts should focus on the impact of stress on decision making in recovery, or more specifically whether differential effects on decision making is dependent upon the degree of stress that is experienced. Although decision making is considered an important aspect that motivates drug use and abstinence, the current literature is inconsistent as to how decision - making deficits manifest across the various drug addictions and whether they contribute to the initiation, progression and recovery from addictions (Ekhtiari et al., 2017).

2.1.7.3. Motivation

Motivation and motivational constructs have been accorded a central place in many theoretical approaches of addiction, and regardless of the perspective taken, there is little debate about the role of motivation in understanding addiction. The decision to receive treatment for addiction is often a trying one for treatment seekers, hence motivation is an important construct in recognising the need for change, seeking treatment and sustaining change (Kopetz et al., 2013). Motivation and commitment are crucial constructs in recovery and relapse, which determines the manner in which one embarks on behaviour change and its impact on treatment outcomes. Motivation refers to the internal states of the individual that leads to the instigation, persistence, energy and direction of behaviour that moves one towards a goal (Ekhtiari & Paulus, 2016).

Motivation concepts have been put forward to provide explanations as to why people behave in a particular manner and what makes individuals shift from one state to another. Ekhtiari and Paulus (2016) outlined three key motivational constructs that encourages individuals to perform certain behaviours or set of behaviours viz, incentive, affect and affective change. The motivational process is encouraged by incentives, which is defined as any object or event that could change a person's affect, either by enhancing positive affect or reducing negative affect.

Affect, which could be positive or negative is the subjective component of the emotional response that may result in affective changes from a person's present state, and it is the affective changes that people are motivated to achieve. The above discussion reveals that addiction is a motivated behaviour, where drug usage is initiated and maintained due to its rewarding capacity, thereby providing the motivation to use a drug. In an attempt to understand the motivational processes that transition casual drug use to an addiction, it is crucial to examine the behavioural processes as the individual transitions from the former mode into an addictive mode. In the experimental stage, drug use is merely a means to different motivations (e.g., feeling good, satisfy curiosity, or to socialise), whereas for an addicted person the behaviour of drug use becomes an end in itself or is compulsively pursued despite negative consequences. Various theoretical models have provided insights into the processes that mediate the transition from casual drug use to addiction, however it remains unclear as to how drug related stimuli acquire motivational value and the nature of such motivational value in the transitioning process (Kopetz et al., 2013).

It must be noted that the belief that persons entering treatment may be variously motivated to undergo and complete treatment, poses a limitation to current treatment models that are structured in a way that assumes that a person entering treatment is already in the action stage and ready to make the desired changes (DiClemente et al., 2004), thereby ignoring a person's motivational readiness to change and its impact on treatment efficacy. An important aspect that should be taken into consideration in the recovery process is that motivation levels tend to wane over time and the thinking that underpins the initial decision to quit using a substance changes or weakens over time. Many people who seek treatment may be under pressure to change or at a difficult stage in life which influences their decision to change, however as the adverse consequences that may have encouraged behaviour change tend to dissipate and the difficulties of engaging in behaviour change become apparent, their motivation to engage in the recovery process lessens (Kopetz et al., 2013). An understanding of motivation and motivational factors provides an understanding of constructs that underlie goal driven drug use, as well one's level of commitment to the recovery process. Treatments that incorporate motivational goal directed principles have recently provided very encouraging results in reducing dropout rates and increasing abstinence rates in treatment seekers (Kopetz et al., 2013). Behavioural activation approaches that aim to activate and increase the value of individual goals by encouraging and

increasing an individual's engagement in rewarding activities, have been found to be successful in increasing treatment retention (Magidson, et al., 2011), and decreasing alcohol usage amongst college students (Reynolds et al., 2011). Therefore, treatments that are designed to promote the use of healthier, nonsubstance related strategies and the use of alternative means to fulfil motivations related to drug use, may be useful in increasing a drug users' motivation to remain abstinent.

2.1.8 Cravings

Drug cravings are central to theories of addiction although various operationalizations of craving have been offered and contested over the years (Thompson et al., 2019). Drug craving as a motivational state for drug-seeking behaviour has been finally considered as one of the main features of substance use disorders in the DSM V classification (Sinha, 2013). Therefore, a thorough understanding of the dynamic and complex phenomenon related to cravings and its role in perpetuating or reinstating drug seeking behaviour in addicted persons is crucial to understanding drug seeking behaviour. The discussion below focusses on definitions and constructs related to cravings, theories of cravings and interventions related to cravings.

2.1.8.1 Definitions, Nature and Constructs

Cravings are possibly the most widely studied and poorly understood concept in the field of addiction. There has been a growing interest in cravings over the past years, which has led to its inclusion as one of the criteria for substance use disorders in the DSM-5, however there is a lack of consensus about its definition and underlying causes. In addition to the problem of defining a craving, which is based on conceptualisations of the nature of a craving and its role in the addictive process, several researchers highlighted challenges in measuring the phenomenon, as craving assessments use varied terms such as “desire”, “want”, “urge”, “need”, or closely related synonyms to refer to the concept of craving (Tiffany & Wray, 2012).

Craving is a multidimensional construct which most researchers describe as a “subjective experience of wanting to use a drug” (Tiffany & Wray, 2012). Common psychological perspectives describe craving as a subjective motivational state in which individual's experience a subjective urge to use a drug (Ekhtiari & Paulus, 2016), however modern theorists

have argued that the subjective state of *wanting* is only one component of the craving experience. The above-mentioned definitions are indicative of three distinct elements that has implications for treatment: craving is conscious, craving is an expression of desire, and the desire is directed towards the use of a specific drug (Tiffany & Wray, 2012). Apart from the subjective state of *wanting*, cravings can also include a variety of related phenomenon such as memories, positive expectancies, concentration difficulties, attentional bias to substance related stimuli and physiological reactions to substance cues (Maarefvand et al., 2013). Two types of cravings have been identified that reflects tonic or phasic shifts in an individual's desire to use a drug. Tonic craving is described as a slow changing signal in response to the unpleasant effects of abstinence or withdrawals, and phasic cravings are of fast onset and relatively short acute craving periods in response to drug related cues that were previously associated with drug use (Tiffany & Wray, 2012). Therefore, cravings can be seen as a subjective feeling that could be elicited in external cue-exposure events or internal withdrawal cue-experiences.

Cravings can be very persistent and can continue for weeks and months after detoxification in opioid patients (Amato et al., 2013), and increased craving levels during periods of abstinence in heroin addicts are associated with increased rates of relapse to active substance use and increased amounts of drug use (Marhe et al., 2013). People rarely experience cravings for drugs and alcohol whilst in treatment facilities, instead the craving seems to return after being discharged from treatment settings and when returning to their normal environments, therefore it makes sense to assess a person's level of craving in close proximity to situations that can evoke a relapse episode (Epstein et al., 2010). Many addiction theories assume that craving plays an important role in the maintenance of addiction and relapse, given that most recovering persons continue to experience cravings in the recovery process, however not all studies demonstrate an association between subjective reports of craving and relapse (Conklin et al, 2015). Drummond et al. (2000), identified four possible explanations for this viz, craving and relapse are unique and independent phenomenon, current measures of craving are unable to detect the relationship between craving and relapse, craving is only predictive of relapse in certain conditions and lastly it is not the subjective experience of a craving but rather the underlying mechanisms of a craving that is predictive of relapse. Despite the challenges regarding definitions and measurements, the correlates of cravings in response to drug related

cues are presumed to play a role in the maintenance and continuation of an addiction, particularly in relation to lapses and relapses (Conklin et al., 2015).

2.1.8.2 Theories of Cravings

There are many different approaches and theories that have emerged to conceptualise and explain the mechanisms of a craving, since the initial attempts made by Jellinek (1960) to explain the etiology of alcohol cravings. Different perspectives have been used to provide conceptual accounts of the nature of a craving and its underlying causes viz, the phenomenological perspective, classical conditioning theory, cognitive theories and elaborated intrusion theory.

2.1.8.2.1 The Phenomenological Model

The earlier explanations of cravings have been derived from interviews and observations of clinically addicted populations hence the strength of the phenomenological model lies in the attention it gives to the human experience. The phenomenological perspective emphasises clinical experience and the substance users' view as a primary source for describing cravings but does not provide an in-depth explanation of the mechanisms of cravings. The phenomenological perspectives popularity in the field of addiction may in part be related to focussing on symptoms of addiction that can be readily elicited, such as cravings, which then forms the basis and part of a diagnostic interview. However, a danger of this approach is that it creates the assumption that cravings are essential to the diagnosis of an addiction, or that it should be the primary target for treatment interventions. This has accounted for the loss of confidence in phenomenological theories as empirical research have not been able to confirm a direct connection between craving and drug use. An analysis of phenomenological models (Isbell, 1955; Jellinek, 1960) demonstrates that it makes assumptions or predictions about the underlying processes that account for the craving experience which are useful in generating hypotheses about cravings, however they offer few pointers as to how to test these hypotheses.

2.1.8.2.2 Classical Conditioning Theory

Traditional models of craving that have been widely used in the field of addiction research and treatment, have been based primarily on the concept of classical conditioning, which focuses on internal and external cues that elicit a craving. Classical conditioning theory is a theory of learning which is similar to cognitive behavioural theory, where it emphasises that environmental cues, as well as conditioned and unconditioned responses are related to a craving experience. Conditioning theories consider cravings to be Pavlovian responses that occur as a result of the continuous pairing of the effects of a psychoactive substance with environmental cues. These conditioned responses can result from repeated pairing of stimuli with the positive effects of substance use, relief from the negative effects of withdrawals (Torregrossa et al., 2011), or due to the incentive motivational features of a substance that sensitises the brain and increases the desire for a substance (Robinson & Berridge, 1993). Conditioned stimuli are individualised and cravings are experienced in varying severity by different persons for different substances. Research has found that different types of drug related cues (visual, sensory, tactile, auditory, smell, imaginal processes), negative emotional states (anger, anxiety, emotional distress, depression etc.) and different stressors (fatigue, hunger, etc.) can induce drug cravings (Huhn et al., 2019; Nosen et al., 2012; Volkow et al., 2016), thereby increasing the individual's vulnerability to drug taking and relapse.

Classical conditioning theory also supports research that views addiction as a brain disease in which repeated use of a drug tends to change the way the brain responds to the drug (Gipson et al., 2013). The reward pathways are closely linked to motivational, emotional and memory centres, which allows people to learn the signals for pleasurable rewards and to anticipate the reward (Bossert et al., 2013). Classical conditioning theory assumes that a person's response to conditioned stimuli persists long into recovery and many people can experience unexpected cravings after many years of abstinence, suggesting that a craving is a deeply ingrained, automatic response to a wide variety of triggers (Ekhtiari & Paulus, 2016). Classical conditioning theory also demonstrates that a craving is not just a subjective feeling, but a more complex process which involves a dynamic interaction of cognitive functions that begin with exposure to cues and ends with behavioural executions. Classical conditioning concepts have had a major impact on theories of alcohol and drug craving. The most influential model of conditioning craving developed by Wikler (1948) to explain heroin addiction, has since been

applied to other drugs. Wikler (1948) hypothesised that stimuli paired repeatedly with AOD withdrawal could become conditioned stimuli that elicited conditioned withdrawals, which in turn generates cravings, and addicts that experience cravings would be motivated to seek out and use drugs to relieve the conditioned withdrawal effects.

Classical conditioning theory and craving research has given credence to the theory of addiction as a long - term brain disease (Gipson et al., 2013), which challenges the view that users are weak people who are unwilling to control their behaviour. Conditioning theories have provided a framework for understanding the impact of conditioned reinforcers and reinforcement learning on eliciting cravings (van Lier et al., 2018), however they do not address the mental processes that accompany a craving. Conditioning theories state that drug use and cravings are both caused by the same physical events (Bossert et al., 2013), therefore the subjective aspects that are associated with a craving are seen as secondary and the feelings that are experienced whilst craving are viewed as a by-product of the addictive process that do not cause people to consume the drug. Furthermore, to date the majority of studies that have assessed drug operant self-administration have done so under conditions that do not result in habit formation, suggesting that research findings on operant conditioning may not be applicable to real life craving experiences (Corbit et al., 2012; Zapata et al., 2010).

2.1.8.2.3 Cognitive Theories

Over the years, researchers have increasingly introduced cognitive concepts into conceptualisations and attempts to understand the processes underlying cravings, which has culminated in the development of cognitive models of cravings. Cognitive conceptualizations of cravings state that a response to a substance - related cue involves various cognitive processes such as memory, communication, classification, problem solving, planning, expectancies, interpretation of experience and automatic behaviour that provides explanations of cognitive factors that facilitate and enhance cravings (Ekhtiari & Paulus, 2016). In determining the impact of cognitive concepts on cravings, it is useful to distinguish between two types of cognitive theories viz, cognitive behavioural theories and cognitive science paradigms. Cognitive behavioural models, also known as social learning models emphasise constructs such as expectancies, attributions, imitation and self-efficacy in explaining the

process of craving (Drummond, 2001). Conversely, the cognitive science paradigm, which focusses on information processing, memory and decision making is representative of recent advances in craving research (Ekhtiari et al., 2016). The above-mentioned approaches consider cravings as a product of higher order mental functions, in which multidimensional cognitive processes reflect the way in which drug relevant information controls an addict's behaviour.

Three cognitive models of craving viz; outcome expectancy model, dual - affect model and the cognitive processing model will be discussed that offer distinct explanations on the various cognitive concepts that underpin a craving. These models have been developed many years ago but the explanations of cravings and the concepts that have emanated from these models have been widely used in the development and implementation of addiction treatment programmes. A popular cognitive model is the *Outcome Expectancy model* (Marlatt & Gordon, 1985), which contends that environmental cues can trigger powerful expectations about the effects of alcohol and it is these expectations that profoundly influence the alcoholic's behaviour. Expectancies have two essential components viz, an informational component that represents specific beliefs about alcohol effects and the motivational component that reflects the desire for experiencing a positive outcome of drug consumption. In relation to expectancy theories, a craving is either mediated by beliefs and expectations about the positive effects of substance use, such as pleasure and relaxation, or the relief from negative effects of withdrawal. Therefore, expectancy research has focussed on the beliefs that people have about drug and alcohol effects and the associations of those beliefs with drug usage (Tiffany, 1999). Skinner and Aubin (2010) in an evaluation of the "outcome expectancy model" stated that there is very little research that validates the outcome expectancy model and that attempts to confirm the proposed features of the model have not been conclusive

Baker et al. (1987) developed the *Dual - Affect - Model* based on their proposition that cravings are controlled by complex emotion- processing systems that influence physiological responses, self-reports of craving and emotion, and drug seeking behaviour. An important feature of the dual-affect model is that both positive and negative affect craving systems are thought to be mutually inhibitory, in which stimulation of one system would suppress activation of the other system. The dual - affect model states that craving systems are structured at a cognitive level

into networks that store information on the stimuli that trigger cravings, drug related responses, and the meaning and interpretation of stimuli and responses. A given network is activated when environmental stimuli matches the stimulus information stored in the network, and the extent of the activation depends on the extent to which multiple cues match the triggering stimuli stored in the propositional network. The dual - affect model has developed propositions that can be readily tested, however the model has primarily considered data from smoking studies, thereby reducing its external validity (Skinner & Aubin, 2010).

The third well established model of cravings is the “cognitive processing model of drug urges” (Tiffany, 1990), which proposes that the regulation of drug use in addicts can function independently of the processes that control craving. The cognitive processing model states that a craving is a non - automatic process and drug usage is an automatic process, which occurs when the drug consumption automatic schema is interrupted by an unexpected event, or when a substance user tries to abstain from a drug. In such cases, non-automatic cognitive processes take over to resolve the situation with either drug use or avoidance of drug use, suggesting that craving and drug use are independent processes. Therefore, the cognitive processing model states that’s although drug usage becomes an automatized process in an addicted person’s life, craving is a non - automatic process that requires mental effort and is limited to a person’s coping ability. Non-automatic processes involving attentional bias taxes an individual’s cognitive resources, therefore the drug user that tries to deal with craving - associated problems will have limited mental capacity for coping with other cognitively demanding situations. According to the cognitive processing model, attentional bias which refers to alcohol users paying more attention to alcohol related cues than neutral cues, accounts for the disruptive impact of craving on daily functioning (Field et al., 2009). Field et al. (2009) performed a meta-analysis of 68 independent data sets, concluding that there is a small but significant relationship between attentional bias and cravings. Apart from the cognitive models introducing new concepts and models to craving research, the cognitive sciences have also been able to offer well established methodology for testing these models, analysing craving processes and developing clinical programmes (Ekhtiari et al., 2016). Whilst cognitive theories provide a framework for understanding the variable effects of drug use on behaviour and emotional states, and the development of treatments that help individuals regain control over their drug seeking that go far beyond conventional craving theories, they have been criticised for

providing only cognitive conceptualisations of a craving and not attending to the relationship between cognition and affect (Ekhtiari & Paulus, 2016).

To address the shortcomings of cognitive theories of cravings, theories have emerged as an extension of traditional cognitive processing models that offers a more comprehensive analysis of a craving and accounts for affective, motivational and cognitive changes that are involved in information processing. The most recently proposed cognitive theory of desire is the Elaborated Intrusion (EI) theory, which has featured in recent research on addiction (Caselli et al., 2012; Caselli & Spada, 2015; Cornil et al., 2018), and provides a motivational framework that explains the cognitive processes underpinning cravings and their impact on addictive behaviours. EI theory has arisen from factors such as becoming aware of not having the substance (e.g. physiological changes), anticipatory responses (e.g. salivation for substances), negative affect (e.g. depression and anxiety), thoughts associated with the substance (e.g. expecting a pleasurable experience) and external cues (e.g. seeing paraphernalia related to drug use) (May et al., 2015). Therefore, EI theory is similar to other theories of addictive craving in that it argues that physiological withdrawal, environmental factors, cognitive associations and negative mood are potential triggers of desire, and that people are generally unaware of these processes. These antecedents may initiate thoughts about the substance, trigger other associations with the substance and result in elaborated thoughts about the substance such as the context in which the substance is taken, recalling the last time the substance was used and thinking about whether there is enough money to purchase the drug. Therefore, these triggers activate drug - related representations in short term or long - term memory through automatic associative processes, and this priming allows for spontaneous thoughts about substance use to intrude into consciousness through a process of associations (May et al., 2015). The focus on affectively charged sensory imagery is a distinguishing feature of EI theory as sensory imagery conveys some of the pleasure or relief of the actual drug use, thus motivating target-directed behaviour. More vivid and realistic images elicit greater pleasure and although desire imagery is briefly pleasurable, it can become ultimately aversive if the desire remains unfulfilled. The negative emotion motivates the individual to achieve their desire and to change their current situation, and as they progressively approach their target, the drug cues serve to heighten the intensity of drug using imagery, giving acquisition extreme importance and attentional priority. Based on the abovementioned explanation, EI theory views desire as a cognitive motivational

state, bringing together automatic, bottom-up associative processes and controlled top down processes.

An important aspect and a central proposition of EI theory, which is often apparent in clinical practice is the distinction between intrusive thoughts about a target and the elaboration processes that follow. The automatic associative processes that operate outside of an individual's consciousness, breaks into consciousness when faced with other cognitive demands, which allows one to subjectively perceive the thought as being spontaneous (May et al., 2004). This apparent spontaneity then orients attention towards the thought of a drug or any related stimuli allows for cravings to become more pronounced and potent. EI theory posits that this elaboration process requires effort and mental processing that places a load on working memory, hence the cognitive processes of intrusive thoughts competes for limited resources of working memory (May et al., 2015). In relation to cue - induced cravings, triggers and cues give rise to cognitive activity below the threshold of awareness, which in turn triggers other associations that do not have any specific consequence until they break through into awareness as intrusive thoughts. These thoughts feel spontaneous because the triggers and prior processing have been operating beneath awareness. The thoughts which contain information about substance use are accompanied by an initial immediate positive sensation of reward and relief that is associated with the actual use of the substance, which then encourages elaboration of the thought, to enrich it or search for further rewarding associations. The elaboration process allows for the construction of mental images of the substance or the context in which it is consumed, which provides enhanced relief and reward (May et al., 2004). In normal situations, it motivates an individual to seek out substances that they need to use, however in maladaptive situations, it can lead to them seeking out substances that they do not need, which in both instances leads to negative affective consequences. May et al. (2004) stated that in instances where an individual's circumstances prevent them from obtaining a drug, the rewarding consequences of elaborated thoughts are soon overcome by a negative realisation relating to their state of deficit, which gains salience in their thoughts.

EI theory suggests that interrupting the process of elaboration with competing imagery tasks may reduce cravings and that attentional training strategies that introduce concurrent sensorial

tasks interferes with elaboration, especially if they compete for the same limited-capacity working memory resources (May et al., 2015). To examine whether introducing an alternative task would reduce cravings, Verstand and Rosenberg (2007) conducted a study to determine whether imagery scripts that emphasised different sensory modalities would reduce cue induced cravings. The researchers concluded that the effects of these interventions on cravings were short-lived and decreases in craving levels were not maintained on completion of the intervention, thereby suggesting that tasks that compete for working memory capacity may not be effective or may only have a short - term effect in reducing cravings. EI theory does not predict that some triggers have greater precedence although individual differences in their weighting may be expected, which has been supported by Schimdt et al. (2013) who found that cravings of alcohol dependent patients were associated with greater tension reduction expectancies when they had poor interoceptive awareness. The authors further stated that cognitive triggers (alcohol expectancies) were more important when somatic triggers were less acute, suggesting that strategies such as mindfulness training could be useful in addressing this problem. EI theory emphasises sensorial imagery in eliciting cravings, therefore training people to use vivid sensory imagery for functional goals holds promise as an intervention for substance misuse, since it is likely to sustain motivation and prevent cravings.

Over the years, EI theory has developed a substantial base of evidence confirming key predictions that support addiction research (Cornil et al., 2018; May et al., 2014). EI theory has provided a comprehensive explanation of the cognitive processes underpinning drug cravings and the associated motivational processes and points the way to interventions that reduce elaboration or that establish mental imagery that strengthens functional goals and desires. A central focus of EI theory is “desire” and a “state of want” in conceptualising a craving and whilst the subjective state of wanting is important in most conceptions of craving, modern theorists have argued that it is only one component of a craving (Maarefvand et al., 2013). The complete mental entanglement of craving includes a variety of cognitive, behavioural, neural mechanisms and environmental factors. It is evident that cognitive approaches to craving have considerable potential, however it is difficult to systematically evaluate some of the concepts generated by the cognitive models, and the theories do not factor in the effects of systemic factors, gender and ethnicity on the individual’s ability to cope with a craving.

2.1.8.3 Cue reactivity and cravings

Cue reactivity is an important addiction related trait that is associated with cravings and relapse, which are most often triggered by cues (e.g., people, places, paraphernalia) in the environment that has been previously associated with the drug taking experience (Ekhtiari & Paulus, 2016). The basis of the cue reactivity paradigm is that previously associated cues to a drug can under certain conditions evoke stimuli and associated responses such as cravings and patterns of physiological responses in persons with a history of drug use (Seow et al., 2020). In essence, the cue signals the drug or drug related stimuli, which in turn activates the reward circuitry and triggers physiological arousal or anticipation for the drug that is expressed as a craving (Hill-Bowen et al, 2020). Drug cue reactivity is one of the hallmark characteristics in addiction research and numerous attempts have been made to elucidate the underlying learning and neurobiological mechanisms (Seow et al., 2020). Human studies and animal models suggest that individuals for whom a cue attains incentive motivational value and incentive salience are most likely to experience cravings and relapse (Seow et al., 2020; Venegas & Ray, 2019). Therefore, an understanding of cue reactivity and the neural systems involved in cue reactivity are crucial to understanding addiction as the combination of heightened cue responses and increased attention to drug related cues is a key mechanism in the development and perpetuation of addictive behaviours (Hill-Bowen et al., 2020).

Neuroimaging research commonly uses the cue-reactivity paradigm to assess neurobiological processes that are linked to cravings, behavioural motivation, the incentive salience of drugs and their associated cues (Hill - Bowen et al, 2020; Venegas & Ray, 2019). Studies that have investigated the neurobiological basis of “cue reactivity” in both human and animal studies have found that exposure to drug related cues engages neural circuits involved in learning, memory, reward and motivation (Hill – Bowen et al, 2020), as well as increased mesolimbic dopaminergic activity in cue reactive individuals (Jasinka et al., 2014; Venegas & Ray, 2019). Research has shown that exposure to drug – associated cues in laboratory settings has reliably induced drug cravings and physiological reactions in drug users (Seow, et al., 2020). A review of factors predicting relapse and sustained abstinence in substance use disorder found greater activation to drug cues resulted in poorer clinical outcomes and greater activation to non – drug cues was associated with better recovery outcomes (Moeller & Paulus, 2017), suggesting that cue reactivity is essential in understanding addiction, craving and clinical outcomes. Cue -

induced craving has important implications for the development of pharmacological and psychosocial interventions for relapse prevention (Seow et al., 2020), and further studies are necessary to explore the effects that this paradigm could bring to more informed treatment approaches.

2.1.8.4 Craving Interventions

The abovementioned discussion relating to conceptions about the nature and underlying causes of cravings show that the most widely used models and treatment interventions are based on conditioning and cognitive theories. There has been some overlap between conditioning and craving theories in which conditional craving models have also included cognitive processes in their explanations of cravings but have failed to explain the impact of cognitive processes on cravings. The various perspectives on cravings have different implications for developing interventions that prevent or treat the processes that regulate cravings. Conditioning theories have influenced the development of cue - exposure and extinction treatments (Torregrossa & Taylor, 2016), whilst cognitive theories have been the basis for cognitive therapies of substance use disorders that target and aim to change cognitive biases and distortions, and focus on reappraisal (Konova et al., 2013). Cue exposure and extinction treatment which entails repeated exposure to sights and smells, that aim at initially reducing and then extinguishing a craving has received some support as an add on treatment in addiction treatments (Torregrossa et al., 2013). Elaborated Intrusion theory suggests that interventions that increase awareness such as mindfulness, imagery scripting, strategies that retrain attentional biases and tasks that compete for working memory will increase the likelihood of consciously noticing drug cues or experiencing intrusive thoughts about a drug (May et al., 2015). People in recovery who experience cravings and correctly identify the craving will be able to prevent a relapse, because the identification prompts them to utilise appropriate coping skills. Therefore, it makes sense to assume that those who learn to cope with difficult and seemingly irrelevant cravings will be able to prevent a relapse episode and enhance their recovery process. On the other extreme, research has found that suppressing a craving can lead to increased responsivity to drug cues when exposed to them (Rogojanski et al., 2011), suggesting that therapeutic interventions need to be carefully integrated into addiction treatment.

Based on the above discussion, the extent to which a craving is or is not related to drug use and relapse has received considerable attention in the clinical realm and treatment literature. Many models have been used to explain the nature of a craving, however none of them provide a complete explanation of the multidimensional phenomenon of a craving (Ekhtiari & Paulus, 2016). Neuroscience has identified associations between cravings and brain regions, and associated cognitive functions in recent years, which could point a way forward to managing cravings (Ekhtiari et al., 2017). These findings suggest that a comprehensive examination and treatment of cravings should include varied aspects of a craving that links neural mechanisms to cognitive, behavioural and emotional factors. These insights should be embedded into specific therapeutic programmes that should target factors that have been identified in perpetuating and maintaining a craving.

2.1.9 Conclusion

An addiction is accompanied by a range of social, environmental, cognitive and neurobiological factors that contribute to vulnerability, maintenance and relapse. It is characterised by behavioural disturbances, emotional dysregulation, cravings, withdrawals, chronic relapses, dysfunctional relationships and the inability to recognise the negative impact of an addiction on the individual and significant others. The theory and research on addiction and related concepts, as well as knowledge and insights related to managing and treating an addiction as a multifaceted phenomenon and specifically cravings has influenced the design of this study.

Addiction being a multi - factorial problem is difficult to treat and dependence to particular classes of drugs are sometimes more challenging to treat (Ekhtiari & Paulus, 2016) with opiate use being far more problematic than the use of any other illicit drug (Amato et al., 2013). Opiate dependence in particular is recognised as a chronically relapsing disorder, in which affected individuals choose continued drug use despite negative consequences and returns to use even after periods of abstinence (Amato et al., 2013; Ekhtiari & Paulus, 2016). The following chapter will provide a thorough understanding of the processes that undergird the choice to continue using opiates despite adverse consequences as it is important in understanding the

science and treatment of an opiate addiction, particularly heroin which is the drug of choice of the sample population in this study.

2.2 HEROIN

Heroin is a commonly abused street narcotic derived from the opium poppy, also known as junk, horse, H, gunpowder, smack, bomb, dope or skag. There are derivatives of a cheaper form known as sugars, whoonga, amapinch, neapa, brown sugar, thai white and amyopi depending on the geographical location in which it is used in South Africa (Hafajee, 2014). The discussion that follows provides an in depth overview of heroin by focusing on source, administration, Global and South African trends of heroin usage, effects and consequences of heroin usage, and an overview and treatment of “Sugars”, which is a cheaper derivative of heroin that is ravaging the lower socio economic communities in KwaZulu Natal.

2.2.1 Source

Heroin is derived from the opium poppy and takes the form of a white, brown or tan powder (Merchant & Dorkings, 2005). Opium is obtained from the milky exudates of the incised unripe seed capsules of the poppy plant, “*Papaver somniferum*”. The milky juice is then dried until it forms a brownish gummy mass, which is then dried further to make the powdered Opium (NIDA, 2018). A morphine base is chemically extracted from the Opium and then converted to heroin by combining it with Acetic Anhydride (Merchant & Dorkings, 2005). Alkaloids are the active constituents of Opium and constitute about 25% of its weight, with the two main alkaloids in Opium being phenanthrene and benzyloquinoline. Heroin also known as diacetylmorphine, is made from morphine by the acetylation of both the phenolic and alcoholic OH group (Merchant & Dorkings, 2005)

Heroin purity seized at the borders of South Africa is between 40 to 60% (Hafajee, 2014), and as it passes through the system more adulterants are added to it to create bulk and more profit. Heroin purity is graded based on its composition and grade 1 and grade 2 heroin is commonly used in poorer socio-economic communities. Grades 1 and Grade 2 heroin is unprocessed, raw heroin which is used as a base and mixed with other substances to create bulk e.g. bicarbonate

of soda, caffeine and washing powders. Street heroin is often “cut” with strychnine, other poisons and additives, which often do not dissolve and cause severe complications to the blood stream and to the organs of the body (Bond & Witton, 2017). Therefore, cheaper derivatives and concoctions of heroin are more hazardous as it is difficult to determine the concentration of heroin and the type of adulterants it contains (Bond & Witton, 2017).

2.2.2 Mode and Administration

Heroin can be sniffed, snorted or injected (NIDA, 2015). Smoking heroin is known as chasing the dragon, where powdered heroin is laid in a line on a piece of tinfoil, which is then heated from beneath and the vapours are inhaled. Smoking heroin refers to administration through the nasal passages by a process of vaporisation, the effects of which can be felt within ten to fifteen minutes (Falkowski, 2000). Pipes made from glass – blown pyrex tubes, light bulbs and pieces of aluminium foil are used as aids when smoking. Snorting, another method of using heroin, where the powder is finely crushed and gently inhaled through the nostril using a rolled up bank note or straw, results in the effects being felt within minutes of snorting (Falkowski, 2000). This is often the choice of usage as it requires very little preparation, however it allows for the drug to be experienced as a “nod” and not a “rush”, due to slower absorption. Heroin is more effective after parenteral administration than oral administration (Bond & Witton, 2017). The effects of heroin last for a duration of 4-6 hours, which varies according to purity level and tolerance of the user and the relatively short life requires administration 3 to 4 times a day to avoid unpleasant withdrawal effects (Bond & Witton, 2017). The course of heroin addiction can extend for decades with intermittent periods of abstinence (Merchant & Dorkings, 2005).

Heroin usage often starts off as a recreational drug because of its effect of “transcendent relaxation” and “intensive euphoria” (NIDA, 2018). Heroin enters the brain rapidly and binds to opioid receptors on cells located in many areas of the central nervous system, especially those involved in feelings of pain and pleasure, controlling heart rate, sleeping and breathing (NIDA, 2018). However, regular heroin usage develops into a physical tolerance for the drug, requiring larger amounts of the drug to achieve the desired effect (McKenna, 2007). At this point heroin is used to avoid the pain of withdrawal (known as ‘getting sick’), and to seek the effects of the drug (known as “getting well”), and as the user develops tolerance to the drug, higher dosages are needed to achieve the initial effects (Hafajee, 2014). Tolerance decreases if

heroin is not taken for a while, which creates a risk of overdosing should usage resume, given that the quality that was previously tolerated is now too high. Heroin is a powerful central nervous system depressant and increased tolerance has the tendency to further enhance the depressant action of the central nervous system (Hafajee, 2014). Heroin withdrawal occurs in addicts within hours (6 to 8 hours) of the last dose, manifesting as a range of withdrawal symptoms which range from mild flu like symptoms to more severe reactions such as: aching of the bones and muscles, cold flashes, vomiting, diarrhoea, excessive sweating, insomnia, body cramps, involuntary spasms in the limbs, depression, extreme anxiety, inner restlessness (akathisia), persistent sleep disturbances and agitation (Amato et al., 2013). Withdrawal symptoms peak at forty-eight to seventy-two hours and disappear within a week of abstinence (Amato et al., 2013).

2.2.3 Global and South African Trends in Primary User Groups

Heroin usage among the general population is difficult to measure with precision as surveys grossly underestimate this hidden population given that few addicts live in traditional households with long standing residency. Another complicating factor is that the nature of heroin addiction has changed over the past decade and is characterised by new suppliers of the drug, new methods of use and younger users (USAID, 2016).

A worrying increase in heroin use disorders has been noted in South Africa over recent years (USAID, 2016; Weich, 2010). South Africa is situated along one of the primary drug trafficking routes through Africa and recent increases in the production of opium from Afghanistan have led to the availability of cheap, reasonably good quality heroin (International Narcotics Control Board, 2015; UNODC, 2010). Heroin use has gradually increased in South Africa and according to trend statistics evident in the treatment data from the South African Community Epidemiology Network on drug use (SACENDU), it continues to pose a countrywide problem (Dada et al., 2015). There is limited research that accurately estimates the true extent of the heroin problem in South Africa. SACENDU data is reflective of trends in small population samples and is not a true reflection of heroin addiction at grassroots levels, furthermore it is not reflective of the socio-economic challenges that accompany treatment as access to drug treatment remains a privileged affair for those that can afford treatment (USAID, 2016). In 2009, heroin was found to be the illicit opioid of choice amongst local users coupled with the

challenge of very few treatment options or accessible treatment centres that treat opioid addictions in South Africa (Pluddeman et al., 2009).

Epidemiology studies have shown a rapid increase in heroin usage as the primary drug of choice in KwaZulu Natal inpatient populations, the proportion having increased from about 2% in 2006 to 30% in 2009 and an increase to 34% in the under 20 year age group, which was attributed to the use of “sugars”, a cheaper derivate of heroin (Pluddeman et al., 2009). A SACENDU report which was based on data obtained from 9172 inpatients from 63 centres across South Africa had found that heroin was a primary substance of abuse in the 23 to 27 year age group (Dada et al., 2012). A SACENDU report which was based on monitoring drug addiction trends between July and December 2015 has shown that there has been an increase in Heroin admissions to treatment centres from 5% to 7% in KwaZulu Natal in comparison to admissions from the previous surveillance period, with the mean age of heroin addicts ranging from 26 years to 32 years (Dada et al., 2015). In keeping with the trends reflected in SACENDU data, interviews with health professionals and law enforcement officials confirmed substantial increases in what has been described as “problematic heroin abuse” amongst previously unexposed cohorts in the Indian and African communities (USAID, 2016). The data obtained from treatment centres has demonstrated that 34% of heroin patients had previously received treatment for their addiction (Dada et al., 2015), suggesting that heroin is one of the substances which has high incidences of readmission to treatment centres. Research across treatment sites in South Africa has also shown that 13% of patients that were admitted for treatment presented with a dual diagnosis, with a higher proportion of patients suffering from mental disorders found in KwaZulu Natal, of which 46% of admissions had comorbid mental health problems (Dada et al., 2015).

2.2.4 Effects of Heroin

Heroin is an active drug which is converted to morphine in the body and has active metabolites which prolong its effects (Hafajee, 2014). Opiates are known to depress the central nervous system, relieve pain, relax and induce sleep (NIDA, 2018). The body’s reaction to heroin varies, depending on a variety of factors such as the person’s frequency of use and mode of administration. The effects and symptomatic presentation of a “heroin addict” depends on

whether they are under the influence of heroin, or whether they are experiencing cravings or withdrawal symptoms. The short term and long - term effects of heroin is outlined in Table 2:

Table 2 Short - and Long-term Effects of Heroin

Short term effects	
Central Nervous System	Euphoric, warm feeling with transcendent relaxation, ataxia, drowsiness, decreased mental acuity, disorientation, delirium, clouded thinking.
Neurological	Analgesia, tolerance, confusion, psychological and physical addiction
Psychological	Euphoria, addiction, tranquiliser effect.
Cardiovascular	Bradycardia, hypotension, hypoventilation, shallow breathing
Gastro-intestinal	nausea, protracted vomiting, constipation, dyspepsia
Musculo –skeletal	Analgesia, ataxia, muscle spasms and spasticity
Skin	Itchiness, flushing, rashes
Other	Dry mouth, urinary retention, constricted pupils, hypothermia
Long term effects	
CNS	Loss of memory and intellectual capacity, insomnia, loss of appetite, partial paralysis, auditory and tactile hallucinations
Physical	Inability to achieve orgasm, reduced sexual capacity
Psychological	Introversion and depression
Respiratory systems	Shallow breathing, chronic bronchitis, emphysema
Gastro-intestinal	Loss of appetite, constipation
Musculo-skeletal	Muscle weakness
Skin	Cold sweats, itchy body, sores and pustules

Note. Data for short and long term effects of heroin from Hafajee (2014) and Merchant and Dorkings (2005).

Like all opioids, unadulterated heroin does not cause many long-term complications, however it is the adulterants that are used that pose the complications (NIDA, 2018). The following symptoms related to heroin usage and addiction can be life - threatening viz, choking on one's vomit, circulatory collapse, pulmonary oedema and respiratory paralysis. Intravenous use of non-sterile needles, sharing of needles and syringes or other related equipment may lead to contracting blood borne infections like HIV, abscesses, poisoning from adulterants used to cut or dilute the drug and decreased kidney function caused by infections (Hafajee, 2014).

2.2.5 Consequences of Heroin use

Opiate usage is far more problematic than the use of any other illicit drug (Kadam et al., 2017). Heroin addiction and its impact on developing countries needs to be taken into consideration given that it poses an enormous burden on the physical, economic, educational, psychological and social functioning of the affected communities (Galaj, Manuszak, & Ranaldi, 2016). From a clinical perspective, addiction is judged to occur when drug usage progresses and persists despite maladaptive consequences. Sentinels of problem drug use result in lost efficiency whereby more time is spent seeking the drug; life functions become impaired with regards to social, cognitive, and/or occupational domains; development of drug related medical disorders; and behaviours that threaten personal and public health and safety (Bond & Witton, 2017; McKenna, 2007; Reimer et al., 2016). Heroin addicts have been frequently characterised by strong aggressiveness, high irritability, anger, fewer abasement needs and poor self - control (Hou et al., 2016). In addition, their actions are more easily influenced by subjective feelings with very little concern for others (Hou et al., 2016). From this perspective, poor emotional control and negative emotions might play a dominant role in drug use, and the accompanying psycho-social behaviours provide a salient mechanism for drug seeking behaviour.

Too much of pure Heroin can result in respiratory arrest and death, and the inability to predict the purity level of Heroin is an added danger (NIDA, 2018). Street heroin has unknown purity, and when pharmaceutical narcotics of unknown strength are used, the results can be very dangerous. When inert substances are mixed with street heroin, there is a chance that some of the adulterants will not readily dissolve in the injectable solution and can block or clog blood vessels, resulting in bacterial infections of major organs (heart valves and lining, liver, kidney), blood vessels, or veins. In cases of sudden, complete withdrawal in addicts whose health is

already compromised, they can be fatal consequences (NIDA, 2018). In recent years, there has been a rapid increase in the number of heroin related deaths, as well as an increase in deaths related to heroin overdose (Rudd et al., 2016). The increased mortality is mainly due to overdose, violence, suicide, HIV infection and other substance use related problems. Among those who continually use opiates, only 50% of addicts live longer than 20 years after the onset of opioid use and about 10% of them attempt suicide during a 12-month period (Darke et al., 2005). There are no accurate statistics on Heroin deaths in South Africa, however a South African research on heroin users have reported that half of their study participants have heard of heroin overdose death in the previous years (Pluddemann et al., 2008). The typical cause of heroin overdose is because the addicted person assumes his tolerance would enable him to survive a fatal dose of heroin, thereby over calculating the amount of heroin needed to achieve the previous “high” (Rudd et al., 2016). Therefore, injecting a form of heroin that is too pure or using too high a starting dose after a period of abstinence can result in immediate death. Dependence on multiple drugs (cocktails) has also become increasingly popular (USAID, 2016), and abuse of heroin is frequently accompanied by abuse of other psychotropic agents or immoderate use of alcohol, therefore there has been an increasing number of deaths as a result of cocktail intoxication.

From an economic viewpoint, Heroin addiction and the accompanying “loss of efficiency” has major ramifications, and decreased productivity is mainly due to unemployment or illegal sources of financial gain (USAID, 2016). An analysis of a study conducted in Detroit on out of treatment heroin abusers over a one-month period, showed that 96% of the users derived at least some income from non-legitimate sources, of which 72% of this income was spent on Heroin (Roddy & Greenwald, 2006). The study showed that in terms of the income that was obtained, 55% were from legitimate sources, the remainder had been acquired through stealing, bartering, prostitution (30%), money from social transactions that involved lying and borrowing (8%) and from drug dealing (7%).

From a psychosocial point of view, heroin addiction is linked with numerous maladies including violence and trauma (Kadam et al., 2017), mental health problems specifically depression and severe anxiety (Ekhtiari & Paulus, 2016), poverty and homelessness (Kadam et al., 2017), discrimination and stigma (Young et al., 2005), and criminal justice involvement

(Amato et al., 2013). Heroin usage encourages family dysfunction (Kelly et al., 2017), which does not only impact on the addicted person but the family system in the following ways: unmet developmental needs, impaired attachment, economic hardships, violence, emotional distress and lack of support (Hou et al., 2016; Launder et al., 2013). It is difficult to study the effects of psychosocial phenomenon in controlled settings, however there is evidence that effective treatment is associated with improved family relationships (Timko et al., 2015), reduced criminal activity and convictions (Reimer et al., 2016), and improved quality of life (Kadam et al., 2017).

2.2.6 Treatment of Heroin

Heroin addiction is seen as a chronic relapsing condition and treatment is necessary to interrupt the pattern of usage and to replace the need to acquire heroin (Bond & Witton, 2017). The ideal treatment outcome for Opioid addiction is cessation of opioid use, along with optimal health and social functioning. Local and international evidence shows that only a minority of opioid dependent patients are able to achieve total abstinence in the short term due to the challenges associated with recovery (Bond & Witton, 2017), therefore in developing countries treatment and prevention should be seen as inextricable parts of the recovery process (Hall et al., 2006).

The relapse process, even after an extended period of abstinence is a hallmark of heroin addiction (Galaj et al., 2016). Gossop et al. (2005), in a treatment outcome research study found that 34% of sample population relapsed to heroin use within 3 days, 45% within 7 days, 50% within 14 days, and 60% within 90 days. However, many patients do achieve remission from addiction to heroin and most experts agree that treatment should aim to reduce or cease illicit opioid use, prevent harm associated with opioid use to the individual and community, and improve the quality of life and well-being of the patient (Bond & Witton, 2017).

2.2.6.1 Treatment Options

The clinical syndrome of drug addiction includes more than just abusing drugs, treatment processes should include pharmacological and non-pharmacological treatments, as well as support as part of the rehabilitative process. Social supports, entry or re-entry into the workforce, psychological support, family supports, legal and correctional supports should form

part of a comprehensive program to aid the recovery of the affected addict. A review of opioid dependence treatments found that psychotherapy administered with or without pharmacological treatments provided few benefits (Bond & Witton, 2017). This finding has been substantiated by studies on addiction medications, where research has found that medication may dampen the conditioned cue that perpetuates a longing for the drug, restore glutamate regulation, normalise dopamine function or influence the release of the stress hormone corticotrophin (Bond & Witton, 2017; Huhn et al., 2019).

2.2.6.1.1 Pharmacological Treatments

Treatment can be broadly divided into two approaches, namely those based on opiate withdrawal and relapse prevention and those based on opioid substitution treatment (OST), the latter sometimes being referred to as opioid replacement or opioid maintenance treatment. Given that no single treatment is a hundred percent effective in all cases, outcomes are improved by providing sufficiently diverse treatment options (Bond & Witton, 2017). A number of pharmacotherapies are available as accepted treatments viz methadone, buprenorphine and naltrexone. Methadone and Buprenorphine are opioid substitution treatments and naltrexone is an opioid antagonist.

- Methadone – Methadone maintenance has been the main pharmacotherapy for the management of Heroin dependence. It was originally introduced as a long acting (24-36 hour) analgesic that was regarded as a substitute drug for Heroin (McKenna, 2007). In a review of 23 controlled trials of 2467 adult opioid users in various countries, methadone has been found to allow for the slow tapering of opioids as a substitute treatment whilst withdrawing, thereby concluding that tapered methadone is an effective treatment for heroin withdrawal (Amato et al., 2013). A negative aspect of methadone is its potential to produce or maintain dependence on opioids, with patients presenting with withdrawal symptoms if doses are missed. Opiate agonist treatments allow for patients to return to or combine heroin use with methadone maintenance treatment, which can result in fatal overdosing (Amato et al., 2013).
- Buprenorphine - Buprenorphine has for many years been extensively used in a number of countries for the management of heroin dependence. Buprenorphine hydrochloride (Subutex) is a partial μ opiate receptor agonist and kappa opiate receptor agonist, which is used for both detoxification and maintenance of opioid dependence treatment (Bond &

Witton, 2016). It has numerous benefits as compared to Methadone. It has a long duration of action which allows for less frequent dosing, is less sedating, does not cause respiratory depression and is therefore associated with a lower risk of overdose, however its use has been found to have limited efficacy and low patient compliance (Sittambalam et al., 2014). In an attempt to reduce the risk of abuse and overdose of buprenorphine, Suboxone was developed, which is a combination of buprenorphine and naloxone hydrochloride (Benckiser, 2004).

- Naltrexone – The ability of naltrexone to effectively antagonise heroin use is unequivocal (Walley et al., 2013). An advantage of naltrexone is that it decreases opioid cravings and can be administered in a non-specialist outpatient setting (Bond & Witton, 2017). Despite its efficacy, non-compliance with oral naltrexone has been a significant impediment to adopting it as a major treatment. This non - compliance is often associated with patient's withdrawing from treatment and returning to heroin use. Periodic relapses to heroin use have been found to be common, even in patients who perform well on oral usage of Naltrexone (Swift et al., 2011).

2.2.6.1.2 Psychosocial Treatments

Addiction is a chronic condition and even if better medications are discovered, the recovering addict will benefit from psychosocial interventions that assist with positive lifestyle changes and coping skills (Reimer et al., 2016). Psychosocial treatments of heroin addiction are similar to treatment methods and techniques that are used in the recovery process of other drugs. Cognitive Behavioural therapy (CBT) is one of the main approaches used in addiction treatment which includes a broad range of interventions which are used in isolation or in combination that emphasise different targets. It helps individuals focus on problematic behaviours and thoughts and provides tools that challenge and change them to promote healthier psychological functioning and recovery. Cognitive Behaviour therapy is useful in that it helps heroin addicts identify cues that induce cravings and promote addiction and provides tools to avoid external cues (stimulus control) and neutralise the feelings (urge control) associated with a craving (Emmelkamp & Vedel, 2006). Meta analytic studies have provided mixed results for the efficacy of CBT in both initial treatment and continuing care interventions for substance dependency treatment (Blodgett et al., 2014). Evidence from numerous large scale trials and quantitative reviews supports the efficacy of CBT for opioid use disorders and

have demonstrated that combined interventions provide more robust outcomes (McHugh et al., 2010). Contingency management is a cognitive behavioural intervention which is grounded in operant learning theory and is used in addiction treatment to change the incentives of recovering persons to help motivate them to remain abstinent, by providing praise and small rewards for resisting the drug. An analysis of 42 treatment - comparison studies of contingency management to other techniques in the United States, found that this modality led to a reduction in drug use amongst study participants in the short term (Pearson et al., 2012).

Behavioural interventions have been criticized as being ineffective at promoting abstinence, or their successes have been found to be short term (Galaj et al., 2016). A possible explanation for the ineffectiveness of behavioural therapies is that these therapies often involve monetary, occupational and recreational rewards that are contingent upon abstinence, however once the reward is removed and the contingency between abstinence and reinforcement is broken, it results in the recovering person relapsing. A review of treatment studies has shown that psychosocial therapies, such as brief psychotherapy and contingency management have resulted in lower relapse rates and higher treatment retention, however the benefits were not maintained long term (Veilleux et al., 2010). Relapse prevention (RP) is another well researched cognitive behavioural intervention in addiction treatment that has emphasised cue reactivity and the systematic training of alternate responses to cues. RP techniques include challenging the patient's expectations of perceived positive effects of drug use, psycho education regarding informed choices, cognitive reappraisal training and improving coping skills. Relaxation training, a behaviour therapy technique where people learn to keep their body and mind calm, has been found to be useful in helping addicts reduce their anxiety on exposure to cue related stimuli (Melemis, 2015). Cognitive based interventions can be used to assist heroin addicts to identify cognitive errors in thinking and to target both reward and executive control processes, which helps to motivate change (Konova et al., 2013). Reappraisal training is a commonly used intervention of cognitive regulation that is useful for managing emotions and cravings. Reappraisal training provides recovering persons with deliberate strategies for interpreting the meaning of a stimulus, situation or action and to use proportional thinking to replace self- defeating craving related thoughts with positive ones (Beadman et al., 2015). A meta analytic review of the efficacy of RP strategies across 26 studies examining alcohol and drug use disorders found a relatively small effect size for RP in reducing substance use, but a large effect size for improvements in overall psychosocial functioning (Irvin et al., 1999).

Memory is one of the most important cognitive functions affected by addiction, therefore it should be considered to be an important intervention target. Cues associated with drugs are strong drivers of behaviour, therefore interventions that interfere with associative memories and disrupts the associations between conditioned drug - related cues and drug experiences has received increasing attention over the past years (Ekhtiari & Paulus, 2016). Extinction learning is an active learning process which diminishes the frequency or intensity of conditioned responses to drug cues, and actively reduces the value of drug related cues and the accompanying emotional responses (Kaplan et al., 2011). Imagination, written scripts, and live exposure techniques can be used to expose patients to stimuli that are associated with addictive behaviour, which ultimately leads to behavioural desensitisation. Exposure to cues in the absence of a drug, either repeatedly or for a prolonged period of time, can lead to a formation of a new memory (Sorg, 2012). Unfortunately, studies have not been able to demonstrate that cue exposure is an effective behaviour therapy in reducing cravings (Kavanagh et al., 2006). An add on process that could be a promising avenue for maximising the efficacy of exposure therapy is the process of reconsolidation, where drug- related memories are overwritten with more positive memories (Sorg, 2012), thereby encouraging individuals to develop new patterns of thinking that can replace conditioned drug - induced memories. Extinction therapy, given its ability to attenuate the efficacy of conditioned reinforcers may represent a useful behavioural strategy to combat relapse to drugs in abstinent individuals. A meta - analysis of nine extinction therapy trials for drug addiction did not show any substantial or consistent benefit of extinction therapy, however the methodological design of these studies failed to factor in the principle of reinforcement learning (Conklin & Tiffany, 2002). Therefore, extinction therapy interventions need to factor in the inextricable link between the addiction process and maladaptive changes that underlie positive and negative reinforcement mechanisms.

Socio cognitive abilities have been found to affect the course of dependence and treatment success in addicted individuals (Hulka et al., 2014), therefore the association between heroin addiction and social interaction have important treatment implications. Decision making deficits have been found to play an important role in the development and persistence of addiction, and individual decision - making processes should be seen as important predictors in the course of drug addiction (Koob & Volkow, 2010). Therefore, social skills and problem-

solving training should be useful in teaching heroin user's important social skills that could aid their recovery such as: refusal skills on exposure to drugs, developing positive interests and productive lifestyles, and stress management without recourse to intoxication.

Many recovering addicts struggle with negative environmental factors and fears of future dangers as outlined in the DARA programme such as, worrying about how they would cope without drugs, relationship worries, financial insecurity, no fixed abode, poor emotional regulation, boredom and peer pressure, which impedes their progress in recovery (Drug and Alcohol Rehab Asia, 2015). Environmental enrichment (EE) which has to do with modifying the life conditions of a patient, has been found to be an effective behavioural approach to diminish the effects of conditioned cues on heroin seeking. The main goal pursued by the intervention is to reduce cue exposure and provide a cue - free environment, and to provide positive life experiences. Environmental enrichment interventions alter the neurobiological mechanisms that are reactive to heroin cues (Galaj et al., 2016), thus proving to be an effective treatment strategy for the treatment of heroin addiction, particularly with regards to heroin seeking and relapse. Behavioural activation strategies are closely related to EE interventions, in which the goal is to increase positive environmental reinforcement that helps to improve mood and affect and by engaging treatment seekers in valued activities, such as physical exercise, learning new skills and improving relationships with other people (Martell et al., 2013).

Personality traits such as impulsivity, hostility and irritability impact on the social behaviour of heroin addicts and challenges the drug user's ability to conform to social norms and rules (Walter et al., 2011). Mindfulness training and mindfulness - based therapies which involve systematic training and self- regulation have been found to be an effective practice in the treatment of addiction, particularly in reducing negative mood states, and managing stress and anxiety (Witkiewitz et al., 2014). It has also been found to improve attention, self - control and self-regulation, thereby normalising negative reinforcement processes in recovering persons (Ekhtiari & Paulus, 2016). A long - term aftercare study conducted in the United States to determine the relative efficacy of mindfulness-based relapse prevention strategies in comparison to standard 12 step programmes or cognitive behavioural treatments, demonstrated that the implementation of mindfulness - based strategies was more effective in helping patients

sustain the gains made in intensive rehabilitation programmes (Bowen et al., 2014). Heroin associated cues and drug - related attentional bias have a major impact on opiate seeking and opiate taking (Galaj et al., 2015). Cognitive remediation strategies and attention training techniques, which train subjects to disengage their attention from drug - related stimuli, have been found to be effective in reducing drug consumption (Rezapour et al., 2015).

Substance abuse treatment often occurs in an individual or group format, however the condition still has strong ties to the person's social environment. Over the years, several promising treatments have been developed, which utilise the support of the family, partner and community to assist the patient in achieving abstinence (McHugh et al, 2010). Supportive therapy in the form of behavioural couples' therapy and family therapy are useful in including loved ones as a support system, which helps family members cope better with substance related situations and promotes functional ways of relating to each other in recovery (Kelly et al., 2017). Family therapy is also useful as it addresses the attitude and beliefs that family members have about addiction, which is important as it influences the individual in recovery and enhances treatment interventions (Lauder et al., 2013). Furthermore, group therapy and self-help groups help recovering persons find new companions that share abstinence goals and are focussed on maintaining sobriety. A meta analytic review has provided considerable support for the use of couples therapy over individually based counselling treatments for drug use disorders, where treatment seekers that engaged in couples therapy demonstrated reduced frequency of drug use and greater relationship satisfaction at follow up (Powers et al., 2008).

Despite a high demand for effective treatments and solutions for heroin addiction, there is no effective pharmacological or behavioural treatment that produces long term abstinence and prevents a high rate of relapse amongst heroin addicts (Galaj et al., 2016), and a systematic review on treatments for opioid addiction provides little evidence that any particular treatment is superior to another for recovering persons (Dugosh et al., 2016). There has been hope that combination treatment strategies will lead to enhanced drug treatment outcomes, however this stance has frequently led to unequivocal outcomes (Schwartz, 2016). A possible reason for the mixed findings is that addiction involves many aspects of a person's life and addictive measures take command for a variety of reasons, so different recovery techniques work for different people and in different situations. More detailed research needs to be conducted in

the future to determine which psychosocial approaches work with particular clients or particular medications to improve treatment outcomes and adherence. Studies have shown that addicts most likely to recover are those who use a variety of strategies to facilitate and enable their recovery, and the treatment literature states that the nature and length of addiction should determine the length of treatment, where longer treatments have been associated with a lowered relapse risk (Veilleux et al., 2010).

2.2.7 Sugars - A Cheaper Derivative of Heroin

Since the early 2000s, a drug commonly known as “sugars” had gained popularity amongst drug users in the Chatsworth area and within 5 years, sugars addiction was already considered a serious problem in KwaZulu Natal that had gained widespread media coverage. Sugars is the street name of a concoction of residual heroin which is left over from the packing process of heroin, that is then mixed with available bulking agents. It is made up of residues of heroin that are mixed with inexpensive items, making it one of the cheapest drugs available on the market that is affordable in middle to lower socio-economic areas. It is a drug which was mostly concentrated in the Chatsworth area, but due to its growing popularity it had spread to other areas such as Phoenix and to other regions within the province (Hafajee, 2014). Interviews with health professionals and law enforcement officials confirmed substantial increases of “problematic heroin use” among previously unexposed cohorts in the Indian and African communities in South Africa (USAID, 2016).

Initial reports regarding the composition of the drug described it as a dangerous cocktail whereby Rattax poison was mixed with various other drugs. Forensic Science laboratory investigations into the composition of “sugars”, confirmed that the substance contains diacetylmorphine which is listed in Part III, Schedule 2 of the Drug Trafficking Act No 140 of 1992 (Organised Crime Report, 2011). The laboratory samples comprised of Diacetylmorphine, which is the chemical name for Heroin and no other psychoactive drugs were found in the investigation of the analysed samples. Sugars is highly addictive due to the nature of its active ingredient, therefore sugars addicts will present with similar symptoms and have similar experiences as Heroin users.

In 2009, a drug called “Whoonga” gained popularity in townships surrounding Durban and was described by media reports as a cocktail of ARV’s and rattax. According to a USAID report (2016), Whoonga is the street name for Heroin used mainly by people in the townships surrounding Durban and is a rebranding of the drug “sugars”. A Sacendu report revealed that the use of whoonga continues to pose a countrywide problem, with five percent of patients in KZN citing heroin as their primary drug of use (Dada et al., 2015). It was further reported that in Gauteng, the very same drug is named “amyopi”, “ungah” and or “amapinch”. In 2011, members of the organised crime unit had targeted various drug outlets and had arrested street runners and dealers in the greater Durban area who made reference to the drugs as either “whoonga” or “sugars”, concluding and confirming that it is the same (Organised Crime report, 2011). A recent report that addressed the problem of drug trafficking and drug use in South Africa confirmed that sugars, whoonga, unga and amyopi are all heroin - based drugs that dominate the secondary heroin market in South Africa (Haysom et al., 2018), which confirms the findings of the Organised Crime report (2011).

Drug dealers have been bulking the Heroin powder with substances that are easily and cheaply obtainable for the purposes of making a bigger profit, therefore the exact make up of sugars may vary among dealers. Sugars is a mixture of heroin cut with other substances such as rat poison, household detergents, baby powder, bicarbonate of soda and teething powder. There have also been reports of sugars being mixed with residual cocaine (Independent newspapers, 2012), which allows for the drug user to have a heightened experience. The sugars concoction is wrapped in minute quantities in bin bag plastic, often tied into small “loops” or filled in plastic straws, from which a user can get three to four hits. The concoction referred to as “loops” or “straws”, cost between R15 to R30, which is contingent on availability, geography and demand (USAID, 2016). Drug users will either “mainline”, which is a term used for an intravenous injection, “chasing the dragon” which is inhaling it on a piece of foil whilst heating it or smoking it either with cannabis or tobacco or a mixture of both. The most common method of using sugars is chasing the dragon or smoking it, and it is used on its own or sometimes used together with other drugs like cannabis. A common drug consumption ritual involves sugars being heated on a piece of tin foil, where it releases vapours that are inhaled with a straw or some short pipe. Once inhaled, it rapidly enters the blood stream where it travels to the brain and triggers the release of certain “feel good” hormones, after which the user experiences a euphoria accompanied by feelings of relaxation and intense pleasure, usually described as an

orgasm (Haffejee, 2014). The effects last for about 15 to 20 minutes, followed by a depressed feeling which is often followed by agitation and restlessness. In relation to sugars usage, there are many physiological features of withdrawals which result in an irresistible craving for the drug (Hafajee, 2014).

Anecdotal evidence suggests that the drug is a preferred choice in persons aged between 13 to 22 years (Vitacare, 2012), with crime reports stating that children as young as 12 years are using sugars (Haysom et al., 2018). SACENDU data mirrors these trends and treatment data has shown 31% of patients were under the age of 20 years in the first half of 2015 (Dada et al., 2015). Apart from the drug being cheap and affordable for this age group, many sugars dealers are marketing and distributing heroin to primary school kids and they build their customer base by offering the drug for free at teen parties or social gatherings (USAID, 2016). The mixture and impurities make sugars much more lethal than the typical more purified form of heroin, as the user is not aware of what he is consuming and its effect on the body.

Sugars addiction just like other addictive substances causes significant behavioural and physical changes. Despite the magnitude and severity of sugars addiction in affected communities, there is a paucity of scientific research on factors related to the onset and maintenance of sugars addiction, as well as treatment effectiveness. To have a better understanding of the precipitating, contributing and maintaining factors relating to sugars usage at a micro and macro level, the researcher had to rely on media articles and anecdotal reports. Hafajee (2014) outlined some of the observable signs related to sugars addiction:

- Significant loss of weight
- Lack of appetite
- Darkening around the eyes
- Fine red pimples – like rash on the body
- Breathing problems
- Slurred speech, disorientation and poor coordination
- Aggression and mood swings
- Poor memory and inability to concentrate
- Poor performance in school with decreasing grades and absenteeism

- Preoccupation with certain group of friends and activities to acquire money
- Theft within and outside the home

Brandon Naidoo, a 14 - year old sugars user from Chatsworth who has been smoking for more than six months quoted in the Mail and Guardian (Tolsi, 2006), described his experience with sugars as follows “There is nothing like the first rush. Your life comes to a standstill, it is like you in the air the way you feel it”. He further stated that it is readily available, almost like going to the shop and buying bread. He said that sometimes there are 250 people in the line outside the drug merchant’s house, a line that is even bigger than that at the social grant office. An interview of 20 sugars addicts stated that the “withdrawal process” is one of the biggest hurdles in stopping the usage, and the subjective discomfort associated with withdrawals perpetuated the physical and psychological need for the drug (Indianspice, 2014). The withdrawal symptoms, commonly known as the “roster” include acute back pains, joint pains, stomach cramps, sweating, goose bumps, intense craving and loss of concentration (Indianspice, 2014). The roster, like clockwork kicks in almost every four hours and is worst when the addict wakes up after an eight – hour sleep. An unemployed couple, Nivesh and Lucy who are 20 and 18 respectively and have a two-year old baby share a R300 a day habit, which they fund by shoplifting. Nivesh, who dropped out of school in grade nine started smoking with friends through “boredom” but is now smoking only for the roster (Tolsi, 2006). As with any drug, the sugars users’ tolerance will increase with time, whereby the user will need larger amounts of the drug to induce the same effect in a set period of time.

Volunteer doctors of the Anti - Drug Forum Programme in Chatsworth stated that treatment medications such as subutex and methadone, which are opiate substitution treatments are being used as a first line intervention to assist sugars users to cease usage of the drug (Tolsi, 2006). However, these doctors have recognised that the social and emotional aspects need to be given due consideration in dealing with the epidemic as sugars usage is related to group cohesion and identification in communities in which it is commonly used. Factors such as boredom, poor motivation, poor coping skills and apathy contribute and perpetuate the drug usage. Many come from dysfunctional families with no proper role model and no guidance. One of the community doctors, Kalpesh Ramcharan is quoted in the above article as saying that the disintegrating social fabric is a bigger threat than overdosing on sugars, given that the quantity of heroin in

the sugars mixture is minute. Sugars addiction coupled with the high rate of unemployment has fuelled the crime in areas in which it has become prevalent, with crime and prosecution data confirming an increase in drug offences and petty theft (USAID, 2016). The sugars craze has fuelled a crime upsurge in Chatsworth and drug use has been linked to the proliferation of petty theft, residential and business burglaries, cable theft, as well as increased levels of street-based prostitution (USAID, 2016) to fund the habit. The sex trade amongst teens in Chatsworth has also increased drastically as a means to funding the habit (Vitacare, 2012). Sugars usage gives users an invincible feeling, full of power and aggression, and crimes committed under the influence have been found to be horrendous and unimaginable (Hafajee, 2014).

Sugars is highly addictive drug with a poor rate of recovery (Hafajee, 2014), however there has been a dearth of information pertaining to treatment programmes and rehabilitation interventions for this population of users. Given the nature and severity of sugars addiction, rehabilitation should incorporate a multi - disciplinary approach and successful recovery programmes should consider pharmacotherapy in conjunction with psychological and social interventions. Withdrawing from opiates is physically and psychologically challenging which hampers the recovery process and increases the rate of relapse of recovering persons. Pharmacological treatments such as methadone and subutex are commonly used in rehabilitation programmes to assist in counteracting withdrawal symptoms from heroin, even though they are addictive (Hafajee, 2014). Apart from the difficulties experienced whilst withdrawing, intense cravings for the drug makes recovery even more challenging. Therefore, rehabilitation programmes should be run in a warm, comfortable environment with a multidisciplinary team of experts such as medical personnel familiar with drug withdrawals, psychologist, social workers, chaplain and a drug counsellor. The successful rehabilitation of a sugar's user will also largely depend on their motivational readiness to quit, good social support and lifestyle changes. Psychosocial interventions can assist with motivational enhancement, reduction of cue distress, changing maladaptive thoughts, modulating emotions and increasing awareness of behavioural coping mechanisms and strategies. Family related interventions are also crucial for this population of treatment seekers as they provide structure and support in a familiar environment, and environmental enrichment strategies implemented within the home environment can counteract the need for a drug. Based on anecdotal reports and information from primary sources regarding the challenges that sugars users experience

and its highly addictive nature, it is evident that a range of therapies and treatments should be implemented to assist with the major challenges in recovery

2.2.8 Conclusion

This chapter provided insight on heroin addiction and a cheaper derivative of a heroin-based drug called “sugars”, which is the drug of choice of the sample population. A broad overview of heroin incorporating historical, social, biological, cultural, economic, psychological and treatment perspectives were presented. The influence of heroin from an individual to a collective social level supports Amato et al. (2013) statement that opiate use is far more problematic than the use of any other illicit drug. The magnitude of the heroin crises in South Africa has been encapsulated by Haysom (2018), a senior analyst at the Global Initiative Against Transnational Organised Crime, who has stated that “South Africa’s heroin crisis is extremely serious and is taking a heavy toll on communities”.

Heroin addiction has been frequently characterised by loss of control, physical and psychological withdrawals, tolerance, intense cravings and frequent relapses (Amato et al., 2013; Bond & Witton, 2017; Hafajee, 2014) that perpetuates the addiction and challenges the recovery process. Heroin addiction does not only affect the addicted individual but society as a whole and is accompanied by a host of medical, psychiatric, legal, social and criminal issues (Bond & Witton, 2017; Galaj et al., 2016; Reimer et al., 2016). Furthermore, the emotional presentation which is characterised by dysfunctional emotional responses that is characterised by aggressiveness, apathy, high irritability, impairment in behavioural control, few abasement needs, poor self-control and diminished recognition of significant problems with one’s behaviour and interpersonal relationships, (Hou et al, 2016) are features of daily living that further compounds the negative presentation of a heroin addiction. There has been growing concern for the widespread and problematic use of “Sugars” which was initiated in the Chatsworth area since the early 2000’s. Sugars is a highly addictive mixture of heroin and other bulking agents, whose abuse has been concentrated amongst the impoverished Indian population and is prevalent amongst the 18 to 35 year old age groups. Due to the lack of scientific research, anecdotal and media reports have provided an understanding of the causes and consequences of this scourge that is ravaging and devastating the Chatsworth community (Indianspice, 2014; Tolsi, 2006). Sugars, a highly addictive drug which is characterised by a

significantly high relapse rate and poor rate of recovery (Hafajee, 2014), due to the nature and prevalence of the drug in affected communities, has been associated with an escalation in crime, poverty, prostitution, violence, homelessness, unemployment and family dysfunction in affected communities.

The etiological, neuroscientific and psychophysiological factors related to heroin usage is supported by global and South African research studies, as well as anecdotal evidence to provide an overall topography of the heroin and sugars scourge. Over the years, a variety of treatment strategies that include pharmacological and non-pharmacological treatments have been researched and implemented as treatment options for heroin addiction. However, the implementation of many of these treatments have not been successful as the motivation to use sugars and the challenges experienced by sugars users are rooted much deeper within the socioeconomic and cultural fibres of the affected communities (Tolsi, 2006). Given that sugars usage has reached epidemic proportions, prevention, intervention and treatment of the affected populations should incorporate individual and collective initiatives that operate from a more comprehensive conceptualisation of sugars addiction that addresses recovery from multiple perspectives. The information and evidence around the nature and severity of sugars addiction suggests that rehabilitation requires an individualised, multi-disciplinary approach that should incorporate a range of interventions that include physical, social, emotional, economic, cognitive, cultural and neurological factors. The magnitude and severity of the sugars scourge requires access to evidence based treatments that provide intensive rehabilitation, however the availability of treatment in affected communities are hampered by lack of rehabilitation facilities and treatment options, old ideas of treatment, poor drug policy and neglect of marginalised communities (Haysom, 2018; USAID, 2016; Zikali, 2018).

The complexities surrounding treatment interventions for sugars addiction challenges the recovery process and is impacting on the magnitude and severity of the scourge and the destruction of affected communities. To address the challenges faced by sugars addiction, it is crucial to find effective and targeted treatment interventions that are evidence based. The current research is rooted in models of learning and memory, therefore the EMDR therapy and the Addiction memory concept will be discussed in detail in the following chapter that will

provide an overall framework for understanding addiction and recovery processes by taking into consideration the mechanisms of learning and memory.

CHAPTER 3

THEORETICAL MODELS

3.1 INTRODUCTION TO THEORETICAL MODELS

The neurocognitive and neurochemical processes related to the initiation and maintenance of an addiction and cravings have gained a substantial amount of attention in the field of addiction research and treatment (Ekhtiari et al., 2016; Paulus & Stewart, 2014; Seow et al., 2020; Venegas & Ray, 2019). This chapter will provide an understanding of the theoretical models that provide the framework for this research. The discussion that follows will provide an in depth overview of EMDR therapy by focusing on the origins and concept behind EMDR therapy, components of EMDR therapy, activation of information - processing system, the eight phases of EMDR therapy, three – pronged EMDR therapy protocol, the adaptive information processing model, mechanisms of action in EMDR therapy, criticism and controversies surrounding EMDR therapy, the therapeutic relationship in EMDR therapy and EMDR therapy in the treatment of addictions. The Addiction Memory concept will focus on the neurobiology of an addiction, memory, neuropsychology of the addiction memory, mechanisms involved in learning the addictive behaviour, effects of long term chronic or intermittent drug administration and the impact of the addiction memory in cue reactivity.

3.2 INTRODUCTION TO EYE MOVEMENT DESENSITISATION and

REPROCESSING THERAPY

Eye Movement Desensitisation and Reprocessing (EMDR) is a psychotherapeutic model, developed by Francine Shapiro after a chance encounter in 1987, where whilst walking in a park she noticed that her rapid eye movements reduced the emotional disturbance that she was experiencing. Intrigued by this realisation that her disturbing thoughts had suddenly disappeared, Shapiro tried to pay attention to what was going on whilst focussing on the negative event and realised that whilst thinking about the events, her eyes were spontaneously moving back and forth in an upward diagonal movement. Later in the day, Shapiro attempted

to bring those thoughts back to mind only to realise that the thoughts no longer evoked the same amount of negative emotion as experienced previously, thus concluding that the events and thoughts had “lost their negative charge” (Shapiro, 2018). Therefore, EMDR therapy was not derived from a theoretical perspective or from research experiments, it was borne through observations where it was observed that spontaneously generated eye movements had a direct effect on thought processes. Due to an interest in her observations, Shapiro began experimenting with EMDR therapy on friends and colleagues by using a standard procedure on a wide range of non-pathological complaints over a six-month period that consistently succeeded in alleviating their complaints (Shapiro, 2018).

In 1987, Shapiro conducted a controlled research study which included participants that were either raped, molested or combat veterans who were assigned to EMDR therapy or a modified flooding procedure. The EMDR pilot research demonstrated a rapid reduction in emotional disturbance and became one of the first published controlled studies assessing Post Traumatic Stress Disorder symptomatology (Shapiro, 1989). The pilot study led to EMDR therapy being developed into an eight - phase therapeutic model of therapy (Shapiro, 2001), which was followed by numerous published studies of EMDR therapy to substantiate its efficacy (Bisson et al., 2013; Watts et al., 2013). Upon discovering the process, Shapiro named the therapeutic process Eye Movement Desensitisation (EMD), which later changed to Eye Movement Desensitisation and Reprocessing (EMDR) due to a change in orientation from the initial behavioural formulation of simple desensitisation to a more integrated information - processing model. EMDR is now being referred to as EMDR therapy, based on the realisation that there needed to be a conscious restructuring of the disturbing memory. EMDR therapy was originally named after the eye movements which were then seen as imperative to the process, but she later stated that a more appropriate name for the technique would have been Reprocessing theory (Shapiro, 2018). EMDR therapy has grown into an approach of psychotherapy that has been extensively researched and proven to be highly effective as a treatment for trauma (Bisson et al, 2013), and its efficacy has been validated by institutions such as the World Health Organisation (WHO, 2013) and the Department of Veteran Affairs and Department of Defence (2017).

3.2.1 The Concept behind EMDR Therapy

EMDR therapy is an integrative approach to psychotherapy, guided by the Adaptive Information Processing (AIP) model which states that within each person is an inherent information processing system whose purpose is to transform, integrate and transmute disturbing life experiences to a healthy adaptive resolution. This system normally operates automatically and outside of a person's conscious awareness. A disturbing event or incident may unbalance, block or overwhelm the system, resulting in the memory of the event being stored in the nervous system in a state-dependent form.

A principle that is crucial to EMDR therapy and evident in its application is that there is a system inherent in all of us that is physiologically geared to process information towards a state of mental health (Shapiro, 2018). AIP regards most pathologies as derived from earlier life experiences that sets in motion a continued pattern of affect, behaviour, cognitions and consequent identity structures. Stored maladaptive memories are viewed as the basis of psychopathology and stimuli that resemble traumatic or distressing events can trigger identical emotions, physical sensations, and behaviours that were present at the time of the original event. EMDR therapy activates this inherent information processing system by using bilateral stimulation together with a conscious act of reprocessing. The processing allows for the negative memory to be brought forward and processed in its entirety. Shapiro (2018) stated that EMDR therapy allows for dysfunctional information to undergo a spontaneous change in its meaning, incorporating insights and affect that are enhancing rather than self - denigrating to the client. Shapiro (2018) simplified the use of EMDR therapy as follows:

- a) Helping the client learn from past negative experiences
- b) Desensitising present triggers that are inappropriately distressing
- c) Incorporating appropriate future action templates that allow for the client to cope individually and within their interpersonal system.

3.2.2 Components of the EMDR Therapy Procedure

EMDR therapy processing depends on effective targeting as the wrong targets minimises positive treatment effects. Each target must be individually circumscribed and fully processed

despite the number of clinical aspects that require treatment, as they are the building blocks of the EMDR therapy treatment process. A fully delineated target will assist the client and clinician in understanding the context and content of the emotional disturbance and will encourage rapid processing. The six parameters that are delineated for treatment are the image related to the negative and positive cognitions, the emotions and their level of disturbance, and the physical sensations (Shapiro, 2006). These aspects of the target must be clearly defined for initiating, processing and concluding EMDR therapy treatment.

3.2.2.1 The Image

At the onset of therapy, the clinician asks the client to think of the event and then narrows it down by asking them to focus on the image that represents the entire incident, or more specifically the most upsetting part of it. It is quite common for the client to have a blurred image or fragmented view of the event which should not be a cause for concern, as the goal is simply to establish a link between consciousness and where the information is stored in the brain.

3.2.2.2 The Negative Cognition

After eliciting the image, the client is then asked to identify a statement which is referred to as the “negative cognition” that expresses the underlying negative belief or maladaptive self – assessment that goes with the image. Like the image, the negative cognition is a link to the dysfunctional material that needs to be processed. The term cognition is generally used to define all the conscious representations of experience, but in EMDR therapy it is used to represent a belief of the client’s current interpretation of the self. The negative cognition is a self-assessment in response to the question “What are your self-denigrating beliefs about yourself in relation to the event?” and includes statements such as “I am bad/worthless/unable to succeed etc”. Stimulating a traumatic memory allows for the dysfunctional stored affect to be felt, and the negative cognition conveys the meaning of this dysfunctional feeling. Negative cognitions are “I” statements that are expressed in the present tense, which are negative self-attributions in relation to the client’s involvement in a traumatic event. EMDR therapy can be administered to reprocess a statement that is considered to be inappropriate or dysfunctional such as “I am powerless”, when it is used in the wrong context and in the absence of current danger or threat.

It is important for the clinician to ascertain the level of disturbance that is presently experienced when a client evokes the memory of a trauma or experience that may have occurred many years ago. The client may continue to have inappropriate thoughts about themselves in relation to the event, projecting feelings of self-blame, incapacity, powerlessness or self-denigration, which demonstrates that the dysfunctional memory has not been resolved. Shapiro (2001), based on clinical observations emphasised that EMDR therapy does not allow for the client to falsify events or incidents, as a result a negative cognition that is actually true will not be changed. Furthermore, clinical observations have demonstrated that EMDR therapy cannot be used to remove a true negative cognition or to install a false one. The negative cognition is interpretive rather than descriptive and most negative cognitions seem to fall into three categories: 1) responsibility/defective, 2) lack of safety, and 3) lack of control (Shapiro, 2018, p 56). The identification of the negative cognition helps the client to recognise the nature of the cognition and establishes a baseline that helps to determine improvements, or that identifies dysfunctional information that requires reprocessing.

3.2.2.3 The Positive Cognition

Once the client and clinician have identified the negative cognition associated with the target, the next step will be for the client to identify the desired positive cognition. The positive cognition is then given a rating on a 7-point “validity of cognition” (VOC) Scale, where 1 is “completely false” and 7 is “completely true”, which offers the therapist and client a baseline (the VOC rating) from which to assess progress. The VOC rating should be based on how true and how believable the positive cognition feels to the client presently, and not on how true it is objectively. The clinician should ask the client to report their “gut - level” response, so that the desired positive cognition can provide direction for treatment and stimulate the appropriate alternative neuro networks. The evaluation of EMDR therapy sessions have consistently reported that reprocessing will be disrupted if a client’s positive cognition is inappropriate or impossible. Disruption occurs when the client tries to incorporate wishful thinking or an unrealistic desired positive cognition into their belief system. Therefore, the client should be instructed to make an “I statement” that incorporates an internal locus of control and one that is attainable within their own capacity when developing a positive cognition, as the client does not have control over other people’s thoughts and actions. In developing a positive cognition,

the goal should be that the client must be able to maintain a sense of self - worth and equilibrium rather than resorting to rationalisations or false hopes for the future. Sometimes the only positive cognitions that can be reasonably presented are in statements like “It’s over,” or “I now have choices”. Such cases allow for a level of responsibility for past behaviour to be recognised and emphasises present and future action.

An important step in recovery is for the client to identify and incorporate a positive cognition as an alternative view of the trauma which needs to be expressed in reasonable language and offers the hope of moving away from the pain of self - denigration. However, as the session progresses, the positive cognition that was initially identified can be replaced by a more suitable or powerful one, and it is quite common for a more appropriate cognition to emerge as the processing continues. The clinician should take special care in noting an appropriate cognition and to make sure to use the client’s own words and avoid the word “not” when stating it, even if the client needs assistance to formulate positive cognitions. The therapeutic goal is to assist clients with a positive formulation of their perception of self, therefore the new self-concept should be the most positive self-attribution possible. Once the dysfunctional material has been processed, the positive cognition intentionally links up to and become associated with the previously distressing information in the next phase, known as the “installation” phase of treatment. In other words, the positive cognition is inserted into the memory network that holds the target material, which then generalises throughout the network into all the associated experiences and memories. Thereafter, when a disturbance is triggered, the positive cognition will emerge into consciousness allowing for a linkage of the information regarding positive outcomes to be associated with the previously traumatising material. It is the linking of the neuro networks that is seen as a primary outcome of successful reprocessing.

3.2.2.4 The Emotions and their Level of Disturbance

The client is asked to hold in mind the picture of the disturbing memory and the negative cognition, and to link the negative cognition to the accompanying emotion. Thereafter, the client rates the emotion based on the subjective Units of Disturbance (SUD) scale (Wolpe, 1958), where the emotion is rated on a scale of 0 -10. The clinician should make sure that the client reports the level of distress felt at the time of the event and not the present feeling. EMDR therapy targets dysfunctional information and unresolved material is mostly indicated by a

significant level of current emotional disturbance. Therefore, the SUD scale allows the clinician to evaluate the client's levels of emotional disturbance and determine which memories should be targeted. A variety of emotions can arise during processing, making it important for the client to name the emotion. Sometimes, a client using the SUD scale may report no change in the intensity of disturbance, however the emotion may have changed qualitatively. Therefore, in EMDR therapy the clinician must know which emotion is being rated so that they can provide appropriate responses and determine whether material is being processed, as well as support the process.

3.2.2.5 The Physical Sensations

Physical sensations that emerge when clients concentrate on a disturbing memory are useful focal points for treatment and pronounced physical sensations are also associated with negative cognitions. These sensations may be associated with emotional tension, such as tight neck muscles or increased heart rate. Physical sensations may also be part of the sensory experience of the target incident, such as the sensation of feeling or holding on to drug paraphernalia. An EMDR therapy session is only complete when all the physical sensations that are generated by thoughts of the distressing event have been appropriately reprocessed. On completion of treatment, the client is instructed to complete a mental scan of the body to determine if there is any residual tension or atypical physical sensations that are still present.

3.2.3 Activating the Information – Processing System

The client's inherent information processing system can be activated using EMDR therapy procedures such as directed eye movements or alternative forms of stimulation such as taps or sounds. The clinician needs to be familiar with all three forms of stimulation, as the client's preferences may vary.

Eye Movements – The clinician's objective is to generate eye movement from one side of the client's range of vision to the other. This full bilateral movement is done as rapidly as possible without discomfort, where the clinician uses two or more fingers as a focal point. This technique allows the client to track the fingers without having to focus on a small object and without having the negative associations that might be elicited by a single moving index finger.

The clinician may also use a pen, ruler, or any other object to direct the client's eye movements, however, two fingers serve well and is preferred by many clients as affording a more interpersonal experience. The clinician holds two fingers upright, palm facing the client, approximately 12 to 14 inches from the client's face at a comfortable level. The clinician then demonstrates the direction of the eye movements by slowly moving the fingers horizontally from the extreme right to the extreme left of the client's visual field for a distance of at least 12 inches. The clinician should evaluate the client's ability to track the moving fingers by starting slowly and then increasing the rate to obtain a comfortable sustainable speed. During this testing phase many clinicians ask the client to report preferences regarding speed, distance and height before concentrating on emotionally disturbing material. If the dysfunctional material shifts readily and the client is relatively comfortable, the speed at which the fingers are moving can be maintained. If either of these conditions are not met, the speed, direction and the number of eye movements within the set may be adjusted.

There are other possible eye movement sets that guides the client's eyes in a vertical, circular, or figure - eight direction. The vertical movements appear to have a calming effect and are particularly helpful in reducing extreme emotional agitation, dizziness, or nausea. If the processing appears stuck, the clinician should try a variation in the eye movements, starting with a change in direction. The duration of the set is also determined by the client's feedback. At the end of each reprocessing set, the clinician should ask one simple question, "What do you get now?" which gives the client the opportunity to report their experience in terms of imagery, insights, emotions, and physical sensations. It also allows for the clinician to assess the amount of processing that has taken place. Some clients are physically incapable of doing more than a few eye movements in a row because of weaknesses of their eye muscles, their inability to follow the hand movements or due to a high level of anxiety, extreme tracking deficits and finding the tracking movements aversive. These difficulties may be treated by using auditory or tactile cues as EMDR therapists have discovered that various types of dual attention stimulation can have the same effects. In fact, Stickgold (2002) stated that there is a good possibility that the primary common denominator is the attentional element rather than a particular muscular movement.

Alternative Forms of Stimulation – For those clients who may find the eye movements physically or psychologically uncomfortable, alternative forms of stimulation viz, tactile and auditory stimulation can be used and have proven to be effective. Alternative bilateral stimulation such as auditory and tactile stimuli have been found to have a clinical effect similar to that of the eye movements. Hand tapping is done by having the client sit with his hands palm upward on his knees. The clinician then rhythmically taps the client’s palms, alternating right and left, at the same speed at which sets of eye movements are conducted. The client does not have to deliberately fixate on each tap for therapy to be effective, however it has been clinically reported that spontaneous sets of eye movements occur during this procedure (Shapiro, 2018). Auditory stimuli entail having the client keep their eyes open or closed while the clinician alternatively snaps fingers next to each ear at a rate comparable to that used with sets of eye movements (two back-and-forth movements per second). Clinicians have also reported positive results with the use of headsets for audio stimulation and electronic devices for tactile stimulation. Whilst alternative forms of stimulation preclude the possibility of changing direction, both the speed and intensity of alternate forms of stimulation can be altered.

3.2.4 The Eight Phases of EMDR Therapy Treatment

EMDR treatment consists of eight essential phases (Shapiro, 2006). The number of sessions allocated to each client and the number of phases included in each session vary greatly from client to client. Each phase focuses on different aspects of treatment and it must be noted that many of their effects such as, increase in self - efficacy, gaining of insight and cognitive restructuring can occur simultaneously as the dysfunctional information is processed.

3.2.4.1 Phase One (Client History and Treatment Planning)

The first phase of EMDR therapy includes a history taking that assists in determining whether the client will benefit from EMDR therapy and to develop appropriate treatment plans. An evaluation of the client’s safety factors is crucial in determining whether the client is suitable for EMDR therapy. A major criterion in determining whether the client is suitable for EMDR therapy is their ability to deal with high levels of disturbance, which is experienced when dysfunctional information is processed. Therefore, an in-depth assessment of personal and psychological stability and current life constraints, as well as adequate screening for dissociative disorders needs to be conducted. If the client can physically withstand intense

emotion, the client is suitable for EMDR therapy and only then should the clinician obtain the necessary information needed to design a treatment plan. This part of the history taking phase entails an evaluation of the client's entire clinical picture, including dysfunctional behaviours, symptoms and characteristics that need to be addressed, duration of disturbance, additional past occurrences, present difficulties and the desired state. Based on the intake information, the clinician then determines the specific targets that need to be reprocessed, which includes the events that initially set the pathology in motion, the present triggers that stimulate the dysfunctional material and the kind of positive behaviours and attitudes needed for coping in the future. EMDR therapy should only be used to reprocess information once the clinician has completed a full evaluation of the clinical picture and developed a treatment plan.

3.2.4.2 Phase Two (Preparation)

The preparation phase, which sets the therapeutic framework involves establishing a therapeutic alliance, explaining the EMDR therapy process and its effects, addressing the client's concerns, and initiating relaxation and safety procedures. In the preparation phase, the clinician must establish a relationship with a client that includes recognition of common goals, a need for honest communication and a level of trust. The clinician needs to inform the client of possible emotional disturbances that may arise during and after EMDR therapy sessions, giving the client an opportunity to make appropriate choices. The client needs to be reassured that nothing will be imposed on them during treatment and that memories will be processed according to their self - healing capacity. Clinicians should also equip clients with either an audiotape that includes guided relaxation exercises or teach them relaxation exercises that they could practice before or after the EMDR therapy sessions. The goal is for clients to be proficient in such techniques so that they could deal with any disturbances between session. Prior to processing, the clinician should also use guided visualisation techniques with the client and EMDR therapy should be discontinued if the client is unable to eliminate moderate levels of disturbance with these techniques. The "safe/calm place" is particularly useful in creating emotional stability and the objective is for the client to create a safe place in their imagination before processing. This technique can be used for a temporary rest during processing, as an aid to closing down a session, and to deal with disturbing material that may arise between sessions.

The preparation phase also includes briefing the client on the theory of EMDR therapy and the procedures involved, offering some helpful metaphors to facilitate successful processing and to inform the client as to what can be realistically expected in terms of treatment effects. The clinician's description of the EMDR therapy treatment model should reassure the client that although unpleasant emotions and feelings may arise during EMDR treatment, they are merely due to the processing of old disturbances and do not present any current danger. During the preparation phase, the clinician also explores with the client the possibility of secondary gain issues and what the client has to give up or confront if disturbances are dealt with? These concerns need to be addressed before starting with the reprocessing of the trauma or emotional disturbance. If the secondary gains are fuelled by feelings of low self - esteem and irrational fears, they should become the initial target of processing and until these negative feelings are resolved, other therapeutic effects cannot be expected or maintained. The client needs to be placed in a state of mind that allows for processing to take place at its own course, rather than making anything specific happen.

3.2.4.3 Phase Three (Assessment)

The assessment phase helps to outline the dominant manifestations of the experience that are access points to be targeted such as images, emotions and physical sensations. The clinician identifies the components of the target and establishes a baseline measure of the client's reaction before starting to process, which provides a baseline on how the brain is currently encoding information and their own subjective connections to the incident. Once the memory is identified, the client is asked to select an image that best represents the memory. Thereafter, the client chooses a negative cognition that expresses a dysfunctional or maladaptive self-belief relating to the experience. These negative beliefs are verbalisations of the disturbing affect and include statements such as "I am useless/worthless/unlovable/bad". If the client is unable to specify a negative self- statement, the clinician should offer a list of suggestions. The clinician should ensure that the negative cognition which is self - referential is in the present tense as a belief rather than a description of circumstances.

Once the negative cognition is identified, the client should identify a positive cognition that will be used in the installation phase to replace the negative cognition. The positive cognition is a verbalisation of the desired state that should incorporate an internal locus of control (e.g.

“I am worthwhile/loveable/in control” or “I can succeed”). The client is then asked to assess the validity of the positive cognition using the 7-point VOC scale. Thereafter, the image and negative cognition are combined to identify the emotion and the level of emotional disturbance, which is measured on a 10 - point SUD scale. The client is asked to choose a number that is indicative of the intensity of the emotion that is attached to a memory. As reprocessing commences, both the emotions and their intensity may change, and often the disturbance becomes temporarily worse before it starts to improve and as the client concentrates on the event, they can also identify the physical sensations that are stimulated. Based on the above, the assessment stage offers a baseline response with respect to the target memory and the specific components necessary for processing. By the end of the assessment session, the client and clinician should have enough information to start with EMDR therapy processing.

3.2.4.4 Phase Four (Desensitisation)

The fourth phase focuses on reducing the client’s disturbance to a 0 on the SUD scale. This phase of treatment encompasses all responses which includes new insights and associations, regardless of whether the client’s distress level is increasing, decreasing or stationary. Therefore, any change in material indicates that processing is continuing. Clinicians are guided during this phase by clients’ reports which should indicate changes in emotional, cognitive and somatic levels. Client’s report their experience as changing imagery, emotions, tastes or smells which should be carefully attended to by the clinician between sets, so that they can identify what needs to be processed next. Depending on the client’s response, the clinician will direct their attention to the last statement, to an alternative aspect of the experience or to a new target. The client should be asked to retarget the original incident if sets of bilateral stimulation allows for aspects of the experience to fade away without leading to another association. It is necessary to process the dysfunctional material that is stored in all channels associated with the target event for desensitisation to take place. During the desensitisation phase, the clinician repeats the sets which allows for appropriate variations or changes in focus, or until the client’s SUD level is reduced to 0 or 1. A reduction in SUD levels indicates that the primary dysfunction involving the targeted event has been reduced or cleared, however reprocessing is still incomplete and the information has to be further addressed in the remaining phases.

3.2.4.5 Phase Five (Installation)

The fifth phase of treatment called the installation phase starts once the client's level of emotion about the target event drops to a 0 on the SUD scale. It focuses on incorporating and strengthening the positive cognition that the client has identified in the assessment phase as a replacement for the original negative cognition. The calibre of the treatment effects, which is based on the client's belief of the positive cognition is measured using the Validity of Cognition (VOC) scale. The clinician asks the client to hold the most appropriate positive cognition in mind along with the target memory and then continues with sets of bilateral stimulation until the client's rating of the positive cognition reaches a level of 7 on the VOC scale. The client is then asked to rate the cognition based on how they feel at gut level. The appropriate positive cognition is either the one the client identified during the assessment phase of the EMDR treatment session, or it might be one that has emerged spontaneously during successive sets. Even if a new positive cognition has not emerged, clinicians usually find that the client's VOC rating of the original positive cognition has increased by the end of the desensitisation phase. The clinician then continues with sets of bilateral stimulation to ensure further strengthening of the positive cognition which allows for negative images, thoughts, and emotions to become less vivid and valid and for positive images, thoughts, and emotions to become more vivid and valid with each successive set (Shapiro, 2018). The sets should continue as long as the client's sense of validity, self - confidence is increasing. The VOC rating is extremely valuable as it helps to determine what further work is required to complete the treatment session. The ultimate goal is the installation of a strong and completely valid positive cognition that will enhance the client's sense of self efficacy and self-esteem.

The associative bond is strengthened by linking the positive cognition to the target memory and if the memory of the original incident is triggered, it will then be accompanied by the new strongly linked positive cognition, such as "It's over; I'm safe now". As the client concentrates on the positive cognition, it becomes intertwined into the target memory network, where it then generalises to associated material. In the case of an addiction, the positive cognition is chosen based on its ability to generalise and reshape the user's perspective of their ability to stay drug free, as well as to empower the client to deal with present and future triggers and cravings. The installation and strengthening of the positive cognition are crucial components of the EMDR therapy session as the presence of a negative cognition indicates that a traumatic event is a powerfully impacting factor on a person's life, which the individual has failed to assimilate

into an adaptive framework. The installation phase of the EMDR therapy session focuses on the strength of the client's positive self-assessment, which is crucial for positive therapeutic effects.

3.2.4.6 Phase Six (Body Scan)

The Adaptive Information Processing model posits that dysfunctional material may have distinct physical sensations which correspond to particular cognitions and can be targeted by itself. The sixth phase which follows the installation of the positive cognition is a body scan, where the client is asked to hold in mind both the target event and the positive cognition and to mentally scan their bodies from top to bottom, in an attempt to identify any body sensations that are indicative of residual tension. These body sensations are then dealt with in successive sets where in most instances the tension resolves itself, however in some cases additional dysfunctional information may still be apparent. The body scan can also highlight major areas of resistance stemming from the client's fears of letting go. Therefore, identifying residual physical sensation and targeting it in the sixth phase of EMDR therapy can help identify and resolve any remaining unprocessed information. This is an important phase and can reveal areas of tension or resistance that were previously hidden.

3.2.4.7 Phase Seven (Closure)

The client must reach a state of psychological equilibrium by the end of each session even if reprocessing is complete. It is extremely important that the client be given proper instructions at the end of each session so that the client leaves with a positive frame of mind. The clinician needs to inform the client that disturbing images, thoughts, or emotions may surface between sessions indicating that additional processing is required. The client is instructed to keep a mental log or journal of the negative thoughts, situations, memories and dreams that may occur, which through writing allows the client to cognitively distance themselves from any emotional disturbance. The client is also told to "take a snapshot" of any disturbances so that they can be used as targets for the next session. In addition, the clinician may be able to use the journal entries to identify any dysfunctional patterns of behaviour and triggers that should be targeted in therapy. The recording of the disturbance and the accompanying thoughts, emotions, physicals sensations or images that come to mind gives the client the opportunity to observe and understand the nature of their own patterns and responses. The use of the log and the

visualisation techniques taught to the client in the preparation stage are extremely important for maintaining client stability between sessions. As with other trauma treatment modalities, the clinician has to debrief the client, as the client can decompensate when they give their disturbing emotions too much significance or may view them as indications that they are permanently damaged. It is therefore important that the clinician debriefs the client as to how to deal with the emergence of disturbing material between sessions. The clinician should provide the client with realistic expectations about the negative and positive responses that may surface during and after treatment. This information will help the client to maintain a sense of equilibrium when disturbances surface as a result of being triggered between sessions.

3.2.4.8 Phase Eight (Reevaluation)

A client needs to be re-evaluated at the beginning of each new session, where the clinician gets the client to re-access previously reprocessed targets and to review the client's responses to determine whether treatment effects have been maintained. The clinician needs to find out how the client feels about the previous targets and should examine the log reports to see if there are any aspects of the processed information that still needs to be addressed. Regardless of the nature of the case, clinical attention must be given to four factors as outlined in the following questions (Shapiro, 2018):

- Has the individual target been resolved?
- Has associated material been activated that need to be addressed?
- Have all the necessary targets been reprocessed to allow the client to feel at peace with the past, empowered in the present, and able to make more desirable choices for the future?
- Has an adequate assimilation been made within a healthy social system?

Based on the above, the re - evaluation phase assesses how well the previously targeted material has been resolved and determines whether the client requires new processing. Therefore, the re - evaluation phase helps the clinician evaluate the various EMDR protocols and the full treatment plan, where the success of treatment can only be determined once the reprocessed incident and behavioural effects are re - evaluated.

3.2.5 Standard Three - Pronged EMDR Therapy protocol

The standard EMDR therapy procedure takes place during each reprocessing session, however the standard three - pronged EMDR therapy protocol guides the overall treatment of the client. Each reprocessing session must be directed at a particular target and structured in line with the standard EMDR therapy protocol. The targets are defined as follows:

- The past experiences that set the groundwork for the pathology,
- The present situations or triggers that currently stimulate the disturbance, and
- The templates necessary for appropriate future action

All specialised EMDR therapy protocols are interfaced with this standard format.

3.2.5.1 Choosing a target

It is easy to choose a target when treating a single event trauma victim, however when treating a multiple trauma victim, the clinician should cluster the traumatic incidents into groups of similar events and then choose a target that represents each group. The reprocessing of the target incident allows for positive treatment effects to spread to all the associated incidents. Clients should be asked to list their ten most disturbing memories so that it allows for them to sort through and consolidate their past experiences into manageable targets. Assessing the SUD level of each event and arranging them in order of increasing disturbance allows for the clinician and client to jointly decide as to which memory should be the initial target for the EMDR therapy treatment. The decision about whether to begin in the first session at the high or low end of the distress continuum will depend on the clinician's assessment of the client's readiness and stability. Some clinicians are of the opinion that starting with an event that has a low rather than a high SUD level enables clients to experience disturbing material with less intensity and distress and the resultant feeling of accomplishment in turn increases the client's confidence to deal with more disturbing material.

As mentioned previously, some clients experience high levels of emotional disturbance between sessions, particularly if the reprocessing was incomplete and they have undergone many highly distressing related traumas. Therefore, it is important to reprocess completely so that the client does not experience high levels of emotional disturbance between sessions. In

attempting to resolve a trauma or a distressing memory, the clinician should target the following:

- The memory of the actual event
- Any flashbacks as they might be different from the actual target incident
- Nightmare images, and
- Sensory triggers that bring back feelings of fear and confusion associated with the target incident such as loud noises.

Triggers which elicit dysfunctional images, cognitions, emotions, or sensations, either as full flashbacks or as partial arousal of the dysfunctional material should be treated individually. Due to second - order conditioning, each trigger can become individually disturbing because of the previously paired association, therefore for a complete resolution of the traumatic experience it is crucial that each of the four elements listed above are targeted.

3.2.5.2 Patterns of Response

Clinical observations indicate that approximately forty percent of the time clients experience a continuous and progressive shift towards resolving the target event (Shapiro, 2001). The kind of shifts reported by clients show that processing affects all aspects of the targeted memory and can progress in a variety of ways. At the end of each set of stimulation, the client may report a change in the target memory or a shift to a different memory. The client may report new memories that appear momentarily during the set, memories that emerge and remain during the entire set, or memories that surface only as the set concludes. The client may report visual images of the event or give a full - blown sensory description, including thoughts, voices, smells, emotions and body sensations, which may be experienced as elements that are merely a shadow, or experienced as a full - force abreaction.

To understand the types of changes that occur as a result of processing, it is useful to return to the concept of memory networks as associatively linked channels of information. A targeted memory may be one of a number of incidents stored in a particular channel and sets of bilateral stimulation allows for information to start processing through the channel and for new memories to come into consciousness. These may appear to the client in flashes or as a collage

of many events all at once, or they may be experienced as body sensations. The clinician then addresses the targeted memory in whatever form it arises. EMDR therapy allows for some general patterns of association to become apparent and for each type of associative response to result in the resolution of material that is unique to the client and their emotional disturbance.

3.2.5.3 Multi memory Associative Processing - Below are some patterns that emerge when clients report various memories:

- a) The belief inherent in the emerging memories of a traumatic incident may be linked to the dominant belief inherent in the traumatic target event e.g., a memory of a sexual assault may be associated with the memory of drug usage because they share the cognition “I am powerless”. In the above example, a craving memory can be used as the pivotal memory that brings on extreme anxiety when targeting feelings of powerlessness. Clinicians often recognise important dysfunctional beliefs by determining what these associated memories have in common, which is useful in establishing a thorough treatment plan. Associations are always based on the client’s experience and will only emerge if it is associated with the target. However, the clinician should allow the client to realise the meaning of the connection (the negative cognition) on their own, rather than superimposing or pushing the client to identify it in the early phases of processing. Cognitive restructuring will take place during the installation phase of EMDR therapy, regardless of whether clients recognise the connections between the negative cognition and their memories.

- b) The major participants or perpetrator - targeted memories may be linked to new memories that share a commonality e.g., an addict who was physically abused may have difficulty with asserting himself with peers, as the perpetrator has set in motion the difficulties that the addicted person will experience with authority and assertiveness.

- c) The Pronounced Stimuli – the emerging memories may be linked to the primary stimuli inherent in the event. The train of associations linked to a sensory cue makes it difficult to separate the emotion (such as fear) or cognition (such as “I am powerless”) from the external trigger. The cue which is considered as the connective link during processing

links the dysfunctional reaction of the client to the stimulus. The dysfunctional reaction is characterised by a high level of emotion and an associated negative cognition.

- d) The Specific Event – emerging memories may be linked to the targeted memory by the nature of the event itself e.g., when targeting a craving experience in a recovering person who has experienced multiple traumatic incidents, it may result in an emergence of a sequence of memories relating to other craving incidents.
- e) The Dominant Physical Sensations – the physical sensations experienced at the time of the event are stored in the nervous system and may present as the dominant thread within the associative sequence, which may emerge as physical sensations whilst processing.
- f) The Dominant Emotions – the emerging memories may be linked to the primary emotion related to the event. Therefore, a clinician administering EMDR therapy needs to be attuned to the nature and severity of emotional distress that the client may experience during reprocessing, as well as pay attention and honor any indication that the client needs to terminate therapy.

3.2.5.4 Single Memory Processing Effects

Processing is indicated by the emergence of a sequence of new memories. Sometimes the target incident is consistently maintained preventing new memories from emerging consciously, whilst in other cases the target may shift to another memory that remains in consciousness for most of the session. Processing occurs when the client describes a change or shift in any of the five distinct aspects of the target viz: image, sounds, cognition, emotion, or physical sensations. Whilst processing, all aspects of the incident shifts simultaneously, however it is possible that one aspect may dominate in consciousness. The clinician can expect to see the following changes during EMDR processing viz:

- Changes in image - The image of the target event can change to an image of a different but associated event, or to a different aspect of the same event. However, a shift in perspective can allow for an image to change in content or appearance, or to a more vivid and detailed scene. The processing of dysfunctional information allows for greater access to information across the

associational network and the clinician needs to reassure the client that any change is acceptable as long as processing continues. The client should also be told that if they lose the picture or get distracted, they should just go back to the target image as any change in image reported by the client indicates that information is being processed.

- Changes in Sounds - Clients commonly report shifts in the auditory component of the target memory when processing memories with perpetrators, parents or others in a variety of settings.
- Changes in Cognitions - The client's level of insight increases as they shift from one set of cognitions to another. However, an appropriate cognition will only be reached when the information is completely processed, which is explained by the metaphor "the train has not reached its destination until the last stop". As dysfunctional material is being processed and shifts are being reported, the clinician should then direct the client to think of the thoughts verbalised in the previous set. It is not uncommon for clients to provide a "polar" response, which is a dramatic shift from a negative to a positive cognition at an early point in processing. In information processing terms, polar responses are interpreted as a shift in neuro networks from a "no" configuration to an associated "yes" configuration, which leads to the assumption that the client has reached the end of the channel with regards to their processing. In such cases, the clinician is required to direct the client back to the target memory and continue with the processing to determine whether there are any other dysfunctional channels that need to be reprocessed.
- Changes in Emotions – During processing, accompanying emotions may lose its intensity or increase drastically before the memory reaches an adaptive resolution. Therefore, the client's report of a change in the level of emotion suggests that the information is being processed. If the emotion is the dominant processing element of the memory, clinicians can use the subjective unit of disturbance scale to assess the degree of change as the client reports a shift in emotions (e.g., from grief to anger) and its intensity. When the client shifts to a different emotion, the SUD level may increase, decrease or remain the same. The clinician needs to pay attention or be alert to any new emotion that arises during the session so that the client's needs are appropriately met e.g., the kind

of verbal and nonverbal support that would be reassuring to a client who may be experiencing extreme anger may be different from the support needed for a client who begins to feel anxious due to a craving. In EMDR therapy, clients often report a progressive shift towards a more valid or appropriate emotion, which can be viewed as movement through different “layers” of emotion. It is important to note that sometimes clients will not display any particular emotional state, and it is equally important that the therapist should not demand any specific emotion or level of expression from the client. Clients sometimes abreact when they are exposed to high emotional intensity, however others process in a straightforward manner with little emotional display.

- Changes in Physical Sensation - It is extremely common for most clients to manifest emotions on a somatic level when a memory is being processed. The body sensations may be the same as those experienced during the original incident and may be connected to the emotions experienced during processing e.g., a tight stomach may be associated with fear.

When a client processes information, somatic sensations may be manifested through a release of the physical sensations, where a client may experience them to a higher or lesser degree through each set of stimulation. These changes can appear due to a reduction in pulse rate or what may be termed as a retraction of the experience. At the start of the EMDR therapy session, the client may only feel vague physical sensations of the experience, however these sensations can increase in intensity at any time, which is viewed as a manifestation of the information being processed. The physical sensations that are experienced during a negative or traumatic experience are locked in the nervous system, therefore the stimulation of information can be experienced in the part of the body where the sensations were originally felt (through the afferent/efferent nervous system).

The processing of information may also be indicative of sensations moving through different locations in the body. A client may initially feel tightness in the stomach, but with each set the sensations may seem to move to other parts of the body such as the chest, throat, or head. It is the task of the clinician to direct the client to focus on the new location without trying to focus too much on the sensation or attach a meaning to it. Clinicians should direct the clients to focus

their attention to the parts of the body in which they feel the sensations. If the client reports dizziness, pain, or nausea or if there is no movement in the sensation after two sets, the clinician needs to change the direction of the bilateral stimulation, which is expected to bring on some sort of change in physical sensations.

3.2.6 The Theoretical Model of EMDR Therapy: Adaptive Information Processing (AIP) Model

The AIP model guides the use of EMDR therapy, which is used as a working hypothesis in understanding the nature of therapeutic change and guides the use of EMDR therapy. Whilst, EMDR therapy is seen as a specific integrative psychotherapeutic approach, the model represents the general model that provides the theoretical framework and an explanation for pathology and personality development. The AIP model is consistent with Freud's (1955) and Pavlov's (1927) early understanding of what is currently referred to as "information processing", which proposes that there is a neurological balance in distinct physiological systems that allows for information to be processed to an "adaptive resolution". Adaptive resolution refers to being able to connect to appropriate associations and for that experience to be used in a constructive way by the individual, which allows for it to be integrated into positive emotional and cognitive schema. Therefore, the process of EMDR therapy allows for what is useful to be learnt and stored with an appropriate affect and to be available for future use. Activating the AIP mechanism is central to EMDR therapy and has been critical in its application to a variety of pathologies.

The concept that past experiences sets the groundwork for present dysfunction is far from new, therefore the EMDR therapy framework needs to be examined specifically in terms of memory storage and the Adaptive Information Processing Model. Exposure to a negative or traumatic experience may result in an imbalance of the nervous system, which could be due to changes in neurotransmitters. Various studies that support the basic tenet of the AIP model have reported that general adverse life events that do not meet the criteria for major trauma can also result in pronounced dysfunction (Afifi et al., 2014; Read et al., 2014). Due to this imbalance, the information processing system is unable to function optimally, and the information acquired at the time of the incident which includes images, sounds, affects and physical sensations are maintained neurologically in a disturbing state. The information associated with the original

incident is held in a distressing, excitatory specific form and can be triggered by a variety of internal and external stimuli that may be expressed in the form of intrusive thoughts, flashbacks and nightmares.

The dual attention stimuli, which is part of the EMDR therapy procedure has been hypothesised to trigger a physiological state that assists with information processing. Shapiro (2018) proposed various explanations on the mechanisms involved in processing viz:

- A shift in brain state that activates and strengthens weak associations
- Deconditioning caused by a relaxation response (Wilson, Silver, Covi & Foster, 1996)
- Other factors that are involved in the client's dual focus of attention, which allows for the client to attend to both the present stimuli and the past trauma (e.g., disruptive functioning of the visuo spatial sketchpad, orienting response and mindfulness etc).

EMDR therapy allows the client to bring forth the memory of the traumatic experience as it is believed that a link is established between consciousness and the site where the information is stored in the brain, and the bilateral stimulation is the mechanism that activates the information processing system and allows for processing to take place. It is unclear as to whether this is due through engendering a state of mind that is necessary for the assimilation of information or the direct alteration of the physiological substrate of the targeted network. However, each set of stimulation allows for the disturbing information to be released at an increased rate along the appropriate neurophysiological pathways until it reaches an adaptive resolution, which is as a result of previously isolated disturbing information being brought into contact with currently held adaptive information. One of the main assumptions of EMDR therapy is that activating and processing the disturbing memory moves the memory towards the adaptive information it needs to resolve itself.

A central tenet of the AIP model is the concept of psychological self - healing, which is a construct that is similar to the body's healing response to physical injury. Therefore, with

regards to mental processes, the natural tendency of the brains information processing system is to move towards a state of positive mental health. However, if the system is blocked or imbalanced due to a negative experience, it will result in the manifestation of maladaptive responses. The responses may be triggered by present stimuli or due to attempts by the information processing mechanisms to resolve the disturbing material.

3.2.6.1 Memory Networks

The memory networks linked to the brains innate information processing system represents an associated system of information that is seen as a series of channels, whereby memories, thoughts, emotions, images and sensations are stored and linked to one another. Disturbing information that are associated with traumatic incidents are stored in the nervous system in the exact form as it was initially experienced due to the information processing system being blocked for some reason. Traumatic experiences remain frozen in time and are isolated in its own neuro network, where it is stored in its original disturbing state and specific form. The intensity of the affect locks the memory into a restricted associational network and the neuro network in which the old information is stored is isolated, thereby preventing new learning from taking place as subsequent adaptive information is unable to link associatively with it. Therefore, emerging thoughts of the incident are still connected to all the negative aspects of the original event, which in turn creates difficulties in dealing with negative cognitions and the associated disturbing affect, due to disparate information being stored in separate neuro networks. The AIP model suggests that insightful moments and integration occurs when the two neuro networks link up with each other and when the information processing system is activated and maintained in a dynamic form, thus allowing for the formation of appropriate connections between the two networks. Clinicians can observe a transmutation of information after each set of stimulation as the target material links up with and is reshaped by more positively oriented information.

The Adaptive Information processing model states that most types of disturbing life experiences can be successfully treated, regardless of its origin. A disturbing experience impacts on the way a person behaves, thinks and feels about themselves and their susceptibility to pronounced symptoms, such as flashbacks, nightmares, and intrusive thoughts which results in negative self - attributions. Clients who have not experienced major traumas but have had

negative early life experiences may also have negative self - attributions from which they have derived negative self - statements such as “I’m powerless” or “I’m worthless”. These clients may have not experienced a major trauma, but the memory of something that was said or that happened to them gets locked in their nervous system and seems to have a similar effect to that of a traumatic experience. According to van der Kolk (2014), any event that has had a lasting negative effect on the self or psyche is by its very nature “traumatic”. A memory is considered to be dysfunctional when the memory of the event still triggers similar negative self-attributions, affect and physical sensations as was experienced on the moment or day that the memory was originally created. Therefore, the therapeutic target is the stored disturbing memory as the previous dysfunctional information has set the target for the present dysfunction. Many conditions are amenable to change, and it must be noted that the specific diagnosis is less important than the appropriate targeting of earlier experiences that have created the client’s dysfunctional symptoms, characteristics and behaviours (van der Kolk, 2014).

3.2.6.2 Static Experience: Affect and Belief Statements

The disturbing aspects of memories that are dysfunctionally stored are held closely together as the memory system cannot make new and appropriate connections. The information stored in the neuro network may be manifested by all elements of the event viz: images, tastes, sound, physical sensations, affect, and belief statements. The stimulation of an unresolved trauma does not only allow the client to see what had occurred but may also re-experience the affect and physical sensations that were felt at the time of the original incident. Some researchers believe that disturbing elements and strong physical sensations are maintained due to inappropriate storage in short term memory rather than in appropriate long - term memory as the elements are stored in motoric rather than narrative systems (van der Kolk, 2014). Therefore, successful EMDR therapy should involve processing and dynamically shifting information to functional storage in memory, where useful information is learned and made available with appropriate affect for future use. Negative beliefs and self- attributions are transformed along with other aspects of a traumatic experience and are not given greater weight than sensory experiences. They are termed “meta perceptions” because they are not sensory experiences, but rather interpretations of the experience that entails language.

3.2.6.3 Resolution

Any disturbance can be resolved by stimulating the client's inherent self-healing processes. The Adaptive Information Processing model postulates that the information processing mechanism is physiologically designed to resolve psychological disturbances. The AIP model further states that psychological dysfunction and its accompanying disturbances such as lack of self - esteem and poor self - efficacy is caused by dysfunctional information being stored in the nervous system. EMDR therapy accesses, processes and adaptively resolves the stored dysfunctional information by connecting it to appropriate memory networks. Bilateral stimulation is the mechanism that activates the information processing system with each set of stimulation allowing for adaptive information to be assimilated into the memory network and transforming the target material to a healthy and functional state.

The shift from dysfunctional to functional forms an integral part of the new affect and sensory experience that will now dominate when the neuro network is activated by internal or external stimuli. In other words, the transmutation of information allows for the changing picture to correspond to shifts of affect and self-assessment, which then becomes part of the way the experience is stored. The client will now behave differently as the underlying belief has changed and the new positive cognition has generalised throughout the neuro network. This shift will allow for any associated memories that are accessed subsequent to treatment to present as positive cognitions with appropriate affect that will manifest in all aspects of the target and allow for appropriate changes in behaviour.

3.2.6.4 Frozen in Childhood

Shapiro (1994) stated that clinical observations of EMDR therapy sessions indicate that in cases in which the client was previously stuck in a childhood trauma, change is often achieved through the progressive emergence of an adult perspective. The parallel between negative childhood experiences and that of the trauma victim reveals common feelings of inadequacy, self-blame, lack of control and issues of choice and safety. It is presumed that a dysfunctional node is set in place in childhood particularly during the developmental stages, which prevents information from being assimilated into the neuro network during critical periods of development that follow the disturbing experience. The EMDR therapy process allows the client to recognise present conditions or circumstances with an appropriate emotion and

cognition, which allows for a shift towards self - acceptance and enhances a sense of safety and control in the present.

3.2.6.5 “Time Free” Psychotherapy

Traditional psychotherapy effects occur only after a length of time, probably because conventional therapy uses verbal rather than physiologically based procedures to shift dysfunctional information that is locked into the nervous system (van der Kolk, 2014). The Adaptive Information Processing model views the healing process as being comparatively time free because rapid treatment effects are observed with EMDR therapy, regardless of the number and time frame of disturbing events (Shapiro, 2018). As mentioned previously, EMDR therapy can target early childhood memories, later traumas and current situations for a therapeutic effect given that the neuro networks are associatively linked to all similar events. As the client holds the target in consciousness, the dysfunctional information is stimulated and transmuted to an adaptive resolution with appropriate affect, positive self-attribution and overall assessment. The associatively linked information allows for similar memories to be accessed during a treatment session, which may allow for a possible new positive affect and positive cognitions to generalise to all events that are clustered within a memory network.

It is presumed that changes during EMDR therapy occur rapidly compared to conventional treatment because:

- The dysfunctional state dependent material is directly accessed
- Focused protocols are used
- The memories can be targeted in clusters
- Stimulating the innate-information processing system transforms the information directly on a physiological level.

The ability of EMDR treatment effects to be comparatively free from time constraints is similar to the ability of individuals who dream through extremely long sequences of events in 45 minutes of REM sleep (van der Kolk, 2014). It is presumed that similar mechanisms in the dream state and the Adaptive information processing state of EMDR therapy allows for rapid

physiological shifting of cognitive and emotive material. During an EMDR therapy session, the adaptive processing of memories is dynamically maintained which allows for the information processing mechanism to be kept active. This is in sharp contrast to the static recall of events that are observed in long - term verbal therapies. In keeping with the Adaptive Information processing model, the EMDR therapist catalyzes the appropriate biochemical balance necessary for processing, whereby the altered brain state which is caused by focussed attention and simultaneous bilateral movements may lead to the activation of the limbic and cortical systems, and it is this interaction that may underlie rapid treatment effects (Stickgold, 2008). The clinician's utilising the treatment model must also be open to the fact that rapid, profound and multidimensional change in a client can take place and be maintained over time.

3.2.6.6 Targets

The key to psychological change is to encourage appropriate information processing which creates healthier associations and connections. There are many EMDR therapy targets and obstructed memory networks such as memory lapses, dissociations and restricted access to negative material within the associative memory networks. The Adaptive Information Processing Model states that negative information that is more likely to be stimulated than other associations is stored in a dysfunctional excitatory form. Therefore, when a disturbing event is processed, there will be an adaptive resolution to a more neutral form with cognitions that are linked to a more appropriate affect, as well as the emergence of positive memories. Thereafter, any internal or external cue that could trigger information from the targeted memory network will no longer be able to access the dysfunctional information and once the disturbing memories are adequately processed, cues and triggers will allow access to more positive aspects of the neuro network.

3.2.6.7 Dissociation

Clients sometimes have no memory of the distressing event but are highly symptomatic and manifests symptoms related to dysfunctional stored information. As mentioned earlier, dissociated material may be nothing more than information that is unavailable to awareness due to it being stored in a state-dependent form in an isolated neuro network. The processing of information allows for material that was previously unavailable to emerge into consciousness. Clinicians have found that the targeting of current symptoms or a client's sense

of danger, allows for approximately fifty percent of clients to retrieve visual images of the dissociated event (Shapiro, 2001), and that presenting symptoms may subside even without retrieving the image. EMDR therapy sessions have shown that effective processing can occur whether or not the information is released as an image into the client's conscious awareness (Shapiro, 2018).

During abreactions, clients can experience dissociation when they merge with the past experience. The overwhelming sensations and emotional reactions experienced when the client abreacts shows that the information is being held in a dysfunctional form. Alternatively, a complete lack of appropriate affect, which is reflected when a client uses terms such as “numb” or “blocked” when accessing a distressing event is an indication that the information is stored in a dysfunctional form. In such cases clients may retrieve the emotion during the initial phase of processing at a high level of disturbance. Any inappropriate dissociative response, either an over or under reaction to a distressing event is an indication of a blocked memory network and should be considered an appropriate target for EMDR therapy (Shapiro, 2018). The Adaptive Information Processing model offers a unifying theory that underlies all psychological modalities. This model has encouraged alternate views and broadens thinking by defining pathology as dysfunctionally stored information that can be properly assimilated through a dynamically activated processing system.

3.2.7 Mechanics of Action in EMDR Therapy

EMDR therapy was developed based on a chance observation in the park and has since been supported and refined by clinical observations and ongoing research for the past 31 years. In exploring the mechanics of EMDR therapy, the salient aspects that contributes to its positive effects include EMDR therapy being described as a synthesis of major psychological orientations and the inclusion of the bilateral stimulation component to the modality.

3.2.7.1 Psychological Mechanisms of Action

Moskowitz (2001), an internationally recognised figure in the treatment of borderline personality disorder has called EMDR therapy “an artful blend of several therapeutic techniques, including exposure therapy, cognitive therapy, and an abbreviated form of

psychoanalytic therapy”. A possible explanation for the rapid effects of EMDR therapy is due to the approach being a synthesis of the traditional orientations, where not just a single element is credited for healing but rather the complex protocols and integrative procedures of EMDR therapy that incorporate elements of all major psychological traditions (Shapiro, 2018). The free association of psychodynamic therapy, the identification of dysfunctional beliefs, cognitive restructuring, the focus on emotions, the client centred approach of experiential and feminist therapies, behaviour modification techniques and the use of standardized protocols that guide the assessment and therapeutic process are only some of major aspects that contribute to the efficacy of EMDR therapy.

3.2.7.1.1 Interrupted Exposure

An important procedural element of EMDR therapy is interrupted exposure. Exposure techniques which are based on the theory of learning are generally thought to be the primary active ingredient in behavioural treatment. Exposure therapy is based on the theory that increased exposure to distressing memories prevents the avoidance response and results in extinguishing negative responses associated with fear and distress. EMDR therapy is an integrated approach that goes far beyond just being an interrupted exposure, where the procedural elements of EMDR therapy allows for a person to focus their attention on a distressing image which is alternated with sets of bilateral stimulation and cognitive debriefing. Therefore, interrupted exposure is a necessary element of EMDR therapy but does not suffice as a sole explanation for the rapid treatment effects. The clinician’s preparation of the client is outlined as a crucial element of EMDR therapy as it increases the client’s ability to remain in contact with disturbing images due to brief periods of exposure alternating with cognitive debriefing. The unique contribution of EMDR therapy methodology which includes alternating exposure to high levels of disturbance is contrary to standard exposure procedures, as the standard extinction model includes prolonged exposure therapies (van der Kolk, 2014).

Boudewyns and Hyer (1996) stated that EMDR therapy structures a procedure whereby the client moves in a cycle from exposure to metacommunication and vice versa. The shift from being a non- reflexive participant to a reflexive observer creates an interplay between the inner and outer dialogues of a person. A meta - analysis of PTSD treatments have demonstrated that

comparisons of straight exposure treatment and EMDR therapy have indicated comparable effects that are achieved with fewer EMDR therapy sessions (Shapiro, 2018). Rothbaum et al. (2005) examined the effects of EMDR therapy and prolonged exposure therapy in a group of female rape victims, in which both the groups demonstrated an equivalent decline on all assessment measures at a 6 month follow up period. Researchers reported that the EMDR therapy group did equally well despite being significantly worse at pre - test, and that the prolonged exposure group had been further exposed to imaginal and in vivo exposure homework. The above - mentioned findings have important clinical implications for the effectiveness of EMDR therapy.

3.2.7.1.2 Perceived Mastery

The process of actively processing information includes various procedural elements that encourages a sense of perceived mastery and stability. EMDR therapy facilitates processing where clients are assisted in repeatedly constructing and dismissing distressing imagery, a process that gives them a sense of mastery in their ability to cope mentally and to manipulate disturbing internal stimuli. The process of attending to disturbing stimuli for short periods of time whilst hearing reassuring therapeutic statements from the clinician in a therapeutically safe environment fosters counterconditioning. The client attending to the distressing memory, coupled with the therapist's reassurance provides a safe therapeutic context to experience repeated exposure to distressing stimuli, which is antithetical to the avoidance response that accompanies and perpetuates many distressing situations.

3.2.7.1.3 Cognitive Reframing

The purpose of the assessment phase is to assist clients with identifying negative self-statements, which then allows for introspection into the negative event and associated irrational perceptions, and to recognise the impact of the event on their current self-concept. The restructuring of negative cognitions and reframing of positive cognitions can also facilitate the therapeutic process (Bivona et al., 2014), by creating associations with adaptive information that is in contradiction to their negative beliefs related to their experiences. The positive cognition also motivates the client to stay in treatment until they reach a positive formulation of the negative experience. During EMDR therapy, clients often spontaneously express positive

insights and cognitions which are then strengthened in the installation phase of treatment. On completion of therapy and with the installation of the positive cognition, clients demonstrate a profound shift in self - concept and self - acceptance, accompanied by new positive and realistic perceptions of the self.

3.2.7.1.4 Alignment of Memory Components

The aligning of primary aspects of a disturbing memory which focusses on the image, the negative cognition, and physical sensations helps the client to access dysfunctional information. These state specific aspects of the memory are linked to corrective information by introducing a positive cognition. The process of reconnecting to disturbing or traumatic material helps the client to make sense of the experience and facilitates storage in the semantic memory component through a process of reconsolidation. Traumatic memories that are insufficiently processed are stored in fragments (van der Kolk, 2014), therefore EMDR therapy procedures forge appropriate connections among the various bits of traumatic material and facilitate the storage of information in semantic memory (Lane et al., 2015).

3.2.7.1.5 Free Association

The EMDR therapy model is similar to the psychodynamic approach as it recognises that aetiological memories underpin and influence subsequent patterns of behaviour (Shapiro, 2018). Freud's psychoanalytic model (1955) postulates that conflicts arise due to blocked affects and free association should be used to explore these conflicts that disrupt associations. In the EMDR therapy procedure, clients are told to simply notice their internal experiences and are asked at the end of a set of bilateral stimulation "What do you get now?", which brings new pieces or chunks of information to mind. The information is targeted as they present and sometimes clients spend very little time on the presenting disturbance but move sequentially through other related material, which is a process that allows for movement from one aspect of a memory to another and linkage of more adaptive information. It is the successive targeting that may be a much more effective way to access the most relevant distressing material rather than returning to the original target material. Free association ensures that salient aspects of the memory network are accessed and processed, an aspect that is well recognised within the psychodynamic tradition.

3.2.7.1.6 Mindfulness

The instruction to “let whatever happens, happen,” and to “just notice” the distressing experience and the accompanying disturbance is included in EMDR therapy to assist clients in maintaining a sense of present safety, and to allow for internal processes to function without interference. The observer stance in EMDR therapy can be seen in a variety of Eastern meditative practices, which is similar to “mindfulness” in dialectical behaviour therapy (Linehan, 1993). Mindfulness increases an individual’s awareness of the present moment and includes both sensory and interoceptive processes, which in turn can improve awareness and decrease habitual responses (Witkiewitz et al., 2013). The dominant state that is observed during EMDR therapy is “mindful experiencing”, where the client experiences an integration of cognitive and affective inner exploration by using current feelings and sensorial experiences that guides them to solve problems. The effectiveness of EMDR therapy is due to its ability to evoke the right balance between re-experiencing emotional disturbances and attaining a non-evaluative “observer” stance related to the somatic, affective, cognitive and sensory associations. A possible explanation for minimising negative reactivity effects is that sets of bilateral stimulation draws the client’s attention away from the disturbing material and forces the client into a “mindful experiencing” mode when processing disturbing material. Therefore, EMDR therapy sessions consist of repeated and frequent experiences of this mode of processing, which is facilitated by a combination of the bilateral stimulation and the therapist’s control of the session flow.

3.2.7.2 *Neurological Mechanisms of Action in EMDR Therapy*

There have been several neurological mechanisms that have been identified as contributing to the efficacy of EMDR therapy. Over the years, scientific evidence has been presented on the following neurological mechanisms operative in the desensitisation and reprocessing of memories with EMDR therapy viz, bilateral stimulation and orienting response, rem sleep, relaxation response, hemispheric synchronisation, cortical functions, working memory and integrative effect.

3.2.7.2.1 Bilateral Stimulation and Orienting Response

A variety of physiological mechanisms are activated by the bilateral stimulation (alternating dual stimulation) used in EMDR therapy processing. Bilateral stimulation contributes to the therapeutic effect of EMDR therapy by simultaneously maintaining the client's external awareness whilst experiencing a state of internal distress, activating brain functions inherent in the bilateral movements and by attending to the targeted stimuli. The resolution of traumatic memories begins with the activation of dysfunctional memories, which in turn leads to a chain of events that are different to previous recollections. Several theorists have suggested that the bilateral movements appear to shift the state of the brain to one that facilitates the healthy reprocessing of these memories, which then allows for the brain to identify and strengthen new associations to the traumatic memories (Stickgold, 2008). It is currently hypothesised that the bilateral stimulation during EMDR therapy processing taxes working memory, stimulates the orienting reflex and associated parasympathetic response that elicits similar processes that characterise rapid eye movement sleep (Shapiro, 2018). Researchers have demonstrated that sets of bilateral stimulation are associated with rapid cognitive shifts, an increase in positive feelings, a decrease in negative emotions and high concentration levels that are required in some tasks (Amano & Toichi, 2016 & Klinger et al., 2007). A study that compared the use of bilateral stimuli and continuous tactile stimuli with PTSD patients and a control group, found faster reductions in distress in the group that was exposed to bilateral stimulation (Servan-Schreiber et al., 2006), thereby providing support for the use of bilateral stimulation in EMDR therapy. Numerous randomised studies have reported that eye movements are clinically superior to exposure alone (Lee & Cuipers, 2013), however there are studies that have indicated that patterns of regional brain activation produced by attention alone show significant overlap than those produced by eye movements (Braga et al., 2016; Corbetta et al., 2008).

Many theorists have stated that eliciting an orienting response is the main contributory element that allows for processing to take place, which is a natural response of interest when attention is drawn to a new stimulus. Shapiro (1991) stated early in the development of EMDR therapy that the client's response to accessing the traumatic memory involves automatic physiological states that are fused in a state specific configuration. The addition of the bilateral stimulation to the process introduces another configuration of a physiological state that intrudes on earlier associations, thereby disrupting the habitual response caused by the distressing memory, and

the simultaneous dual configurations may allow further processing to occur. The orienting response that occurs during processing allows for EMDR therapy to take place in the absence of actual danger, which allows for the activation of parasympathetic activity that facilitates the activation and desensitisation of distressing memories without avoidance.

3.2.7.2.2 Rem sleep

A mechanism used to explain EMDR therapy that has received research support is associated with sleep. Shapiro (1989) suggested early in the development of EMDR therapy that directed eye movements may be stimulating the same process that occurs in REM sleep, which is the lightest stage of sleep where the eyes move rapidly while closed and dreams occur. Stickgold (2002) has outlined neurobiological similarities between EMDR therapy and REM state functions and stated that REM sleep has recognisable physiological characteristics similar to the orienting response. Eye movements are present in both the orienting response and REM sleep, and features of REM sleep entail momentary cholinergic activation (Stickgold, 2002). Researchers have supported the preceding findings, where they have concluded that physiological data collected during EMDR therapy sessions provide support for the presence of both the orienting response and a REM - like state during the desensitisation phase (Schubert et al., 2011, 2016).

A clear function of REM sleep is the processing of information and the consolidation of memories. REM sleep is essential for the cortical integration of memories into general semantic networks (Walker & Stickgold, 2010), and it has been found that in EMDR therapy there is a repetitive redirecting of attention due to regional brain activation similar to those produced during the REM phase of sleep. Stickgold (2008) stated that REM is characterised by the processing of episodic memories which integrates into the existing semantic networks, assists with the elimination of associated negative affect and results in increased insight. Therefore, the simultaneous activation of these systems in EMDR therapy shifts the brain into a memory-processing mode which is similar to that of REM sleep, which in turn facilitates and integrates traumatic memories into associative cortical networks.

3.2.7.2.3 Relaxation Response

Shapiro (2018) suggested that eye movements may induce a relaxation response (a state in which the level of physical and mental arousal is reduced), by the reticular formation (which causes muscular inhibition in REM state), or by some other mechanism that activates the parasympathetic nervous system, which is responsible for eliciting the relaxation response. The parasympathetic system inhibits the sympathetic nervous system which is associated with the “fight, flight or fear” response, brought on by a distressing experience. Research has supported the above - mentioned hypotheses by demonstrating that eye movements induce a relaxation response and a study using biofeedback equipment has shown that during the eye movement phase of EMDR processing, stress related arousal is associated with changes in respiratory patterns, decreases in heart rate and skin conductance (Schubert et al., 2011).

3.2.7.2.4 Hemispheric Synchronisation

Pavlov (1927), Freud (1955) and van der Kolk (1994, 2014) stated that the essence of any psychotherapeutic treatment is the restoration of neurological balance. The AIP model postulates that distressing or traumatic situations causes information processing systems to be blocked and the blockage in turn allows for the original incident to be experienced as highly anxious. EMDR therapy has been consistently observed to facilitate the balancing of a system that was previously blocked or to stimulate the information processing system. Neuroimaging and psychophysiological research on EMDR therapy has focussed on the brain changes that occur pre and post EMDR therapy, of which much of this research has focussed on the effects of repetitive bilateral movements as the active mechanism and distinguishing feature of EMDR therapy. Structural analyses demonstrate that EMDR therapy induces bi hemispheric activation and may function as a pacemaker for the limbic system, thereby facilitating down-regulation and the integration of higher cortical functions (Bossini et al., 2017).

Neurobiological research and empirical investigations have indicated that bilateral stimulation encourages interhemispheric connections (Stickgold, 2008), and has a direct effect on the working memory (Smeets et al., 2012), and brain connectivity (Nieuwenhuis et al., 2013). Structural research has supported the notion that synchronized hemispheric activation produces positive information-processing effects and have led to the conclusion that EMDR processing

results in a change in brain network topology in the parahippocampal gyrus (Jung et al., 2016) and thalamus (Bossini et al., 2017). The abovementioned changes enhance communication between subcortical and cortical structures, thereby facilitating the processing of distressing material and the disappearance of disturbing symptoms (Jung et al., 2016).

3.2.7.2.5 Cortical Function

The effects and outcomes of EMDR therapy points to various neurophysiological mechanisms that describe the information-processing system. A memory of a traumatic or disturbing experience establishes a link between consciousness and the site where the information is stored in the brain and sets of bilateral stimulation allows for disturbing information to move at an accelerated rate along the neurophysiological pathways until it is resolved. The EMDR therapist in accordance with the AIP model catalyses the appropriate biochemical balance that is necessary for processing. The altered brain state brought on by the procedural elements may lead to the activation of the limbic and cortical systems (Stickgold, 2008), which provides support for the orienting response theory.

Several neuroimaging techniques have been used to investigate the neurobiological changes that occur in patients with PTSD on receiving EMDR therapy. The physiopathological model proposes that the intrusive characteristics of PTSD are due to an imbalance between the hyperactivation of subcortical regions, such as the amygdala and the hippocampus, and a lack of control exerted by the frontal cortex of the hyper aroused regions. MRI studies have demonstrated that successful EMDR therapy results in changes in the amygdala and hippocampus, which is contrary to the findings that these structures atrophise under stressful conditions (Bossini et al., 2017; Laugharne et al., 2016). A longitudinal study using structural MRI found that there was an increase in grey matter in the four frontal lobe clusters in an EMDR therapy group as compared to a wait-list group (Boukezzi et al., 2017). Based on the above discussion, it is evident that physiological and neurobiological studies converge in describing a significant reduction of sympathetic arousal and subcortical limbic activity during EMDR therapy, specifically during periods of bilateral stimulation. These findings suggest that brain activity normalisation is related to emotional regulation, relaxation and positive feelings.

3.2.7.2.6 Working Memory

The working memory hypothesis in EMDR therapy is related to the dual attention task that pairs the inner attention to the target memory and external attention to bilateral stimuli which triggers the orienting response. This underlying mechanism in which the bilateral stimuli causes negative memories to become less graphic and disturbing allows for the individual to psychologically distance themselves from the traumatic memory and facilitates therapeutic action. Baddeley's (1986) working memory model suggests that each component of working memory has a limited memory resource capacity, such that when two tasks make simultaneous demands on the attentional capacity of the component, performance on the primary tasks deteriorates. During EMDR therapy processing, visual imagery and bilateral stimulation draws on the visuospatial sketchpad, which is one of the subsystems that integrate and coordinate working memory. Andrade et al. (1997) examined the effects of eye movements on the working memory, where they paired eye movements, eye fixed and tapping with vivid images of distressing memories and noticed that eye movements allowed for the distress to be effectively reduced. The researcher concluded that it is the competition of such a dual task with or without fixed attention (Andrade et al., 1997) that impairs vivid imagery and reduces the associated emotions. The researchers further postulated that the eye movements worked to disrupt the functioning of the visuospatial sketchpad of the working memory, which allowed for a reduction in the intensity of the distress. This suggests that carefully chosen working memory loads may be a useful treatment aid when designing stepwise exposure protocols for EMDR therapy. The findings relating to a reduction in images and emotions raises important theoretical questions about the link between the working memory processes that underlie imagery and emotion. The dual task procedure has been well established in cognitive research that have investigated the extent to which the processing demands of one task interferes with the performance of the second task (Tiffany, 1999).

3.2.7.2.7 Integrative Effect

It is crucial to understand the mechanisms involved in the activation of the information processing system to be able to understand the effects of EMDR therapy. Target events may remain unprocessed because the immediate biochemical responses to the distressing event may have left it isolated in neurobiological stasis. The introduction of a bilateral stimulation allows for the active information processing to attend to the present stimulus, whereby a client is asked

to focus simultaneously on the bilateral stimulation and the distressing event. The active information processing mechanism is linked to and processes both the target event and the current stimulus which results in an integrative effect. This processing mechanism is physiologically configured to take the information to an adaptive resolution. The rapid processing occurs because the clinician guides the client to the appropriate targets, and because the other procedural elements encourage the associative process and prevents avoidance of disturbing materials (Shapiro, 2018). The rapid treatment effects of EMDR therapy provides a window to the brain as it allows one to observe patterns of memory association, emotional and cognitive processing and the differential effects of processing of recent and long - standing memories (Shapiro, 2018).

3.2.8 Criticisms and Controversies surrounding EMDR therapy

Despite the adoption of EMDR therapy as a preferred treatment for PTSD, EMDR therapy remains controversial and continues to be the subject of intense and sceptic debate over some issues. van der Kolk (2014) states that despite several published studies demonstrating positive outcomes of EMDR therapy, some researchers and clinicians continue to be sceptical about EMDR therapy, perhaps because it is an unusual procedure, seems too good to be true or too simple to be powerful.

The first controversial issue questions whether the effectiveness of EMDR therapy is as a result of it being a clever marketing ploy and a repackaging of other validated PTSD treatments such as exposure therapy or whether the bilateral stimulation is a red herring. The second controversial issue concerns EMDR's lack of efficacy and inconsistencies in empirical outcome studies (Sikes & Sikes, 2003), which has been hindering EMDR's progress to become an officially recognised evidence-based treatment for disorders aside from PTSD. Historically, considerable value has been placed on evidence- based practice (EBP) and there are implications that if a therapy is not evidence based, it will be seen as a medical treatment with leeches (Wattis, 2001).

In addressing the first controversial issue surrounding EMDR therapy as being nothing more than a repackaged exposure treatment, the differences in the protocols of each treatment

procedure needs to be highlighted. Exposure therapy is highly directive and moves stepwise through a traumatic incident with a client making use of prolonged, uninterrupted exposure where the underlying mechanism is a combination of habituation and extinction (Zayfert & BlackBecker, 2007). The EMDR therapy process in contrast to exposure therapy is more associative rather than directive and focuses on one segment of the traumatic memory network rather than prolonged sessions, of which the major outcome is the physiological reconsolidation of memory (Shapiro, 2014a). Therefore, a disturbing experience is the starting point and the focus is on stimulating and opening up the associative process. In EMDR therapy the memory is changed through the associative process and then restored in its altered state (Else & Kindt, 2017) as compared to traditional exposure therapy in which the original memory is left intact and a new one is created (van der Kolk, 2014). Empirical support for the distinction comes from research that indicates that long exposures result in extinction and short exposures results in reconsolidation (Suzuki et al., 2004). EMDR therapy is also client directed, giving the client not only the power to set the pace of therapy but also to choose for themselves what information they would like to focus on and how they would like to process it. Proponents of exposure therapy believe that brief interrupted exposure to traumatic memories as observed in EMDR therapy should make clients feel worse because the brief exposure should sensitise rather than desensitise clients, however this has not been supported with scientific or anecdotal evidence (Perkins & Rouanzoin, 2002). A meta-analysis of the two treatments in terms of treatment time and relief of symptoms revealed profound differences between the two modalities with EMDR therapy as compared to exposure therapy needing fewer sessions to desensitise a client to a traumatic incident (Rogers & Silver, 2002). Therefore, the argument that EMDR therapy is nothing more than an exposure therapy remains unsupported. The bilateral stimulation, which is a procedural element that is used within the context of focused and multifaceted procedures as a mechanism that supports processing, has been criticised as being a “red herring”. This argument remains unsupported as leading neurobiological researchers and empirical investigations have supported the role and effectiveness of bilateral stimulation on treatment effects (Amano & Toichi, 2016; Nieuwenhuis et al., 2013; Smeets et al., 2012; Stickgold, 2002).

The second argument that EMDR therapy lacks as an evidence-based practice (EBP) has arisen as theorists and researchers that support EBP believe that if a technique cannot be measured it is not real and have further advocated particular form of measurements to validate an evidence-

based technique (Khazan, 2015; Michell, 2003). Early EMDR therapy studies have been criticised for methodological inconsistencies such as inadequate sample size, lack of treatment fidelity and too few sessions for clients with multiple trauma (Perkins & Rouanzoin, 2002). Lack of treatment fidelity has been frequently highlighted as a weakness in outcome studies (Sikes & Sikes, 2003). There has been concerns regarding sessions that have been prematurely stopped or that consisted of shortened protocols which were indicative of weak or absent treatment effects and have led to criticisms regarding EMDR therapy group design outcome studies (Macklin et al., 2000). Therefore, Shapiro (2018) stated that research on recovery must use state of the art methodology including large representative samples, quantitative and qualitative methods and sophisticated statistical techniques that help elucidate the critical processes at work. In response to the methodological inconsistencies noted in prior research on the efficacy of EMDR therapy, Shapiro (2018) has emphasised that EMDR therapy research should adhere to the highest standards of controlled research and further outlined research criteria that is necessary for a valid test of single-cased and controlled research in her book EMDR therapy (3rd edition). Despite the lack of substantive research, anecdotal evidence and research findings have been extensively reported in peer reviewed journals and proficient practitioners have been using their clinical expertise to administer EMDR therapy to an increasing number of disorders. EMDR therapy is currently being used to treat a wide range of conditions and has proven to achieve positive treatment outcomes (Nowill, 2010; Shapiro, 2018), suggesting that there are benefits to stepping outside the EBP model.

3.2.9 The Therapeutic Relationship

Establishing the therapeutic relationship and developing rapport is extremely important to the therapeutic alliance in EMDR therapy and has been described as an essential interaction between client, method and clinician (Shapiro, 2001). Duncan et al. (2009) cited in the “Heart and Soul of Change” stated that the collaborative, therapeutic alliance between client and clinician is a primary factor in determining successful therapeutic outcomes and is even more important than the specific execution of therapeutic protocols. The above view has been supported by Bond and Witton (2017), where they stated that the therapeutic alliance is of paramount importance and the therapeutic relationship can create conditions that maximize the success of therapy and recovery.

Relational theory which is a synthesis of diverse areas of psychotherapy has grown from studies showing that the quality of the therapeutic relationship is a robust predictor of success in psychotherapy (Ulberg et al., 2016), has gained momentum and acceptance in the literature on therapeutic outcomes. Relational theory proposes that client and clinician are constantly interacting in an unseen relational matrix and that the process of explicating, understanding, and strengthening the matrix is a major source of psychotherapeutic change (Hoglund, 2014). Therapeutic protocols such as those evident in EMDR therapy that are co-created by client and clinician encourages dialogue about attunement and intention of their relationship is in contrast to one-person therapies, as the clinician creates rapport and trust with a client and applies a treatment. Watchel (2002) suggested that EMDR therapy should be taught and practiced as a two-person therapy, which is particularly important in expanding the scope of EMDR therapy from being a treatment of PTSD to a therapy that relieves the suffering of those who have developed pervasive negative patterns in functioning. Kazantzis (2018) stated that the client-therapist relationship is an important aspect that underpins the efficacy of therapy. Furthermore, therapeutic approaches that facilitates rapport such as “guided discovery”, in which the therapist uses techniques that are designed to guide the client to an understanding of the problem, identifying possible solutions and developing a working plan for dealing with conditions are crucial to successful therapeutic outcomes (Kazantzis, 2018). This therapeutic approach outlines the importance of “collaborative empiricism” in therapeutic processes, where the counsellor works collaboratively with the client to help them recognise cognitions and other factors that cause problems, to test the validity of the thoughts, beliefs and assumptions that are prevalent and to make the necessary changes in thoughts, emotions and behaviours. A thorough understanding of the phases and process of EMDR therapy are reflective of collaborative empiricism, where the EMDR therapist in a non - directive way facilitates an understanding of negative thoughts, affects and behaviour and guides the client away from information that is stored in a dysfunctional way towards meaningful change. Therefore, EMDR therapy is a client - centred approach in which the clinician acts as a facilitator of the client’s self- healing process.

The therapeutic alliance is an important mechanism in facilitating meaningful change for clients exposed to EMDR therapy. In EMDR therapy, the clinician must establish a relationship with the client that is characterised by a firm therapeutic alliance, a recognition of common goals, and an understanding of the need for honest communication. Shapiro (2018) maintained

that because the potential for disturbance between sessions is high in EMDR therapy, it emphasises the need for a strong therapeutic alliance. Clients must feel that they are protected and in control during processing, which is only possible if an atmosphere of safety and confidence is established during the initial sessions. She further stated that the clinician/client rapport and the therapeutic alliance are prerequisites to beginning the desensitisation and installation phases of EMDR therapy, where the therapist needs to be sensitive to the client's feedback in determining how hard and far to probe. This was supported by Marich (2010), who based on phenomenological research on incorporating EMDR therapy into addiction treatment highlighted the importance of the therapeutic relationship to the overall experience of safety. She found that female research participants regarded safety as an essential element that needed to be in place for them to have a positive experience of EMDR therapy, thus concluding that the success of therapy depends entirely on a client's trust and confidence in the therapist (Marich, 2010). In emphasising the importance of rapport as a crucial element in a therapeutic relationship, one needs to be mindful not to exclude confrontation as sometimes being an important aspect that brings a shift in perspective and opens the door to alternate ways of thinking.

A slightly differing view has been presented by van der Kolk (2003), where he stated that the therapeutic attunement and not the therapeutic alliance is central to the ability to process information. He stated that for effective therapy to occur, the therapeutic environment must provide some degree of safety and structure that is necessary to prevent the activation of interpersonal projections of threat or rescue. He further stated that therapy must help people fully experience their sensations and emotions without projecting them onto the environment or reactivating a sense of helplessness and lack of control. A sense of safety allows for people to experience pleasurable physical sensations accompanied by feelings of openness and expansion, thereby opening themselves up to new possibilities. The role of the therapeutic alliance in EMDR therapy has gained much attention concluding, that relational issues between client and clinician often impact on positive or negative outcomes of EMDR therapy and should be given due consideration in the training of EMDR therapy clinicians. Regardless of the differences in opinion, both the therapeutic attunement and therapeutic alliance are crucial to the therapeutic process, as the end goal of therapy is to increase the client's sense of self-esteem and self-efficacy at every phase of treatment.

3.2.10 Summary of EMDR Therapy

EMDR treatment effects are based on the ability to target and access dysfunctional material. The initially targeted facets of this material include the image, then negative cognition, and the physical sensations associated with the event. A baseline measure which is useful in preparing the client to focus includes identifying the stimulated emotion, a SUD rating indicating the intensity of the disturbance, and a VOC rating that indicates how true the client believes the desired positive cognition to be. EMDR therapy includes the processing of the target material by having the client focus on the appropriate bilateral stimuli, whilst simultaneously concentrating on the elements of the target in sequential doses. Processing takes place during successive stimulation sets, which is alternated with cognitive debriefing and the client determines the next appropriate target.

The purpose of the entire eight - phase EMDR therapy treatment is to facilitate accelerated information processing. The first phase determines whether the client is an appropriate candidate for EMDR therapy and includes treatment planning. The second phase prepares the client for any disturbance that may arise during or between sessions and sets appropriate expectations. The third or assessment phase focuses on ascertaining a target and determining its components and measures. The fourth or desensitisation phase focuses on the disturbance, which is judged by the client's feedback of the spontaneously emerging material and the SUD scale. The fifth phase which is the installation phase concentrates on infusing and strengthening the positive cognition as measured by the validity of the cognition scale. In the sixth phase, the remainder of the reprocessing is accomplished by targeting any disturbing material as revealed in the body scan. The seventh phase is closure, which returns the client to emotional equilibrium, where the client is reminded about the possibility of experiencing disturbances between sessions. The eighth and final stage, which is re-evaluation determines the quality of treatment effects and guides the clinician regarding the need for extended protocols.

There are various psychological and neurological mechanisms of action in EMDR therapy which may best be described as a client - centred, interactive, interactional, intrapsychic, cognitive, behavioural and body - oriented therapy. The key elements of all these modalities are integrated to treat the client as a whole person and to bring on shifts in functioning. The therapeutic relationship in EMDR therapy has been considered an essential element in

treatment outcomes, where clinicians have highlighted the importance of the therapeutic relationship to a positive overall treatment experience.

3.2.11 EMDR Therapy in the Treatment of Addictions

Shapiro reported on the use of EMDR therapy in the treatment of addictions early in its development and emphasised that it should be used in combination with traditional addiction treatment approaches (Shapiro et al., 1994). To date, there are only a few articles and chapters describing the use of EMDR therapy in treating addictions, and there is limited scientific research and sparse literature documenting the efficacy of EMDR therapy in the treatment of drug addictions. Therefore, best practices for the use of EMDR therapy with addictions are based mainly on uncontrolled studies, case reports, a sound theoretical framework, and consensus among clinicians within this field. In addition to the paucity of literature, there are also differences in opinion regarding the implementation of EMDR therapy in relation to stages and readiness to change, with some researchers being of the opinion that EMDR therapy is not an effective treatment to be used with a client who is actively using substances (Hase, 2010; Marich, 2011; O'Brien & Abel, 2011; Shapiro et al., 1994). This leads to questions about what type of targets needs to be addressed in addiction treatments and what type of client will benefit most from EMDR therapy.

Shapiro et al. (1994) were among the first to address the use of EMDR therapy in addiction treatment and suggested that EMDR therapy could be used to desensitise memories and triggers that contribute to substance use, thereby affording the client a greater chance of positively engaging with recovery and maintaining sobriety. An explanation for the development of a drug addiction from an AIP perspective is that drug usage starts out as being positive because they mask or help the person to escape from the underlying negative affect. However, the ongoing presence of maladaptive negative thoughts and emotions encoded in linked associated networks contributes to the allure of the addictive substance and maintains the addiction, ultimately resulting in the drug user becoming dysfunctional (Felitti & Anda, 2014). Shapiro (2018) states that based on the AIP model, the standard EMDR therapy protocol for treating addictions should involve the reprocessing of earlier traumatic memories that set the basis for dysfunction, which should include the contributing elements for the addiction, the present triggers that activate the disturbance, and the development of future templates for more

adaptive behaviour, which is essentially a form of relapse prevention. EMDR therapy used in the treatment of addictions is best implemented as part of a system designed to make the client feel safe and supported and works best when used in conjunction with counselling groups that provide a nurturing atmosphere, such as group therapy, Alcoholics Anonymous (A.A) and Narcotics Anonymous (N.A) (Shapiro & Forrest, 1997). The use of EMDR therapy encourages the association process that may transform dysfunctional stored information and integrates it within appropriate contextual memory networks (Shapiro, 2002; Stickgold, 2002). Therefore, EMDR therapy can assist in breaking down both cognitive and experiential roadblocks that impede meaningful addiction recovery.

Addiction treatment programs often find it difficult to individualise care, despite knowledge that individualised treatment programmes provide the best outcomes (Mericle et al., 2010). Current models of addiction are heavily focussed on examining the way in which addiction changes the brain structure and have been incorporating this awareness into treatment (Goodman & Packard, 2016), thereby allowing for EMDR therapy to fit perfectly into addiction treatment as it focuses on biological and neurological processes. There has been an increasing number of neurobiological studies and reviews that support EMDR's role as the potential missing piece in treating addictive disorders (Bossini et al., 2011, 2017; Laugharne et al., 2016), particularly the psychophysiological effects of the bilateral stimulation. The use of the bilateral stimulation in the treatment of addictions has been investigated in controlled studies and has been shown to reduce affect, reduce addiction imagery, increase attentional flexibility and assist in the retrieval of the episodic memory (Little et al., 2016; Markus et al., 2016).

Expertise in dealing with trauma and PTSD is essential for clinicians working in the addiction field as the comorbidity between substance use disorders and trauma has been well established (Gielen et al., 2016), and unaddressed PTSD or trauma has been cited as a relapse factor in many clients with substance use disorders (Brown et al., 2015). Gielen et al. (2016) interviewed patients with comorbid PTSD and substance dependence and found that patients did not attribute the onset of drug usage to PTSD but believed that PTSD symptoms maintained their addiction, hence supporting the "self-medication" hypothesis. A slightly differing view has been maintained by other researchers in the field who states that unprocessed trauma "pushes" addiction, while the euphoric recall and other rewarding affective states "pulls" one towards

the behaviour (Knipe, 2015; Muller, 2013), suggesting that most clients may never get sober unless the emotional charge is taken out of their traumatic past. Zweben and Yeary (2006) proposed that EMDR therapy provides a more holistic approach in the treatment of addictions co-occurring with trauma due to its ability to combine cognitive, body – oriented, emotional and experiential matter into a single treatment protocol and suggested that EMDR therapy should be incorporated in managing trauma at various levels of care, whilst the patient is recovering from an addiction. A period of sobriety, a solid support system and the ability to develop a goal of a healthier lifestyle before processing underlying disturbances is most suitable before dealing with traumas. Most EMDR therapists that specialise in addictions believe that unresolved traumas should be addressed as early as possible in treatment as it will help to facilitate the processing of addiction related memories and assist in enhancing and maintain sobriety (Shapiro, 2018). A study that provides support for the use of EMDR therapy with patients with comorbid PTSD and alcohol and drug dependence found that EMDR therapy assisted in maximising recovery, and patients no longer met the criteria for PTSD or substance dependence at the end of therapy (Kullack and Laugharne, 2016). The resolution of substance dependence in combination with the resolution of PTSD symptoms as observed in the above - mentioned study supports the hypothesis that addictive substances may be used as a means of self - medicating from emotional pain and distresses.

A growing body of literature suggests that EMDR therapy can be useful in the treatment of addictions and has been useful in enhancing client stability, relapse prevention, and in promoting recovery. Reports and case studies, along with reviews analysing these reports and their implications (Shapiro et al., 1994; Zweben & Yeary, 2006), suggests that the proper use of EMDR therapy by trained clinicians, “is a powerful tool for trauma resolution, but it has to be carefully integrated into addiction treatment” (Zweben & Yeary, 2006). Case evidence and usual care research which is conducted in clinical settings continue to support the use of EMDR therapy as a plausible intervention for addiction (Abel & O’Brien, 2010; Brown et al., 2015; Kullack & Laugharne, 2016; Marich, 2009; Muller, 2013), especially when implemented alongside other supportive care. Hase et al. (2008) in a randomised controlled study on EMDR therapy and addiction memories which included drug effects, relapse and cravings, randomly assigned thirty - four patients with chronic alcohol dependence to treatment as usual, or treatment as usual and two EMDR therapy sessions. The findings of the abovementioned study

indicated that patients receiving EMDR therapy sessions had significantly less craving than the control group after terminating inpatient treatment and at a 1month follow-up, and EMDR therapy was also associated with fewer relapses and a reduction in depressive symptoms. The above-mentioned study demonstrates the usefulness of targeting aspects and memories of the addictive behaviour to reduce the risk of relapse. Marich (2009) examined the treatment of a cross addicted female using EMDR therapy, where it was demonstrated that treatment enhanced the client's progression through the 12 - step model of recovery. Negative cognitions and their related memories were targeted which allowed the client to free herself from blocking beliefs that might have impeded her recovery. The abovementioned case has never been able to achieve more than 4 months of consecutive sobriety in 12 years of attempting multiple inpatient and outpatient treatment programs. However, after receiving EMDR therapy sessions and resolving core traumatic memories, the patient was able to remain sober for 18 months and was finally able to complete the fourth and fifth steps in the Alcoholics Anonymous Program, a feat that was unattainable in previous times due to the negative effects and complications of the underlying trauma. Marich (2011), contends that administering EMDR therapy to an addicted client who has a long history of trauma can be such an amazing experience, but it may result in the client believing that they are "cured", and although restoration to wholeness is a gain that can result from EMDR therapy, it can create overconfidence thereby placing the client at risk to slipping back to old lifestyle patterns.

Most addicted persons have an attachment to a drug as it symbolises being a friend, comfort and salvation from intolerable internal and external discomfort, therefore there is generally a great deal of fear about losing this attachment. Although controlled research is lacking in this area, it is proposed that once disturbing memories are reprocessed with EMDR therapy, they will no longer evoke the physical, emotional or cognitive disturbances that contributed to the onset and maintenance of the addiction (Brown et al., 2015; Knipe, 2015; Kullack & Laugharne, 2016). Miller and Guidry (2001) stated that factors such as poor self-efficacy, high levels of negative emotion and poor coping skills are risk factors for relapse and have suggested that a more holistic approach is required to promote long term recovery and prevent severe relapses. In other words, they have contended that treatment needs to extend beyond the cognitive interventions that have been traditionally used in relapse prevention counselling or the twelve steps - oriented methods, which has led to many researchers and clinicians

recommending and supporting the use of EMDR therapy to enhance the entire recovery process. Several emotions have been identified in triggering addictive behaviour however none is as powerful as “shame”, which is often associated with the stigma associated with the societal view of addiction coupled with memories of the instability and pain inflicted by their compulsive need for a drug. Maladaptive cognitions such as, “I am worthless, I am disgusting, I am shameful” that are reinforced by behaviours presented in active addiction are at odds with the client’s core values, thus generating deep shame and preventing clients from seeking help. EMDR therapy targets the negative cognition, which allows the client to separate the negative behaviour from a sense of self, and ties into the overall goals of EMDR therapy in encouraging self-worth and empowerment.

The incorporation of EMDR therapy into addiction treatments involves complex decisions and must be done judiciously. Due to the nature of chemical addictions (Shapiro, 2018) and an addiction being considered a “chemically assisted dissociation” (Knipe, 2015), EMDR therapy should be administered as a phased model within the eight - phase standard EMDR therapy protocol, similar to its administration with complex traumas and dissociation. The importance of a client’s readiness and motivation to change cannot be overestimated when it comes to when and how to use EMDR therapy with addicted persons, therefore the stages of change model is a useful construct when using EMDR therapy with addicted persons to help move them towards active engagement (Abel & O’Brien, 2014). The choice of an addiction is not random, and an addicted person pursues what they are seeking most, hence addiction is often referred to as an “affect regulation strategy”, therefore enhancing safety and coping procedures are necessary before any EMDR processing takes place. Therapeutic safety and attunement are crucial in enhancing safety regardless of whether the client may be ready to let go of the addiction or not. A drug court program in which seeking safety was offered to addicted offenders with a trauma history followed by voluntary EMDR therapy, demonstrated improved program outcomes such as higher completion rates and lower recidivism rates as compared to those that did not receive EMDR therapy (Brown et al., 2015). Brown et al. (2015), recommended that safety and stabilisation resources should be included in the preparation phase of treatment as affect regulation strategies can empower clients and enhance their emotional stability prior to the reprocessing of distressing memories.

A useful construct when administering EMDR therapy with a recovering addict is that of a “recovery capital”. This refers to the “quality and quantity of internal and external resources” that one utilises in initiating and maintaining recovery (White & Kurtz, 2006). This concept can be conceptualised as the tangible and intangible resources that an individual possesses to make recovery successful. Recovery capital can be inclusive of a support group, 12 steps meetings, a sponsor, a church group, a job, hobbies, supportive family, motivation, a fixed abode or essentially whatever a person has going for him or her. In assessing whether EMDR therapy is suitable for a particular individual, it is important to evaluate the depth of his or her recovery capital before commencing with EMDR therapy, therefore the decision to introduce EMDR therapy in recovery should be based on a client’s stabilisation resources (Marich, 2011). This is an approach that is similar to preparation and stabilisation stage work i.e. when the therapist uses whatever they can to get the client ready for EMDR therapy. It has been suggested that preparation oriented EMDR therapy (i.e. Shapiro’s phases 1 and 2), should preferably be done on persons who are in the active phase of addiction. Part of the stabilisation and preparation of an addicted person is to help them to achieve a modicum of functional sobriety, whilst building positive coping skills that they can use in place of the addictive substance. It has been found that some of the classic resource skills that are used in EMDR therapy (e.g. safe place, light stream, installation of positive memories or cognitions) work very well during stabilisation.

Addicted persons often have great difficulty in maintaining sobriety and behaviour change, therefore EMDR therapy and pre - EMDR addiction strategies can be utilised to assist clients in developing coping skills, increasing affect tolerance, and supporting sobriety. A few protocols have been well established by EMDR therapists and are commonly used in treating clients who present with addictions viz:

- *Desensitisation of Triggers and Urge reprocessing (DETUR)* – DETUR which was developed by Popky (2005) to help clients reinforce positive coping skills by focussing on both treatment goals and relapse triggers, has been investigated in multiple case studies (Bae & Kim, 2012, 2015). In the first part of the DeTUR protocol, the client focuses on a positive treatment goal, which focusses on an image of what life would be like when changes are made in relation to their alcohol and drug usage, be it abstinence or harm reduction. Visual imagery is

used to enhance this goal, which is then reinforced by bilateral stimulation, as the clinician works with the client to develop both internal and external resources that can encourage and support change. The clinician and client then work to desensitise each cue or trigger related to the client's use of substances and the client is encouraged to use bilateral stimulation on their own should they experience any urges. Reports have indicated that the therapeutic gains accompanied by DeTUR are maintained at a 6 and 12 month follow up, suggesting that it might be a useful adjunct with the standard EMDR therapy protocol

- *Michael Hase Memory of Addiction/ Cravex Protocol* – the Hase Memory of addiction/ Cravex Protocol (Hase, 2010) specifically targets the memory of the client's last craving or relapse, using the broad general outline of the standard EMDR therapy protocol. Reprocessing the addiction memory (AM) leads to a decrease in cravings or urges and to the channels in the brain relating to why the individual became addicted in the first place. Instead of a SUDS rating, the protocol calls for a rating of the level of urge (LOU) on a scale of 0-10, where 0 is no urge and 10 is the highest urge one can imagine. The positive and negative cognitions are identified, as well as the emotions and the location of body sensations associated with a craving. On completion of the assessment, the memory of the addiction or craving is desensitised using the EMDR therapy protocol, and a positive cognition related to the recovery process is installed on completion of the desensitisation process. This protocol indicates the potential utility of targeting cravings and other memories of addictive behaviours to reduce the risk of relapse.
- *Affect Tolerance Protocol* – poorly managed affect has been reported as a primary trigger for relapse (Marlatt & Gordon, 1985). York and Leeds (2001) has found that the affect tolerance protocol is extremely effective in teaching clients to tolerate intense feelings. The client is asked to identify a feeling that is creating distress and the worst part of that feeling. The client then develops an image of the feeling, a negative and positive cognition, and validity of cognition, SUDS and body sensations. The goal of this protocol is to lower the SUDS but

not to get it to zero. After desensitising the intense affect with bilateral stimulation, the clinician returns to the target image and checks on the SUDS rating. If the SUD rating does not decrease after several sets, other affect management techniques, such as breathing should be utilised followed by the installation of the positive cognition.

- *Resource Development Installation Protocol* - clients with addictions often need to enhance their relapse prevention strategies by strengthening qualities or resources needed in recovery and may benefit from the use of the Resource Development Protocol (Korn & Leeds, 2002). The client is first asked to identify a challenging current life situation in which increased coping skills are needed, thereafter the client is asked to develop an image of this situation and rate the SUDS. The clinician directs the client to identify a personal challenging life experience in which he or she used the resource, a figure that embodies the resource, or an image that represents it, after which bilateral stimulation is used to reinforce these representations. The client then returns to the image of the challenging life situation and imagines how he or she will effectively use the newly developed positive qualities to enhance coping, whilst focussing on bilateral stimulation.

The abovementioned suggestions, studies and protocols constitute a positive beginning to the research on using EMDR therapy with addicted individuals, however more experience-based data and scientific investigations are required to evaluate implementation and the impact of the technique. Random controlled trials are needed to confirm these protocols and to identify the different treatment elements that are needed for comprehensive recovery. EMDR therapy based on practice and research has gained acceptance over the past few years as a plausible intervention for addiction treatment, especially when used in conjunction with other approaches utilised in the treatment of addictions. However, future research is needed to determine which targets should be processed for the most robust, long - term outcomes when using EMDR therapy to treat addictions, as well as quality-of-life assessments, since the ultimate goal of addiction treatment is a lifestyle that makes abstinence worthwhile.

3.3 ADDICTION MEMORY

The addiction memory concept has gained a lot of attention and momentum in the field of addiction research. Based on 30 years of addiction research, the existence of a “memory of addiction” and its importance in perpetuating an addiction and uncontrollable relapses has been highlighted by scientific and clinical work. The term “memory of addiction” was first described by Mello (1972) but without any explanations of its development. A year later, Kalant (1973) used the term “carry over” to describe an addiction related memory and expanded the definition by including concepts such as “tolerance” and “withdrawal” to explain and define an addiction. Edwards and Gross (1976) used the term “reinstatement” for the addiction memory, stating that it is not only implicated in tolerance and withdrawal, but also affects the entire clinical addiction syndrome. The explanations of the addiction memory that followed the early definitions, included and highlighted the role of conditioning processes in the development and resistance of addictive behaviours, which is suggestive of an induced “addiction body memory” for the central nervous system (Boening, 2001). Studies have demonstrated that even after long periods of sobriety, the addiction body memory could trigger and encourage addictive behaviour, which could result in a relapse (Goodman & Packard, 2016).

3.3.1 Neurobiology of an Addiction Memory

The role of learning in the development and maintenance of addictive behaviours has been demonstrated in both animal research and human studies (Torregrossa & Taylor, 2016). Repeated drug usage results in long lasting conditioned responses which allows for an addiction to be viewed as a learned reaction, controlled by a memory of addiction (Taylor & Torregrossa, 2015). The brain is an open learning system, where the neuronal connections in the brain are influenced by an individual’s perception of their environment due to an interaction between the individual (microcosmos) and the social environment (macrocosmos) (Belsky et al., 2013). Wolffgramm et al. (2000), outlined three distinct processes in the development and maintenance of addictive behaviours viz, a memory of drug effects (reflected by a sensitivity to the effects of a drug), a memory of drug use (reflected by controlled drug usage), and a memory of addiction (reflected by loss of control of drug use and accompanying changes in dopaminergic neurotransmission). Therefore, the memory of addiction is defined by key concepts such as “loss of control” and “obsessive-compulsive craving”(Volkow et al., 2016), and consists of two components viz, a general memory of loss of control and a specific memory

of the addictive drug. Based on the addiction memory concept, addictive behaviour can be viewed as a chronic functional disorder of the brain (Volkow & Morales, 2015), which is encouraged and influenced by the social and behavioural context of the user. Despite the wealth of pre – clinical data favouring an aberrant learning and memory conception of addiction, there is still a lack of clinical research to explain the way in which learning serves as a drug-predicting cue in a human addict (Torregrossa & Taylor, 2016).

3.3.2 Neuropsychology of the Addiction Memory

The learning of an addictive behaviour involves phylogenetically old brain structures and is based on the effects of positive reinforcement. This positive reinforcement system works like a “joy-decision switch”, where contextual learning is influenced by basic emotional states such as fear, happiness or joy (Murphy et al., 2012). Inherent in this “joy decision switch” is the ability to verbalise the experience in the form of the more implicit psychomotor abilities, habits, or simple conditioning. The memory of an addiction can be explained by an understanding of the neuropsychological systems of memory as associatively linked channels of information (Goodman & Packard, 2016). Long term memory is divided into an explicit and implicit memory. The explicit memory is further divided into a declarative (semantic memory and a procedural memory) and a non – declarative memory (episodic memory and priming) (Muller, 2013).

The addiction memory is based on the combined experience of the history of one’s life together with the individual’s environmental context, therefore developmental and environmental factors influences the effects of addictive drugs on learning and memory systems. Based on the above, the episodic memory and priming which is based on remembering similar situations or previously experienced patterns of stimuli needs to be taken into consideration in understanding the addiction memory, (Frederiksen et al., 2012), and should be considered an important mediator in the establishment of early drug use and the transition to compulsive drug use. The encoding of experiences is associated with the association areas of the central cortex and the decoding is associated with the right temporal frontal cortex (Volkow et al., 2016). The frontal cortex is seen as part of the reward system, where the prefrontal cortex analyses, anticipates and predicts the positive stimuli. A memory of addiction is considered to be an

episodic memory because of pre-frontally stored experiences (Huhn et al., 2019), and it can be concluded that the emotions attached to drug use play an important role in creating the episodic memory for continued drug use (Muller, 2013). In explaining the link between learning and addiction, individual's employ purposeful behaviour when initially seeking the drug, however following extensive repetitive usage and the rewards associated with usage, drug using becomes autonomous and can be performed with little attention or cognitive effort, thus constituting a habit (Knowlton, 2015).

Psychoactive compounds like alcohol, opiates or psychostimulants alters the transmission of signals in the neural circuits of the brain due to changes in the emotional state of the drug – user, which is then reflected in the behaviour of the drug user. The actions of the drug may induce or suppress fear, anxiety, aggression, excitation, sedation, euphoria, dysphoria, etc. The opioid system is related to consummatory aspects of reward such as satisfaction, sedation and bliss (Ekhtiari & Paulus, 2016). Therefore, there is a positive correlation between the emotional effect of the events surrounding drug usage and the effects of learning. A repeated stimulus can also be remembered independent of its context, even if the new stimulus differs slightly to the previous one (Volkow et al., 2012), thus placing an individual at high risk for relapse. The neurobiological effects of drug usage and the accompanying psychological and behavioural consequences between a drug - naïve and a drug experienced person may differ due to the repeated pharmacological actions of a drug or due to the learning process that accompanies drug usage (Mohamed Ahmadi et al., 2016).

A summary of the neurobiological effects of drug usage are as follows:

- a) The pharmacological actions of a drug and the adaptation process of brain signal transmission brings on long lasting changes in the mental and behavioural state of the drug user and their response to drug usage (tolerance or sensitization).
- b) Based on the learning process, the user learns the effects of the drug and associates using a drug or a pattern of several administrations with positive changes in emotional and motivational functioning and expects a similar outcome with repeated usage.

- c) The user learns to use the drug in a way that he finds pleasure or relief from drug use. Learning occurs by means of “operant conditioning”, where the desire or need to change their current emotional state into a preferred emotional state is associated with drug usage (Huston et al., 2013).
- d) The user is then controlled by a compulsive urge for the drug, where drug seeking and drug usage is not just due to “enjoying the drug”, but due to an irresistible “craving for the drug”. This process which is termed “memory of addiction” can outlast long periods of abstinence and sometimes appears to be inextinguishable (Torregrossa & Taylor, 2016).

3.3.3 Mechanisms involved in learning the Addictive Behaviour

The development and presentation of human behaviour is associated with specific cerebral regions which play a fundamental role in the development of addictions. There is sufficient evidence that an addiction involves an individualised specific imprinting process which allows for controlled drug usage to become uncontrollable dependent usage (Torregrossa & Taylor, 2016). The reward system of the brain evaluates mental wellbeing by encoding positively reinforced experiences, which is based on the individual’s motivation as a result of drug induced changes to their mental state (Volkow & Morales, 2015). This fundamental system of regulating mood, drive and complex behaviours influences rudimentary functions such as: sensory perception, emotions, intellectual thinking, memory processes and learning. The reward system through the simultaneously learned processes of reinforcement and avoidance encourages every operation that is involved in enhancing wellbeing (Volkow et al., 2016), and is associated with exploring, motivating and activating behaviour, as well as creating and intensifying a drug user’s susceptibility to drugs. Direct reinforcement (e.g. the euphoric effects) and indirect reinforcement (e.g. avoidance of fear and stress relief) tends to complement each other (Karoly et al., 2013). This simultaneous process leads to significant disruptions in self-awareness which hampers an individual’s ability to notice internal mental states and emotions, which in turn impairs an addicted individual’s awareness of their condition, need for treatment, and their desire for the drug (Ekhtiari et al., 2016).

The neuroanatomical reward system comprises of four functional connected structures of the brain viz, medial prefrontal cortex, nucleus accumbens, lateral hypothalamus, ventral tegmentum (Belin et al., 2009). The reward system is influenced by a complex group of neurotransmitters viz; dopamine and serotonin, behaviour modulating neuropeptides (like the endogenous opioid beta – endorphin) and the glutamatergic NMDA receptor – system which are needed for molecular learning and memory processes (Volkow et al., 2012). The complex interactions of the connected pathways determine the individual’s potential to abuse a drug and their ability to develop a dependency on the drug (Muller, 2013). Addictive behaviour is due to the reinforcement of repetitive subjective experiences of wellbeing that provides relief, satisfaction or joy when using a drug, which in turn reinforces the need for the drug (Muller, 2013). This interaction process between the reward system and memory functions allows for accompanying emotions to be created by the entorhinal limbic allocortex (Volkow et al., 2012), and for the addiction related memory to develop as a result of the connections between the dopamine and endorphin connected pathways in the hippocampus.

Studies have demonstrated enhanced dopamine release in response to drug cues in heroin dependent patients (Bond & Witton, 2017). The reward system which is connected to structures of the basal frontal brain is responsible for psychomotor reactions (behavioural sensitisation) if the addictive substance is used repeatedly (Koob et al., 2014). The neuroanatomical structures responsible for psychomotor behaviour due to dopamine connected pathways of the midbrain and the resultant effect of an addictive behaviour can be viewed as the interface between motivation and activity (Ekhtiari & Paulus, 2016). Therefore, the sensitivity of the mesolimbic and mesocortical reward system can be viewed as the underlying basis for perpetuating an addiction (Paulus & Stewart, 2014). These connections and processes bring on long lasting changes in behaviour and motivation which in turn encourages loss of control, obsessive behaviour and a high rate of relapse due to the memory of addiction (Volkow et al., 2012).

3.3.4 Effects of Long Term Chronic or Intermittent Drug Administration

Long – term effects of drug use may either be due to the chronic presence of the drug at the synapses of the brain or to neural tissues having adapted to the presence or memories of

voluntary drug usage (Murphy et al., 2012). Chronic exposure to a psychoactive drug alters the acute effects of the drug of choice, as well as other related drugs by increasing the user's tolerance to the drugs (Karoly et al., 2013). The length and severity of drug use has a huge impact on addiction phenomenon such as "tolerance" and "withdrawal". Drugs can have different effects based on the dosage and latency after administration and can also result in bipolar actions of excitation and sedation, as well as selective tolerance to some of the effects. When neurotransmission systems and regulation circuits of drug using individuals adapt to the regular use of a drug, the need and craving for the drug starts to outlast the period of drug intake and the psychophysiological dependence is apparent even when drug usage is discontinued (Muller, 2013). A drug user may also continue to experience drug - specific symptoms when abstaining from a drug, which is referred to as "rebound effects" (Karoly et al., 2013). Rebound effects are the opposite of the acute action of the drug and may be related to the adaptive processes which result in tolerance and cross tolerance. Based on the above, drug addiction may be based on memory formation and voluntary and involuntary retrieval.

Wolffgramm et al. (2000) investigated rats that were subjected to either a free – choice or a forced - drug intake, followed by forced abstinence for several months, after which the drug was reintroduced based on conditions of free choice. The results of the investigation showed that both groups differed significantly in their drug intake behaviour, where the forced choice group consumed as much as it did before the abstinence period and was not affected by bitter tasting gall. This compulsive and uncontrollable drug using behaviour is in keeping with terms such as "persistence", "loss of reversibility" or "loss of extinction" and is indicative that an addicted person is at an extremely high risk of relapse even after long periods of sobriety (Torregrossa & Taylor, 2016). When an individual reaches this stage of usage, drug seeking and drug intake are no longer controlled via "liking the drug" but by an irresistible craving for the drug" (Karoly et al., 2013), and for persons in this state of addiction individual and social parameters, as well as social living conditions become less important (Ekhtiari & Paulus, 2016). The enhanced motivation to use a drug, which is a hallmark of addiction is well captured in Robinson and Berridge's (1993) "incentive salience" hypothesis of addiction. This hypothesis proposes that in an addictive state, drugs acquire enhanced incentive salience, where drugs are consumed not because they are liked but because they are wanted. In addicted persons, drug seeking and drug taking become the main motivational drive, as a result the

addicted person is aroused and motivated when seeking the drug and lacks motivation to pursue non-drug related activities (Volkow et al., 2012).

Wolffgramm et al. (2000), based on his study of rats stated that the transition from initial to controlled drug usage can be interpreted as a “sensitive period” of the imprinting process that determines future addictive behaviour. It is this stable imprinting that scientists have termed the memory of addiction, which in their view develops based on controlled drug usage. However, both a memory of drug effects and the experience of drug use must already be established and should include phenomenon such as a “compulsive urge for the drug” and “loss of control” in increasing drug intake or in posing challenges to abstaining from a drug (Barker & Taylor, 2014; Torregrossa & Taylor, 2016). A memory of drug use is similar to a memory of drug effects, where subjects must have learned the effects of a drug before it results in chronic use. Therefore, in chronic drug use the addiction memory is developed on the basis of controlled drug usage, where both a memory of drug effects and a memory of drug use must already be established, which is rarely extinguishable without some form of therapeutic intervention. The memory of drug effects is not only specific to the drug but also to factors surrounding the administration of a drug. The abovementioned could be the reason for the high rate of relapse following intermittent treatment at a rehabilitation facility, as mesolimbic and behavioural sensitisation is often context dependent within a treatment facility and not necessarily generalised to other environments and settings. Therefore, it is critical that future research on addiction and cue reactivity should be conducted in natural settings using ecologically valid triggers.

3.3.5 Addiction Memory and Cue Reactivity

Cue reactivity is a major trigger for relapse with research suggesting a strong association between cue reactivity and the compulsive use of a drug (Tiffany & Wray, 2012). According to learning theories, cues are seen as discriminate stimuli and conditioning processes may induce an emotional state and using behaviour (Ekhtiari & Paulus, 2016) that triggers the memory of addiction, which in turn results in “obsessive craving” or “compulsive behaviour”. Drugs do not just shape memories of active drug - effects but also of preceding events and behaviours (Muller, 2013). A study that compared the craving experiences of alcohol and drug

dependent patients to healthy controls by using new imagery techniques found that participants exposed to drug related stimuli demonstrated changes in psychophysiological phenomenon, skin conduction and brain activation as compared to the healthy control group (Schneider et al., 2001). This finding was further supported by a review of studies on cue reactivity where it was found that physiological changes associated with cue reactivity demonstrate a positive relationship between cues and drug use, and the episodic memory together with priming is also affected by cue reactivity and manifests as a memory of addiction (Jasinka et al., 2014).

Studies have shown that exposure to drug paraphernalia is influenced by the emotional state, coping ability and anxiety level of the drug user, providing evidence that drug usage is related to emotional dysregulation (Goodman & Packard, 2016). Neuroimaging studies have further demonstrated that stimuli or cues associated with a negative or positive emotional state in drug dependent patients correlates positively with drug urges (Courtney et al., 2015; Huhn et al., 2016a). The above studies demonstrated that the cues associated with drugs of abuse can become strong drivers of behaviour and contribute to the development of addiction. Therefore, identifying approaches that can reduce the strength of drug associated memories could aid with addiction treatment at multiple levels. One such approach that has become the focus of research is attentional training or attentional bias modification, where substance dependent persons are trained to down regulate their brain reactions to drug related stimuli (Cox et al., 2014). The general principle used in various types of attentional training programs is to help recovering persons improve their brain's inhibitory processes so that they can more easily disengage their attention from drug related environmental stimuli and emotionally salient stimuli to alternate (neutral) stimuli.

A good understanding of the relationship between the addiction memory and cue reactivity in the development of an addiction has been provided by the “incentive-sensitisation model” of addiction (Robbinson & Berridge, 1993), which suggests that previously neutral stimuli like the sight and smell of alcohol becomes tightly associated with reinforcing drug properties. These stimuli become stronger through repetitive associative learning processes and acquire the potential to evoke drug like or drug opposite responses. The incentive – sensitisation model further proposes that the mesolimbic dopaminergic system is the neural network system that increases cravings upon exposure to drug related stimuli. The brain regions that are most

commonly implicated in cue reactivity are the anterior cingulate cortex, the dorsolateral prefrontal cortex, the orbitofrontal cortex, the insula, nucleus accumbens, amygdala, thalamus and hippocampus (Karoly et al., 2013; Konova et al., 2013; Koob et al., 2014; Paulus & Stewart, 2014; Rezapour et al., 2015). Recent brain imaging studies on cue induced craving found that certain structures in the limbic system were activated in alcohol dependent (Karoly et al., 2013) and heroin dependent patients (Lou et al., 2012), concluding that neural activity during cue exposure can be a predictor of relapse following addiction treatment.

Cue induced drug use is often very strongly encoded and can be remote after years of abstinence. Several studies have indicated that remote or strongly encoded memories are harder to destabilise or reconsolidate than newer memories (Raybuck & Lattal, 2014), therefore established biographical memories may not be destabilised or disrupted with the dominant therapeutic interventions. Clinical phenomenon like “drug flashbacks” or “echo flush” as well as the sudden relapse of an abstinent addict may be due to the memory of addiction being activated by internal triggers and cues (Ekhtiari & Paulus, 2016). Cue reactivity has also been implicated in drug related experiences without a drug intake, in which the individual experiences restorative affective symptomatology and subjectively overwhelming urges in the absence of a drug, which threatens the sobriety of recovering persons (Edwards & Koob, 2012). Opiate addicts who have been sober for months or years can experience cue-induced reinstatement or what is commonly called an “addiction fit”, which is characterised by an irresistible urge for heroin on exposure to drug related cues (Koya et al., 2006). Based on the abovementioned, the successful treatment of addictive disorders may require an approach that addresses neurobiological changes to learning and memory systems that occur as part of the addictive process. Memories can be re-established, or new memories can be formed with re-exposure to drugs of abuse (Ekhtiari & Paulus, 2016), however based on the existing literature on the addiction memory, successful addiction treatment may require multiple intermittent memory manipulation sessions to maintain abstinence and to develop new memories over time. Therefore, developing and implementing a maintenance treatment plan is critical for the long-term success of memory-based therapies for addiction.

3.3.6 Summary of the Addiction Memory

The long-term usage of a drug forms deep seated alterations in the behavioural and neurobiological aspects of an addicted person, thereby affecting brain reward, motivation,

memory and related circuitry. The memory of drug effects involves associating drug usage with the accompanying stimuli or cues that result in psychotropic effects. Drug effects are anticipated in accordance to the drug related memory once the learning process is accomplished. The rewarding properties that are expected from drug usage leads to changes in cellular dopamine levels within the limbic system (Karoly et al., 2013), and results in a chronic search of the drug for reward and relief.

Advances in cognitive neuroscience has enriched our knowledge of brain functions and the understanding and treatment of substance use disorders. Addiction research and treatment modalities have predominantly focussed on behavioural outputs, such as abstinence and reducing high-risk behaviours with different therapeutic processes, however research in recent years suggests that this approach is not able to cover all the potentially important aspects of addiction treatments. Neurobiological processes and cognitive underpinnings of behaviour are important aspects that provide an understanding of the effects of drugs on the brain that affect learning and memory processes and suggests a need for an extended spectrum of interventions in the treatment of addictions. A complete understanding of the interaction of all these factors and their impact in developing risk and resilience to an addiction may help to prevent the cycle of addiction. Furthermore, the development of an integrative model of drug craving based on the accumulated knowledge can help to obtain greater success with craving management and relapse prevention. Future studies are needed to determine whether interventions based on the integrative models can be used to target important aspects of addiction treatment.

The addiction memory model has raised hopes for an evolution in the role of memory circuits in perpetuating a drug addiction, however the view that potential types of memories are involved in drug use remains incomplete and limited to the definition of addiction. Muller (2013) stated that there appears to be a conceptual gap between the concepts of addiction and the literature on brain mechanisms, as most of the evidence is derived from animal studies. These studies measure only single drug associated behaviours which were not established to the level of compulsiveness, and neglects looking at an addiction as a condition in totality. Therefore, conclusions on brain mechanisms might be based mainly on non - addicted drug use and only serve as a starting point for neuronal adaptations related to addiction.

3.4 CONCLUSION

The current study is rooted in models that provide an understanding of learning and memory processes that are associated with the development and maintenance of a drug addiction, more specifically the impact of these processes on cue-reactivity and cravings. Recent advances in addiction research and cognitive neuroscience have demonstrated that drug cravings are a neurocognitive, emotional response to a wide range of internal and external cues (Ekhtiari & Paulus, 2016; Hill-Bowen et al, 2020; Torregrossa & Taylor, 2016; Venegas & Ray, 2019). The two theoretical models adopted in the study viz, Eye Movement Desensitisation and Reprocessing Therapy (EMDR) model and the Addiction Memory concept provided the framework for this study. The preceding discussion on the Eye Movement Desensitisation and Reprocessing Therapy (EMDR) model, which focuses on the components, phases of therapy, the mechanics of action and the underlying biological and neurological processes provided an in - depth understanding of the therapeutic modality used in the study to desensitise and reprocess cravings. The Addiction Memory concept provided an understanding of the underlying neurobiological and cognitive processes operant in cue reactivity and cravings, as well as the mechanisms that encourage and perpetuate addictive behaviour.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

The aim of this investigation was to evaluate the impact of EMDR therapy on cue reactivity, utilizing a quasi - experimental mixed method design. This chapter will provide a detailed explanation of the processes involved in producing the data for investigation. The chapter outlines the objectives of the study and provides an explanation of the settings of the research study, research design, sampling, research instruments, procedures in collecting the data from the experimental and control groups, data collection and data analysis.

4.2 OBJECTIVES

The objectives of this study were:

- 1) To investigate the effects of EMDR therapy on cue reactivity using an experimental and control group.
- 2) To determine whether EMDR therapy impacts the psycho physiologic symptoms of the craving experience in the experimental group.
- 3) To determine whether rehabilitation programs that address cue reactivity be considered an integral part of recovery by program developers and rehabilitation facilities.

4.3 LOCATION OF THE STUDY

The study was conducted in the KwaZulu - Natal area. The rehabilitation facilities that were used in the study were community-based organisations that were based in the lower socio-economic regions of KwaZulu - Natal. The facilities used in the study have been created by religious organisation to address the shortage of rehabilitation facilities in economically disadvantaged communities and to provide some form of rehabilitation to individuals that are unable to afford the cost of rehabilitation. The researcher visited six Christian based rehabilitation facilities in the KwaZulu - Natal area and had decided to use two of the rehabilitation facilities that worked closely together and provided support to each other. The two rehabilitation centres used in the study, situated in the Durban Metropolitan area were matched based on their programme, facility, type of management and inpatient characteristics. They were similar in terms of the overall program offered, were more structured and had a file on each inpatient that contained important information such as background information and medical history, that was necessary for sampling purposes.

The treatment approach used by the rehabilitation facilities had incorporated aspects of the therapeutic community treatment model of recovery. The environment, as well as peer and staff role models who were also recovering addicts were an active component of the desired behaviour change process. The staff who were recovering addicts and had demonstrated commitment, concern and responsibility in maintaining sobriety for a period of 12 months, played a key role in managing inpatients and the rehabilitation process. The program at both these facilities advocated a drug free environment which incorporated a strong spiritual component for achieving behaviour change and sobriety. The length of stay in this facility ranged from six weeks to three months. Spirituality was an important feature of the rehabilitation model with chaplains and Christian based religious teachings playing a salient role in treatment. The distinguishing feature of this type of programme is that it aims to assist patients with examining their value systems, and the change agent is a healthy value system based on morals and values.

In addition to the core spiritual component of the program, the only other aspect of the program that both the rehabilitation facilities included and strongly encouraged was participation in peer

driven self - help groups, such as Narcotics Anonymous and Alcoholics Anonymous. Weekly participation in the Narcotics Anonymous program which was conducted at the rehabilitation facilities focussed on understanding and incorporating the 12 - step programme into their recovery and lifestyle. Therefore, it was an added advantage using these facilities as the literature on the use of EMDR therapy for addictions strongly advocates that it is best implemented in a supportive environment, and as an adjunct to traditional addiction treatment approaches such as group therapy, Alcoholics Anonymous and Narcotics Anonymous (Abel & O'Brien, 2010). Apart from the inclusion of religious based and spiritual components and the 12-step Narcotics Anonymous program, inpatients did not receive any further individualised or group therapeutic or supportive interventions. The two facilities maintained an “open - door” policy for admission, however inpatients that were unable to meet the demands of the programme viz; not follow daily routine, deal with cravings and withdrawals without medication, and who negatively impacted on the programme and other patients were removed from the treatment facility.

4.4 RESEARCH METHOD

A clearly defined research method guides the researcher in collecting and organising the data for evaluation (Palinkas et al., 2011). A good research method ensures that that data obtained will help to answer the research questions more effectively and includes the research design, sampling strategies, research instruments used to collect the data, procedures for collecting and organising the data, as well as criteria for quality assurance.

4.4.1 Research Design

The study was a small exploratory intervention that was designed to assess the feasibility and to evaluate the impact of EMDR therapy on participants' cravings for Sugars and to determine whether EMDR therapy should form an integral part of addiction treatment programs. An evaluation research design using a mixed method approach was used to collect the relevant data and examine the effectiveness of the therapeutic interventions used in the study. Evaluation research is used to determine whether an intervention has produced an intended result and to provide evidence for the effectiveness of an intervention under review (Tashakkori & Teddie, 2009). In this study, evaluation research was used to determine whether EMDR

therapy and relaxation training were able to impact on participant cravings, thereby providing evidence for the effectiveness of these modalities in craving management and addiction treatment. Mixed method designs are preferred in implementation research because they provide a better understanding of the research issue than qualitative and quantitative approaches alone (Palinkas et al., 2011). The benefits of using a mixed method design in evaluating therapeutic modalities has been further supported by Gaston and Marmar (1989) in a time-series study of therapeutic change, who concluded that both quantitative and qualitative knowledge are essential for the understanding of the change process in psychotherapy. Therefore, in this study, quantitative measures were used to evaluate the effectiveness and outcome of implementing EMDR therapy and relaxation therapy to the sample population, and qualitative measures were used to evaluate participant's experiences of the EMDR therapy process.

The type of mixed method design used in this study is a sequential explanatory design where quantitative and qualitative data were collected sequentially, with priority given to the quantitative data and the integration of data carried out in the discussion phase. The advantages of using a mixed method research approach as outlined by Hanson et al. (2005) was considered as it enabled the researcher to address a range of confirmatory and exploratory questions using both quantitative and qualitative approaches in a practical and ethical manner, created an opportunity for participants to describe their therapeutic experience, and provided better and stronger inferences from the data collected as they were implemented in a real-world setting, thus having stronger external validity. The researcher also took into account the disadvantages of mixed method designs as outlined by Tashakkori and Teddie (2009), where the design has been critiqued as being complex and requiring an understanding of both quantitative and qualitative methods, time consuming because they involve multiple stages of data collection over long periods of time of which priority is often given to one form of data over the other, and that conclusions about causality are less definitive than randomized experiments due to reduced internal validity.

In order to thoroughly evaluate the impact of the therapeutic interventions under review, an additional research design was used to approach the research questions viz, quasi-experimental research design. The quasi-experimental research design, a variation of the classical

experimental design was considered as it could be applied to the research setting and provided an opportunity to maximize the collection of relevant data and to test for causal relationships. The type of design used in this study comprised of a non - random assignment of participants to the respective treatment conditions, a pre - test and a post-test using research instruments, and an experimental and control group. The independent variable (IV) in this study were the therapeutic interventions (viz, EMDR therapy administered to the experimental group and relaxation training administered to the control group), and the dependent variable (DV) was the variable that was monitored in the study, which was the participant's level of craving. The researcher used a non- random technique where a sample with similar characteristics was matched with the treatment group. This process allowed for the creation of similar groups for comparison purposes which was in keeping with the inclusion and exclusion criteria. The sample was drawn from an inpatient treatment facility on the basis that a population of individuals exposed to a standardised treatment program, over the same period of time and under similar conditions could minimise the extraneous variables that an outpatient facility could potentially introduce into the study. Quasi - experimental designs have been criticized for a lack of randomization, which increases the risk of bias and compromises the scientific validity of the study (Thompson & Panacek, 2006), however it was considered as the most valid design for this study taking into cognisance the research setting, ethical considerations and the nature of the independent variables used in the study.

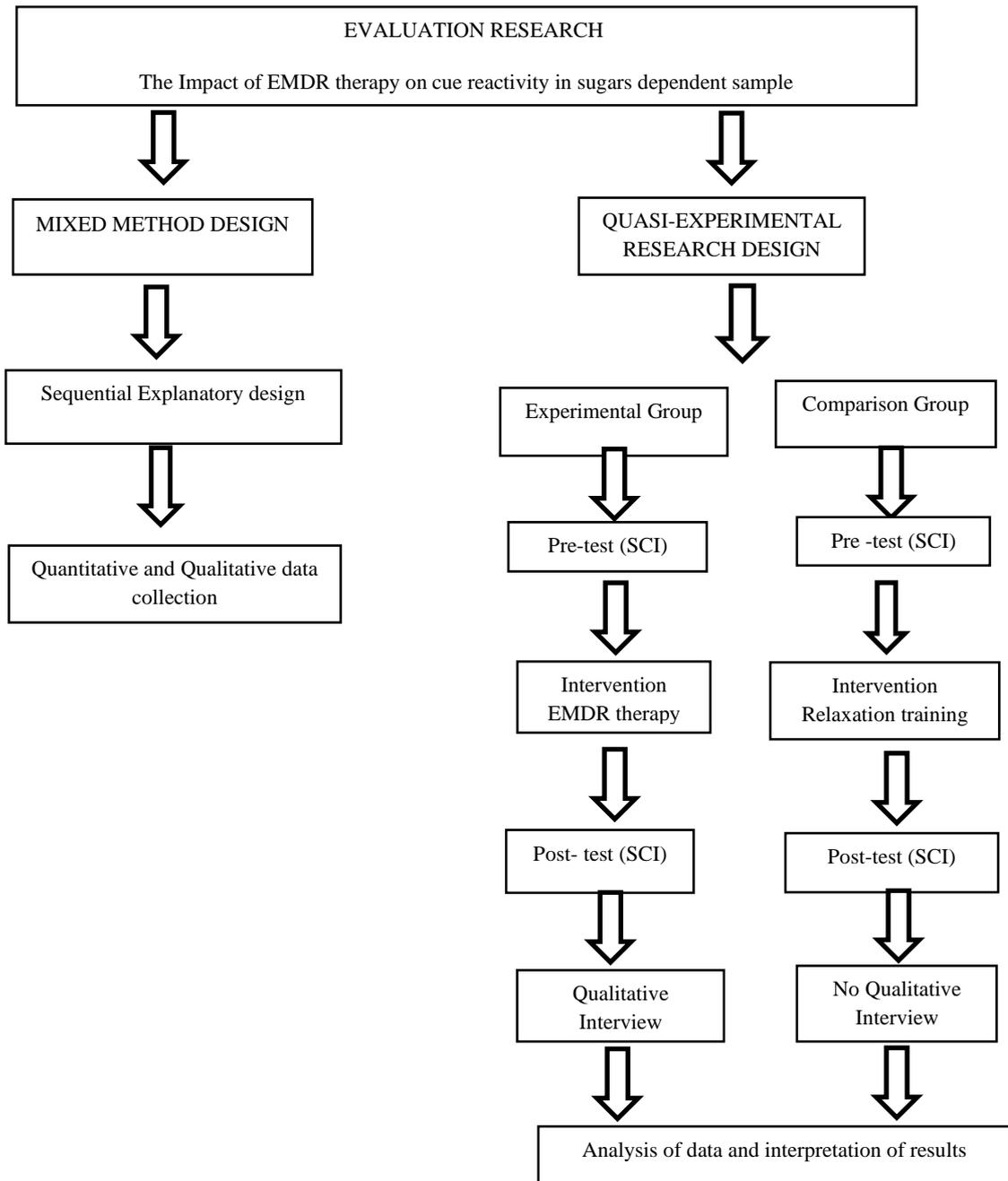


Figure 1 Flowchart of Research Design

4.4.2 Sampling

A non - probability sampling design was used but rather purposive experimental design with inclusion and exclusion criteria. Given that subjective methods were used to decide which elements were included in the study, the results may not be representative of the target population or generalisable. Despite the abovementioned limitations, a non-probability

sampling technique was chosen as it was consistent with the type, nature and purpose of the study. A purposive sampling design is used in achieving the aims of research, where cases are selected based on particular qualities that they fulfil in addressing a research problem (Etikan, Musa & Alkassim, 2016). Criterion sampling in which cases were required to meet established criteria (Palinkas et al., 2015), were incorporated into the sampling design of the research, as participants were selected based on the inclusion and exclusion criteria.

Eight community rehabilitation facilities in the Durban Metropolitan area were approached to participate in the study, however most of these facilities were reluctant to engage in a study of this nature. The decision to include the two community based rehabilitation facilities in this study was partly based on the willingness of these rehabilitation facilities to participate in the study. Furthermore, both the facilities were suitably matched in terms of in patient characteristics and program. Participants were mainly from the lower socio - economic strata as the rehabilitation facilities were community-based organizations, catering mainly for persons that were unable to afford rehabilitation costs. The participants in the study were recruited two to three days post admission and were still presenting with withdrawal and craving symptoms, allowing for the experimental and control groups to be similar in terms of assessed level of recovery from their Sugars addiction. The supervisors at both facilities provided a list of inpatients that were admitted on a fourth nightly basis, and permission was obtained from the inpatients to peruse through their personal files to obtain their medical history and to determine whether Sugars was the primary drug of abuse. Thereafter, each inpatient was individually briefed by the researcher on the purpose and ethical controls of the study. Participants that agreed to participate in the study were then included only if they had met the inclusion criteria.

Participants had to fulfil the following criteria to be included in the research study:

- a) Sugars had to be the primary drug of dependence
- b) There should be no psychiatric diagnosis or current usage of psychotropic medication
- c) Participants had to be over 18 years of age

- d) Inpatients must not have a diagnosis of a severe medical condition such as epilepsy or heart conditions which can be aggravated by EMDR therapy
- e) Participants would have to be in the action stage of change
- f) Participants must not qualify for a diagnosis of severe trauma or PTSD at any point in their lives as the researcher was unable to provide extended support that is needed in complex trauma cases
- g) There must be some identification of their dependence or inability to abstain from sugars
- h) Participants must not be currently undergoing any other psychological treatment.

A total of 70 participants were identified to participate in the study. Participants in this study were sugar dependent inpatients seeking treatment in a religious based community rehabilitation centre that offered a combination of the 12-step programme with a Christian based religious program. The experimental group consisted of 35 male participants who completed the EMDR therapy assessment and two sessions of treatment and the comparison group comprised of 35 male participants who received two relaxation sessions.

4.4.3 Research Instruments

An important aspect of evaluation research is to determine whether the interventions used in the study have been able to produce desirable effects or not. The following three instruments were used in the study for the collection of data viz; Intake Interview Form which was developed by the researcher, Sugars Craving Inventory which was developed by the researcher to measure participant's level of craving pre and post intervention, the Subjective Units of Craving Scale which is an adaptation of the Subjective Units of Disturbance Scale that forms part of the EMDR treatment protocol and a qualitative semi-structured interview to determine participants experiences of EMDR therapy.

4.4.3.1 Intake Interview

The intake interview form was developed based on the literature on addiction and the researchers' experience of working with addicted persons. The intake interview form is a semi structured interview schedule that comprised of questions relating to participant's background

variables (refer to Appendix D). The experimental and control group were interviewed individually prior to any treatment being conducted. The interview schedule comprised of the following aspects:

- a) Demographic Profile (biographical details, marital status, educational history, employment history)
- b) Substance use history (symptom presentation, triggers for usage, previous treatment, relapse history, challenges to efforts of sobriety, fears relating to future dangers, genetic history).
- c) Mental status.
- d) Trauma history.
- e) Treatment goals.

The interviewer recorded the responses in writing on the interview schedule which were analysed as frequencies. The intake interview schedule provided a useful measure in understanding the socio demographic characteristics and the addictive profiles of both the experimental and control group participants.

4.4.3.2 Sugars Craving Inventory

Craving is an important theoretical construct in the dependency literature that influences an individual's pattern of use and treatment outcomes (Alim et al., 2017) and plays an important role in addiction research (Tiffany & Wray, 2012). It has also been considered a cue element to take into account when developing and testing the efficacy of treatments on substance use disorders (Rojewski et al., 2015). The measures most commonly used for assessing craving in clinical settings are single item questionnaires, behavioural measures (e.g., amount of alcohol consumed) and psychophysiological measures (e.g., changes in salivation, heart rate). Drug craving scales in the current literature are limited in both their scope and conceptual development, where it has been found that dimensions of craving may be more general rather than substance specific (Mazza, 2014). Taking the above into consideration, a scale was developed to measure cravings for the heroin- based drug that the participants were addicted to. In the present study it was not suitable to measure cravings for sugars using a single item instrument or under laboratory conditions, therefore a multi item instrument called the Sugars

Craving Inventory (SCI) was developed with specific emphasis on the cognitive, emotional and physiological mechanisms involved in craving for the heroin - based drug.

The SCI was developed based on the existing literature on Heroin, the researcher's experience with sugars addiction and by referring to published scales that measure anxiety viz, Burns Anxiety inventory, Jungs Anxiety Inventory and Becks Anxiety Inventory. The structure of the Burns Anxiety Inventory was adopted in this scale, whereby symptoms were categorised into three domains. The SCI consist of 25 items, each rated on a 4 - point Likert scale, representing three domains viz, thoughts, feelings and physical sensations. The scale is a state measure which focuses on the patient's current (here and now) craving status. State measures are useful for assessing patient's craving experiences at specific points in time and in determining changes in craving over time (Nosen et al., 2012). To complete the SCI, subjects were provided with oral and written instructions to indicate their response to each item by marking a Likert - type scale, ranging from 0 (not at all) to 3 (a lot), according to their current experience of a craving. The scale has a scoring key with a maximum score of 75, in which scores between 0-5 reflect minimal or no craving and scores between 61-75 demonstrates extreme craving.

4.4.3.2.1 The Pilot Study of the SCI

In piloting and validating the SCI, the scale was administered to 100 sugar dependent persons who were in the early recovery phase. The sample consisted entirely of male participants, aged between 18 and 42 years. The sample used to pilot the scale were under residential treatment in their first week of recovery and were presenting with acute cravings for Sugars. The researcher held a meeting with participants to introduce and explain the nature, purpose and ethical controls of the pilot study. It was made clear to the participants that there were stringent measures in place to ensure confidentiality, participation was voluntary and that they could withdraw from the pilot study if they felt that they did not want to continue with the study. All participants provided written informed consent before being included in the study. Participants were asked to rate their current craving experience for Sugars, the responses of which were filled out by the research participants. The craving did not take place in the presence of physical drug related cues but during the recall of past craving experiences.

The utility of any craving instrument depends on its psychometric properties, specifically on whether the instrument reliably and validly measures the craving experience. An important aspect to reliability is the internal consistency of the scales. Internal consistency is when similar items on a test yield consistent response, which is useful in determining whether all the items in a scale are measuring the same underlying construct. A commonly used indicator of internal consistency is the Cronbachs alpha coefficient. The reliability estimates can range from 0 to 1.0, indicating the highest degree of reliability (Drobes & Thomas, 1999). Ideally, the Cronbachs alpha coefficient of a scale should be above 7 (DeVillis, 2003). Cronbachs alpha values are sensitive to the number of items on a scale, with shorter scales having lower Cronbach's values. In cases where scales consist of fewer items, it is more appropriate to report the mean inter-item correlation coefficient for the items of the scale. According to Briggs and Cheek (1986), a recommended optimal range for the inter item correlation lies between 0.2 and 0.4.

- a) **Feelings:** The Cronbach's Alpha value of the feeling scale which comprised of 4 items was 0.681. As mentioned above, a scale with good internal consistency should have an alpha coefficient above 7. The Cronbach's Alpha for this scale was below 8, which is indicative of poor internal consistency, however it must be taken into consideration that it is a short scale which constituted of only 4 items. For a scale with a small number of items (less than 10), it is difficult to get a Cronbach's alpha value above 7, therefore the mean inter item correlation should be taken into consideration. The mean inter item correlation for this scale is 0.35, with values ranging from 0.19 to 0.52. This suggests a good relationship among the items.

- b) **Thoughts:** On an item level, the item reliability of the thoughts scale which comprised of 6 items was 0.856. The Cronbach's Alpha demonstrated very good internal consistency although the scale comprised of only 6 items.

- c) **Physical Symptoms:** On an item level, the item reliability of the physical symptoms scale which comprised of 15 items was 0.916. The Cronbach's Alpha value demonstrated very good internal consistency.

The scale appears to be a practical scale, however certain items that were viewed as “difficult to understand” or “confusing” were omitted or reworded according to the way participants described their presentation e.g. “I feel anxious and worried” was changed to “I feel worried” and “I feel prickling sensations in my body” was changed to “I feel electric shocks in my body”. This questionnaire was found to be useful in providing information about the multiple elements that define a craving experience. The SCI has demonstrated satisfactory to high internal consistency for individual subscales and is therefore considered to be a reliable measure of cravings in a group of treatment seeking sugars users. However, further development and refinement of the SCI is necessary as the sample size was too small to test for any factor analysis of subscales and overall scales or to determine test-retest reliability, thereby reducing the statistical power of the questionnaire. Further validation with larger clinical and non-clinical populations will increase our understanding of the use of the SCI as a measure of Sugars cravings. Despite the abovementioned limitations, the SCI is an easy to administer and user friendly instrument that measures Sugars cravings from a multi-dimensional perspective.

4.4.3.3 Subjective Instruments

Assessing an individual’s level of subjective craving is an important element in therapy, specifically in relation to evaluating treatment processes and changes in cue reactivity. A simple check enables clinicians to anchor client’s self - rated discomfort at baseline, to monitor any change of their status, and to evaluate the progress of therapy (Wolpe, 1990). Based on this, behavioural therapist, Joseph Wolpe developed and introduced the Subjective Units of Disturbance Scale (SUDS) in 1969, sometimes referred to as the Subjective Units of Distress Scale. The one - item, 11- point Likert - type subjective anxiety scale, ranging from 0 to 10 has been used extensively in the field of behaviour treatment. Francine Shapiro, the founder of EMDR therapy incorporated the SUDS into the standard treatment protocol and used it to rate any emotional disturbance or negative feelings that were experienced. In EMDR therapy, the SUDS is used to measure the level of distress before and after target memory processing, where the therapist checks the initial SUDS score of the target memory in the assessment phase and then rechecks at the end of the desensitisation phase to evaluate changes.

For the purposes of this study, the Subjective Units of Craving scale (SUC), which was adapted from the subjective units of disturbance scale of the standardised EMDR therapy protocol was used to determine participant's subjective drug cravings. The SUC is a single item instrument which ranges from 0 to 10, which participants used to report their level of subjective craving. The instrument included the question "How strong is your craving for sugars now on a scale of 0 to 10, where 0 is no craving and 10 is the highest level of craving?" The participant rated their craving by selecting the most appropriate choice on the 10-point scale by creating a vertical mark along the line that connected the 2 anchor statements (refer to appendix H). With the visual analogue scale, the distance between the "no craving" end of the line and the patient's mark served as an index of their craving. The SUC was used at three points viz: the assessment phase, the beginning of the second desensitisation phase and at the end of each reprocessing stage. The SUC was not just used as a quantitative index of progress but also as a valuable source of information of the shifts during reprocessing.

4.4.3.4 Clinical interviews with Experimental group

To determine participant's subjective experience of EMDR therapy, a semi-structured qualitative interview schedule was used in the study (refer to Appendix F). The experimental group who received two sessions of EMDR therapy were individually interviewed a month after receiving the two EMDR therapy sessions using the qualitative interview schedule. A semi structured format was used as the researcher chose to limit qualitative probing due to sample characteristics that were considered to negatively impact on the quality of the feedback, as discussed in Chapter 7. The interview schedule comprised of four sets of questions. The issues that were explored in the qualitative interview which are based on four sets of questions were as follows:

- f) Psychophysiological changes experienced on receiving EMDR therapy
- g) Therapeutic safety which focussed on levels of comfort, nature of discomfort and disturbing issues that surfaced during EMDR therapy.
- h) Participant's capacity to withstand a craving following EMDR therapy, nature of improvements and changes in craving disturbance and their perception on needing sugars to cope.
- i) Participant's perception on the use of EMDR therapy in craving management.

The interviewer recorded the responses in writing on the interview schedule which were then collated and analysed thematically to determine participant's experiences of EMDR therapy. The interview schedule provided a useful measure in understanding the experimental group participants' subjective experience of EMDR therapy and their perceptions regarding the efficacy of EMDR therapy in managing cravings. However, for future use and based on the characteristics of a sample, interview questions could be extended, and the interview schedule could be revised to allow for further probing.

4.4.4 Procedures and Data Collection

Data gathering is crucial in research as the data is meant to contribute to a better understanding of the research questions. Sugars dependent male inpatients that were admitted to the two rehabilitation programmes were recruited into the study from January 2014 to December 2014. The research was conducted over a lengthy period of 12 months as the process of recruiting eligible participants, in-depth intake interviews and the administration of the treatment interventions and data collection procedures, which were conducted by the researcher proved to be time consuming. The researcher obtained approval by the University ethics committee (HSS/1300/012D), as well as permission from the management and board of directors of both treatment facilities. The researcher worked closely with the supervisors who were recovering addicts in the advanced stages of recovery, who assisted in structuring the recruiting process and preparing the participants for the initial meeting with the interviewer. The supervisors compiled a list of new admissions in both facilities on a fourth nightly basis and informed the newly admitted inpatients that they will be attending an information session with the researcher. A consulting room away from the daily activities was made available by the management of the rehabilitation facilities to conduct information sessions, interviews, and the interventions.

Meetings were held with inpatients on a weekly basis to allow for the researcher to introduce herself and to explain the nature and ethical controls of the study. Participants were informed about the aims and purpose of the study, that participation in the study was voluntary and that they could withdraw from the study at any time should they feel the need to do so. They were

informed of the confidential nature of the study including the fact that staff from the treatment facility would not be involved in the process and that identifying details and raw data will always be under the control of the researcher. The experimental group were informed that the research is concerned with the impact of EMDR therapy on cravings and its effect on the recovery process, and a detailed explanation was provided so that they would have a thorough understanding of the process. The control group was informed that they would be receiving an intervention comprising of a relaxation session.

Following acceptance to participate in the study, all participants had undergone an initial interview to determine suitability to participate in the study in relation to the inclusion criteria, as well as to provide informed consent in the form of written permission. Based on the inclusion criteria, eighty-six participants in total were recruited over twelve months. Forty-three participants recruited from one of the rehabilitation facilities formed part of the experimental group that received two sessions of EMDR therapy in the early treatment phase. The remaining forty-three participants that resided at the alternate rehabilitation facility comprised of the control group and received two sessions of relaxation training. Eighty-six participants were initially recruited into the study based on the inclusion criteria and had undergone the intake interview, however the data of only seventy participants were included in the study. Sixteen participants were excluded from the study as the data collected could not be used in the study due to the following reasons:

- a) Ten participants exited the rehabilitation programme due to non-compliance and three participants left prematurely due to ill health, which prevented them from completing the therapeutic sessions or the feedback interview.
- b) One participant was excluded from the study based on the exclusion criteria that participants that have experienced severe trauma were not included in the study. Although participants were screened for trauma and were included in the study on the basis that they did not experience any trauma, traumatic issues emerged in the desensitisation phase, which warranted exclusion from the research process. This participant continued with EMDR therapy sessions to ensure that the emerging trauma was reprocessed and that participants were not placed at risk, however the data that was obtained from the participant was not used in the study.

- c) One participant underwent the two EMDR therapy sessions, but no processing seemed to have occurred and the participant was unable to provide any feedback when asked “what are you noticing?”, as a result the data could not be used in the study.
- d) In the reprocessing phase, one participant indicated that they were forcefully admitted to the programme by their families and were not ready to stop using sugars, which they did not reveal during the intake interview. The data obtained from this participant was not used in the study as participants had to be in the action stage of change in their recovery.

The EMDR therapy sessions were administered by the researcher who is a psychologist registered with the Health Professions Council of South Africa, who works as a Principal Psychologist at the South African Police Service and is a trained EMDR therapy practitioner. In ensuring fidelity of the EMDR treatment process, the researcher had to fulfil the following criteria: the researcher was an accredited EMDR therapy practitioner who has undergone the full accredited EMDR therapy training by Rehana Seedat in South Africa, to adhere to the EMDR therapy protocol and to have detailed written records of the sessions. The relaxation session for the control group was also administered by the researcher. The relaxation session entailed the use of a popular relaxation script called “Ego Strengthening”, written by D. C. Hammond (appendix I). The relaxation script focussed on guided imagery, where the participants were guided into generating mental images and feelings that evoked a state of relaxation.

4.4.4.1 Experimental Group Processes

Session one (Initial Consultation)

Each participant had an initial consultation of up to 60 minutes. The aim of the initial consultation was to explain the study, determine suitability of participants in terms of inclusion and exclusion criteria, to obtain biographical information, patient’s substance use history, trauma history and treatment goals. The EMDR therapy model was explained in detail and participants were introduced to the bilateral stimulation as an important procedural element in

processing. They were familiarised with the Tac/Audio scan unit, which is a device that has been designed to assist clinicians in the administration of EMDR therapy. Tactile pulsers were used to create the bilateral stimulation, and the speed and intensity controls were adjusted in accordance with the desired levels. The choice of tactile stimulators as opposed to eye movements was based on the researchers concern that sugars dependent persons in early recovery may have difficulty tracking fast moving fingers. The tactile stimulators were also seen as a less threatening way of introducing the bilateral stimulation, where participants were asked to close their eyes and focus on the pulsating effects of the stimulators.

Participants were then introduced to a stabilisation technique called the “safe place exercise”, which is in line with the EMDR therapy protocol and can only be administered if a person has the ability to soothe themselves (Shapiro, 2018). The participant was asked to bring to mind an image of a safe place that creates feelings of peace, calmness and well-being, which could be a spiritual place or a park. The participant was then asked to think of a cue word for the image, which allowed for the participant to recall the pleasant image and helped to induce a feeling of calmness. The researcher repeated the exercise if the participant was unable to focus on the safe place exercise and participants were excluded from the study after a few unsuccessful attempts. Research participants were requested to practice the safe place exercise in the morning and evening, or when experiencing any physical or emotional distress. The initial consultation therefore covered a thorough in-depth explanation of EMDR therapy, introduction to bilateral stimulation, addressing fears and the stabilisation technique.

Session two

The researcher inquired about the use of the “safe place” exercise at the beginning of the second session to determine whether participants were able to recall the exercise and the effects of the technique. Participants were then asked to complete the Sugars Craving Inventory (appendix F), which was an untimed instrument that provided an index of their current subjective craving experience. The researcher was always present, even whilst participants were completing the self-report questionnaire. The EMDR therapy model of treatment was once again explained and the metaphor used to understand and conceptualise the process was the “train metaphor”, where the participants were told that the disturbing experience should be seen as the scenery

passing by, which they are noticing from a moving train. Participants were also reminded that if they were unable to cope with the distress that they were experiencing whilst reprocessing, they could stop the process by using hand signals reflective of a stop sign.

Thereafter, the assessment phase was conducted in which the clients craving experience was assessed, so that the information can be used for the “desensitisation of craving” protocol. Participants were asked “when you think of sugars, what happens to you?” They were then asked to focus on the occurrence more intensely and rate their craving on a scale of 0 to 10, where 0 was no craving and 10 was the most severe craving. Once the target was identified, the client had to identify an associated negative cognition which was expected to be a presently held belief related to their craving experience. To facilitate this process, the client was presented with a list of addiction specific beliefs (appendix G), that were adapted from a book called EMDR made simple (Marich, 2011, p.230). The list comprised of a negative cognition which is a negative, irrational self - referencing belief that begins with an “I” statement, and a corresponding positive belief. After establishing an appropriate negative cognition, the client was asked to state a corresponding positive cognition. Participants were also presented with a list of positive cognitions to choose from, which were the participant’s desired positive cognition and what they would prefer to believe regarding their ability to overcome a craving. The positive cognition needed to resonate with the accompanying negative cognition e.g. “I cannot cope without drugs” resonates with “I can cope without drugs”. On choosing the positive cognition, the validity of the cognition (VOC) was established, where participants were asked to rate the strength of the positive cognition on a scale of 1 to 7, where 1 was completely false and 7 was completely true. The last part of the assessment focussed on identifying body sensations, which were bodily disturbances that were experienced when participants focussed on the target image and negative cognition.

Following the assessment, participants were again given instructions regarding the process and what was to be expected. Thereafter, the desensitisation process was carried out in which the participants were expected to focus on the target image and negative cognition, whilst being exposed to the bilateral stimulation. The instruction given by the researcher to the participant was to bring the craving experience to mind together with the associated negative cognition and to notice where they felt it in the body, whilst following the tactile sensors. A set of

movements consisted of 20 sets of bilateral stimulation lasting for about 30 seconds. The researcher paid careful attention to the participants facial expressions, body movements and emerging reactions to determine whether they were congruent with their verbal feedback. At the end of each set of bilateral stimulation, the researcher would ask the participants to provide feedback as to what they had noticed during the set and would record it in writing. During the processing, the researcher made notes of shifts, which included changes in thought, content, emotions, and body sensations, as well as looping thoughts and feelings. The participants would report what they noticed and based on what they noticed at the end of each set of bilateral stimulation, the researcher continued with the flow of processing by simply saying “go with that” and continuing with sets of bilateral stimulation.

The associative chain of memories and responses were worked with until the end of a channel of information had been reached, or when participants would state that they were not getting anything or unable to process anymore. If the subjective unit of craving was not rated as a zero, the researcher would go back to the target image and start processing again. Bilateral stimulation continued until the SUC came down to a zero, or when the participant was able to cope or reach an ecological resolution. If the participant reached a preferred ecological resolution with the level of craving being higher than 0, they were asked to outline factors or conditions that prevented the SUC from becoming a 0. The first session was concluded when the participant’s SUC was a 0 or the craving experience no longer seemed disturbing, although the SUC was not a 0. At the end of the first session of EMDR therapy, participants were debriefed and informed that they could continue with processing after the EMDR therapy session. They were told that they could possibly experience flashbacks of drug use, intense cravings, intense using dreams and strong emotions for a few days afterwards. Participants were encouraged to use the safe place exercise to rid themselves of any disturbance that they may continue experiencing, and to keep a log of disturbing thoughts, feelings and emotions.

Session three

The second session of EMDR therapy processing was carried out after two days. The participant’s level of craving was assessed at the beginning of the second session on a scale of 0 to 10, where 0 is no craving and 10 is the highest craving experienced. They were engaged

regarding any disturbances that they may have experienced after the first session. Thereafter, processing continued based on the participant's responses until the SUC was 0 and associative channels were reprocessed.

Once the reprocessing was completed, the researcher continued with the installation of the positive cognition until the validity of cognition scale (VOC) was 7. Once the positive cognition had been installed, the participant was asked to close their eyes and do a body scan to determine whether they were experiencing any tension, tightness, or unusual body sensations. If the participants reported uncomfortable sensations, the therapist would continue with sets of bilateral stimulation until there were no more disturbing body sensations. The participants were once again debriefed about the possible continuing effects of EMDR therapy on completion of the session, where they could still experience some form of processing in the form of new thoughts, memories and unusual sensations, and they were encouraged to use the safe place exercise to let go of any disturbance. Participants were encouraged to inform their supervisors if they continued to experience or cope with any disturbances so that the researcher could be informed and immediately provide the necessary support. On completion of the process, the Sugars Craving Inventory was once again administered to determine the participant's subjective level of craving.

4.4.4.2 Control Group Processes

Session one

Each participant received an initial consultation of up to 60 minutes. The purpose of the initial consultation was to explain the purposes of the study, determine suitability of participants in terms of inclusion and exclusion criteria, to obtain biographical information, patient's substance use history, trauma history and clients treatment goals. The participants were then informed that they would be receiving a relaxation session which will last for about ten minutes. Participants completed the sugars craving inventory before the relaxation session. The control group was exposed to a relaxation session and the script used in the study was Ego Strengthening by D.C. Hammond (appendix I). The guided imagery served as a stabilisation technique, where the sensorial based coping skill allowed for the participants to create a safe

place in their minds by bringing up the imagery of chapels and natural scenery such as: seaside, waterfalls and parks. The sessions took place in a relaxed, comfortable and quiet setting away from the activities and peers in the rehabilitation facility. On completion of the relaxation session, participants were encouraged to make use of the relaxation method when experiencing any disturbances related to their craving experience.

Session two

The researcher inquired about the usefulness of the relaxation session at the beginning of the second session, as well as the participant's ability and difficulties experienced in recreating the feelings of relaxation. The relaxation session was repeated in the second session. Thereafter, the Sugars Craving Inventory was administered to obtain an objective rating of the participant's craving experience.

4.5 DATA COLLECTION

The Sugars Craving Inventory, that was used to measure constructs related to a craving were administered to both the experimental and comparison group at assigned times before and after intervention. Thereafter, an in - group analysis was conducted on experimental group participants a month after administering EMDR therapy using semi structured interviews to ascertain participant's perceptions of the EMDR therapy experience and its effect on cue reactivity. Participants were interviewed individually after a one month follow up period using an interactive format, which was useful in engaging respondents and allowing them to reflect and provide an account of their EMDR therapy experience. A brief interview was conducted at similar intervals with participants who had not received EMDR therapy, to ascertain how they coped with cue reactivity through their recovery process, without any EMDR therapy intervention.

4.6 DATA ANALYSIS

The primary aim of the analysis was to determine whether EMDR therapy in the experimental group was successful in reducing or reprocessing cravings, therefore the relationship between

factors relating to cue reactivity and successful recovery were explored. The measurements that were analysed were:

- The demographic characteristics of the sample, as well as the biographical and intake data.
- Sugars Craving Inventory - The first measurement was taken before the administration of the therapeutic interventions and the second measurement was taken on completion of the therapeutic interventions in the experimental and control groups.
- The responses from the qualitative interview to determine participants' experience of EMDR therapy.

4.6.1 Data Quality Assurance Process

Shapiro (2018) stated that the evaluation of therapeutic procedures should adhere to the highest standards of controlled clinical research and advocated that researchers adhere to the Revised Gold Standard Scale (RGS) for the planning and evaluation of research. The RGS which comprises of the seven “gold standards” for research design by Foa and Meadows (1997) and three additional standards identified by Maxfield and Hyer (2002) delineates the following criteria for methodological rigor:

- 1) *Clearly defined target symptoms, so that appropriate measures can be employed to assess improvements, which specified inclusion and exclusion criteria.* The episodic addiction specific memory associated with sugars usage was targeted in the study. The study also used specific inclusion and exclusion criteria. The research study met this criterion as participants were sugars dependant inpatients who did not have a psychiatric diagnosis and were similar in terms of assessed level of recovery.
- 2) *Reliable and valid measures with good psychometric properties.* To ensure methodological rigor, measures with good psychometric properties should be used to evaluate changes in treatment. The psychometric tools used to evaluate the intervention were appropriate for the sample. The SCI inventory which was developed for the purposes of this research has demonstrated satisfactory to high internal consistency for individual

subscales and was found to be a reliable measure of craving in a group of treatment seeking sugars users. The SUC scale, which is an adaptation of the SUD scale and is part of the standard treatment protocol of EMDR therapy was used to evaluate participants level of subjective craving before and after EMDR therapy.

- 3) *Use of blind evaluators, other than the treatment provider to collect assessment measures and minimise the influence of bias.* This study did not have blind evaluators due to the exorbitant cost involved in employing blind evaluators. To minimise the influence of bias, the SCI which is an untimed self-reporting instrument was used to report the symptom presentation pre and post intervention.
- 4) *“Assessor training”, with demonstrated interrater reliability.* The assessor who was also the researcher ensured the standardised administration of the research instruments throughout the study.
- 5) *Manualised, replicable, specific treatment programs to ensure consistent and replicable treatment delivery.* In this study, the standardised EMDR protocol was used, which is accredited by the EMDR institute in USA. Furthermore, the researcher kept detailed written records of the procedures of each session and the instruments that were used for data collection.
- 6) *Unbiased assignment to treatment, either random assignment to conditions or stratified sampling, with treatment deliverance by at least two therapists.* Despite randomization being the “gold standard” in causal study design, it was not possible to randomize individuals to experimental conditions based on the nature of the study. Therefore, purposive and criterion sampling were implemented, and treatment was compared to a non-treatment comparison group. Due to the lack of resources, the researcher was the only therapist that conducted the EMDR therapy sessions and relaxation training.
- 7) *Treatment adherence evaluated by treatment fidelity ratings.* It was difficult to ensure fidelity checks and to ensure that the standard protocol was adhered to due to a lack of resources. Therefore, the sessions were not validated by external assessors.

- 8) *No concurrent treatment to ensure that treatment conditions is not unfounded.* In this study, participants did not undergo any other psychological treatment and were not being managed on any psychotropic medication.
- 9) *Use of multimodal measures to assess a wide range of outcome with interview, behavioural and physiological measures is found to be more accurate than self-reporting instruments alone.* A mixed method design using quantitative and qualitative data collection instruments were used in this study that allowed for a wealth of information to be collected.
- 10) *Adequate course of treatment to ensure that participants receive the number of sessions necessary to eliminate the disorder in most persons.* In this study, sufficient treatment was given to participants to reduce the subjective unit of craving to zero.

An evaluation of this study against the Revised Gold Standard Scale demonstrated that the research partially or fully fulfilled most of the stated criteria. Due to financial constraints, the research did not fulfil two of the criteria viz, fidelity checks and assessor reliability.

4.6.2 Quantitative Data Analysis

The data was analysed using the SPSS statistical package for windows which is useful in determining statistically significant relationships between variables. Chi squares were conducted to determine statistically significant differences between groups. Recoding was done to improve response categories, however no significant differences were found in terms of demographic variables and some cells were found to have low response rates. As noted in the frequencies, similar patterns had emerged in the frequencies, thus leading to Chi square tests being invalid due to the low response rate. Upon inspection, missing values were random and not a systematic pattern.

Univariate analysis was done on the demographic characteristics of the sample and the biographical and intake data was analysed by establishing frequencies and percentages of responses. A comparison of pre and post treatment scores of specific psychological measures were used to determine whether there was a decline in craving and improvement in the overall functioning of the experimental and control group, or whether the experimental and control group differed with regard to their responses on the craving scale. Non - parametric statistical techniques were used based on the skewness of the data, which is commonly found in social sciences research and is often the nature of clinical data. Non - parametric statistical techniques were also used as the sample sizes were small. The Mann - Whitney U Test was used to test for differences in cravings between the experimental and control group after receiving EMDR therapy and relaxation therapy respectively. The Wilcoxon Signed Rank Test was used to determine the changes in both the experimental and control groups at two different intervals (pre and post intervention).

4.6.3 Qualitative Data Analysis

Data obtained from the interviews and clinical observations were analysed using thematic content analysis, which is applicable to small data-sets. Braun & Clarke (2006, 2013) stated that this method is about reducing words to concepts that have meaning to the phenomenon under study, which is presented in the form of psychologically recognisable themes. This approach serves as a flexible and useful research tool that provides a rich, detailed and complex account of the data collected, and an understanding of the experimental group's therapeutic experience in relation to their addiction and life stories. Braun & Clarke (2006) distinguished between two levels of themes viz, semantic and latent. Semantic themes focus on the explicit and surface meanings of the data and latent themes identify and examine underlying ideas, assumptions and conceptualisations that shape or inform the content of the data. In this study, semantic themes were focussed on and the contextualist method, which is a combination of essentialism and constructionalism. The contextualist method acknowledges the way in which individuals make meaning of their experiences, and the ways in which the broader social context impinges on these meanings in reflecting the participant's therapeutic journey.

In analysing the qualitative data, the researcher adhered to Braun & Clarke's (2006) linear model which was useful in outlining the six phases of thematic analysis.

- 1) *Familiarisation with the data* involves reading the data several times so that the researcher could familiarise herself with the data and make notes of any initial analytic observations.
- 2) *Coding* involves generating labels for important features that are relevant to the research question, thereby capturing semantic and conceptual aspects of the data. All data items were coded and then collated in this phase.
- 3) *Searching for themes* involves looking for coherent and meaningful patterns in the data that were relevant to the research question. In this phase, themes were constructed by the researcher who collated all the coded data relevant to each theme.
- 4) *Reviewing themes* involved checking whether the themes were appropriate to the coded extracts and the full data-set. In this phase, the researcher had to determine whether the themes are a convincing and a compelling reflection of the data, and the nature and relationship of the themes were defined.
- 5) *Defining and naming themes* involves an in-depth analysis of each theme, which identified the essence of each theme and allowed for choosing an informative name for each theme.
- 6) *Writing up* involves putting together the data extracts and the analytic narrative. It is an integral process as it provides the reader with a coherent and persuasive story of the data in relation to the existing literature.

The six steps outlined above provided a useful framework and guidance on the practical aspects of thematic analysis.

4.7 VALIDITY, RELIABILITY and RIGOUR

In this study, the researcher employed many strategies to ensure the credibility and trustworthiness of both quantitative and qualitative aspects of the study. Garg (2016) stated that the reliability and validity of a study depends on a well-designed study with objective, reliable, repeatable methodology, as well as data collection and analysis with logical interpretation. In terms of ensuring reliability from a quantitative perspective, the Sugars Craving Inventory (SCI) was developed to determine whether the therapeutic interventions were able to produce desirable effects or not. The SCI was piloted, validated and refined, thereby demonstrating good psychometric properties. The SCI scale was found to be a practical, multidimensional

scale with the three subscales demonstrating satisfactory to high internal consistency as discussed in 4.4.3.1 above. The Cronbach Alpha values for the three subscales demonstrated that the SCI is a reliable measure of cravings in treatment seeking sugars users. The nature of the study and the small sample size did not allow for factor analysis of individual subscales and overall scales, thereby making it difficult to determine test-retest reliability and to some extent reducing the statistical power of the SCI. The SCI is a newly developed instrument that was constructed by making reference to relevant literature on heroin addiction and published scales that measure anxiety, as well as the researchers experience working with people addicted to heroin, suggesting that the instrument has been able to achieve face and content validity. The instrument was developed specifically for treatments seeking “sugars users” from the lower socio-economic strata, therefore the instrument lacks external validity and is only suitable for use amongst this group of individuals.

The qualitative intervention comprised of semi structured interviews that were administered to the experimental group participants so that the researcher could have a better understanding of the experimental group participant’s experiences of the intervention. The qualitative component of the evaluation study conformed to validity and reliability measures that have been conceptualised for qualitative studies. In this regard, attention was paid to conducting thematic analysis in a structured and consistent manner as outlined by Braun and Clark (2006). Braun and Clarks (2006) linear model of thematic analysis was applied rigorously. Data was transcribed verbatim and with as much detail as possible. The coding process was thorough, conclusive and exhaustive and themes were internally coherent, consistent and distinctive.

The use of a mixed method design and multiple methods of data collection helped increase the validity of the study findings. In this study, ecological validity which relates to the findings of empirical research being applicable to people’s daily lives within their natural social setting was high, given that participants were in the early stages of recovery and still experiencing cravings and withdrawals. Furthermore, the therapeutic interventions were conducted whilst participants were in an active state of craving. Lincoln and Guba (1985) identified criteria such as trustworthiness, authenticity, credibility, transferability, dependability and confirmability as crucial for evaluating qualitative research. Transferability which refers to the relevance of research findings to other contexts was achieved in this study by using purposive sampling

strategies and by providing a detailed account of the context or setting within which the study took place, as well as a thorough description of the procedures from the beginning to the end of the study.

Dependability is concerned with the trustworthiness of the research, which was established by keeping complete and in-depth records of the interviews. Confirmability recognises that complete objectivity in qualitative research is unachievable (Golafshani, 2003), however this was established through reflexivity and the researcher validates that she did not allow her thoughts, opinions and perceptions to taint the research findings and conclusions. In addition, the researcher acknowledges that ethical principles were strictly adhered to throughout the research process and when taking into consideration the various perspectives of the respondents. Based on the foregoing discussion, the researcher took cognisance of the importance of reliability, validity and rigour so as to ensure good quality research, which is essential if findings are to be utilised in practice and incorporated into treatment programmes.

4.8 CONCLUSION

This chapter provided an in-depth explanation of the processes involved in producing the data for this investigation. The chapter included the objectives, research design, methodology, research instruments, methods of data collection and data analysis procedures. Chapter 5 will look at the analysis of data.

CHAPTER 5

RESULTS

5.1 INTRODUCTION

This chapter describes the data analysis of the study. The data in this chapter will be presented as follows:

- a) Socio demographic findings - A variety of background variables of the experimental group (EMDR therapy group) and control group (Relaxation group) were obtained and compared. The demographic profiles (marital status, educational history, and employment history) will be presented as frequencies. These variables provide a better understanding of the characteristics of the sample.
- b) The substance use history (symptom presentation, triggers for usage, previous treatment, relapse history, challenges to efforts of sobriety, fears relating to future dangers, genetic history and treatment goals) will be presented as frequencies. These variables are useful in understanding the participants' substance use presentation and history, as well as the impact of these variables on the therapeutic techniques administered.
- c) Responses on the Sugars Craving Inventory (SCI) - pre and post treatment scores of the three subscales (the feeling scale, thought scale and physical symptom scale) that comprise the Sugars Craving Inventory provides an indication as to whether EMDR therapy is useful in reducing the psycho physiologic intensity of the craving experience and the changes observed on the SCI. The SCI is useful in identifying the changes observed from the EMDR therapy experience.
- d) Experimental and control group differences on the three subscales of the Sugars Craving Inventory and the differences between time periods (pre and post intervention) will help to determine the superiority of EMDR therapy in reducing a craving.
- e) Subjective Units of Craving Scale -The results of the subjective units of craving scale that assessed subjective levels of craving pre and post EMDR therapy will be presented to determine whether EMDR therapy is useful in reducing a craving.

5.2 SOCIO DEMOGRAPHIC FINDINGS

5.2.1 Marital status

Of the 35 participants in the experimental group, 26 (74%) were single and 9(26%) were married. Of the 9 married participants, 2 (6%) participants were living with their spouses for a period of 1-5 years, 6 (17%) participants were married for a period of 6-10 years and 1 (3%) participant was married for a period of 10-25 years. Of the 9 married participants, 1 (3%) participant reported that their spouse used drugs with them.

No significant differences in marital status were found in the control group, where 23 (66%) of the control group participants were single and 5 (14%) were married. 3 (9%) participants were currently separated and 4(11%) were divorced. Of the 5 married participants, 2 (40 %) participants were married for a period of 6 -10 years and 3 (60 %) were married for a period of 10-25 years. Of the 5 married participants, 1 (20%) reported that their spouse used drugs with them.

5.2.2 Educational History

In the experimental group, 7 (20%) participants completed grade 10, 11 (31%) completed grade 11 and 17(49%) completed grade 12. 28 of the 35 (80%) participants did not receive any post school education, 5 (14%) received technical training which included a trade apprenticeship and 2 (6%) completed an administrative course.

The control group did not differ from the experimental group with 7 (20%) participants having completed grade 10, 13 (37%) participants completed grade 11 and 15 (43%) participants completed grade 12. Of the 35 participants, 28 (80%) participants did not receive any post school education and 7 (20%) received technical training.

5.2.3 Employment History

In terms of employment status, participants were asked whether they were employed before they entered the rehabilitation programme, 11(31 %) of the experimental group participants

reported that they were employed prior to being admitted to the rehabilitation centre. It was found that 3(27%) reported being employed for a period of 1 to 3 months, 3 (27%) were employed for 3 to 12 months and 5 (46%) participants reported being employed for a period of 1 to 5 years.

With regards to employment status of the control group, 5 (14%) participants reported being employed prior to being admitted to the rehabilitation centre, with 1 (20 %) participant being employed for a period of 1-3 months and 4 (80%) participants being employed for a period of 1 to 5 years.

The list of gainful employment that participants engaged in at some point previously is shown in Table 3. All 35 participants in the experimental group stated that they had been employed at some point in their lives and 33 participants from the control group also indicated that they had been previously employed.

Table 3 Distribution of types of employment in the experimental group (n =35) and control group (n = 35)

Types of Employment	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Professional	1	2.9	1	2.9
Administration	4	11.4	1	2.9
Artisan	3	8.6	4	11.4
Sales	9	25.7	8	22.9
Driver	2	5.7	11	31.4
Mechanical	8	22.9	5	14.3
Self employed	6	17.1	2	5.7
Supervisor	2	5.7	1	2.9

5.2.4 Job loss due to drug usage

Of the 35 participants from the experimental group, 1 (3%) was never employed. 9 (26%) have reported that they have never lost a job because of drug usage. The remaining 25 (74%) participants had lost their jobs due to various drug related reasons. Of the 35 participants in the

control group, 10 (29%) participants reported that they had never lost a job because of their drug usage and the remaining 25 (71%) participants lost their jobs to reasons related to their addiction. The reasons for job loss and related percentages are outlined in Table 4. Some participants cited more than one reason for their loss of employment.

Table 4 Distribution of reasons of job loss in the experimental group (n = 25) and control group (n=25)

Reasons for job loss	Experimental group		Control group	
	Frequency	Percentage	Frequency	Percentage
Dismissed using drugs at work	8	22.9	8	32
Absenteeism	8	22.9	14	56
Theft	3	8.6	3	12
Late coming	4	11.4	0	0
Intoxicated at work	1	2.9	0	0
Unable to cope at work	1	2.9	0	0
Total	25	100	25	100

5.3 SUBSTANCE USE HISTORY

5.3.1 Age of onset

Of the 35 participants from the experimental group, 27 (77 %) reported age of onset of drug use to be younger than 15 years, 7 (20 %) reported onset between the ages of 15 to 20 years and 1(3 %) reported age of onset between 21 to 25 years. In the control group, 26 (74%) of control group participants reported onset of usage before the age of 15 years, 3 (9%) reported onset between 15 to 20 years of age, 1 (3%) reported usage between the ages of 21-25 years and 5 (14%) reporting onset between the ages of 26 to 30 years. The control group differed from the experimental group with a slightly higher number of 5 (15%) reporting onset of usage between ages of 26 to 30 years.

5.3.2 Period of usage since onset

At the time of being admitted to the rehabilitation centres, 12 (34%) reported using sugars for a period of 1-5 years, 14 (40%) of the experimental group participants reported using sugars for a period of 6 to 10 years, 6 (17%) have been using sugars for a period of 11-20 years, 2

(6%) participants reported using sugars for a period of a year and 1 (3%) reported usage for a period of 9 years. The control group differed from the experimental group, where it was found that a higher number of participants have been using sugars for a slightly longer periods of time. 7 (20%) of the control group participants had been using sugars for a period of 1 to 5 years, 13 (37%) participants reported using sugars for a period of 6 to 10 years and 15 (43%) reported using sugars for a period of 11 to 20 years.

5.3.3 Frequency of usage

To determine the severity of the addiction, participants were asked about the quantity of sugars that they smoked in a day which is purchased in straws. Sixteen (46 %) of the 35 experimental group participants reported using 3 to 8 straws a day, 11 (31%) participants reported using 16 to 30 straws a day, 7(20%) participants reported using 9 to 15 straws a day and 1 (3%) participant reported using 0 to 2 straws a day. Ten (28%) participants in the control group reported using 3 to 8 straws daily, 16 (46%) reported using 16 to 30 straws daily and 9 (26%) reported using 9 to 15 straws daily.

5.3.4 Patterns of sugars usage prior to being admitted

To determine the pattern of usage prior to being admitted to the rehabilitation centre, participants were asked to describe their pattern of usage in a day. In the experimental group, 25 (71%) participants reported using sugars throughout the day, 5 (14%) reported using sugars in the morning and evening, 3 (9%) reported using sugars four times a day, 1 (3%) reported using sugars only once in the morning and the remaining 1 (3%) reported smoking sugars at 2-hour intervals. With regards to participants in the control group, 2 (6 %) reported using sugars throughout the day, 5 (14%) participants reported smoking sugars in the morning and evening and 28 (80%) reported using sugars three times a day and.

5.3.5 Period of last usage

Participants were questioned about the last time they smoked sugars before being admitted to the rehabilitation centre. In the experimental group, 23 (66%) participants reported using sugars on the day of being admitted and 12 (34 %) used sugars the day before being admitted. The

control group's responses were similar, 30 (86%) of participants smoked sugars on the day of admittance and 5 (14%) participants used sugars the day before being admitted.

5.3.6 Symptoms associated with usage

Participants were asked to list the symptoms they presented with when smoking sugars. The symptoms listed in Table 5 were identified as commonly experienced symptoms because of smoking sugars. Most participants experienced an average of three symptoms.

Table 5 Distribution of symptoms associated with sugars usage in the experimental group (n =35) and control group (n = 35)

Symptoms	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Body pain	14	40.0	8	22.9
Relaxed feelings	7	20.0	9	25.7
Depression	3	8.6	1	2.9
Anger	9	25.7	1	2.9
Hallucinations	3	8.6	0	0
Intoxication	2	5.7	5	14.3
Escaping feelings	7	20.0	14	40.0
Irritability	2	5.7	0	0
Increased sex drive	1	2.9	1	2.9
Increased confidence	4	11.4	7	20.0
Induces sleep	0	0	2	5.7

5.3.7 Loss of control of sugars usage

Participants were questioned as to when their sugars usage had become uncontrollable or when they had realised that they had lost control of their sugar's usage. In the experimental group, 4(11 %) participants reported that they had lost control of their usage within a year of onset, 6 (17%) reported uncontrollable usage after a year of onset, 14(40%) reported uncontrollable usage within 2 to 4 years of onset, 2 (6%) reported loss of control after 5 years and 9 (26%) reported loss of control between 6 and 10 years. The control group differed from the experimental group, with a larger percentage of participants reporting loss of control after several years of usage. Of the control group participants, 3 (9%) reported loss of control within

a year, 5 (14%) reported loss of control after a year of onset, 7(20%) reported loss of control within 2 to 4 years of onset, 4 (11%) lost control after 5 years, 9(26%) reported loss of control between 6 and 10 years and 7 (20%) reported loss of control between 11 to 20 years of onset. Loss of control was linked to tolerance in which 85% of the experimental group and 90% of the control group participants stated that they needed higher dosages of sugars to get the effects that they experienced in early usage. The majority of participants in both the experimental and control group (90%), stated that they continued using drugs although they did not experience any pleasure or euphoric effect from its use.

Participants were asked whether they were experiencing any difficulties in their lives, which may have impacted on losing control of their usage of sugars. Some participants indicated that they could not recall any particular circumstance or difficulty that influenced their loss of control of drug usage. Of the experimental group participants, 7 (20%) reported experiencing family problems at the time, 1(3%) reported experiencing grief, 1(3%) reported financial difficulties, 1(3%) reported experiencing physical pain, 1(3%) cited loneliness and 1(3%) reported working for a drug dealer that contributed to their loss of control of drug usage. With regards to the control group, 10(29%) participants cited family problems as the reason for loss of control, 5(14%) stated that grief affected their loss of control, 3(9%) stated that job loss had affected their drug usage and 1(3%) stated that exam stress contributed to the loss of control of sugars usage.

5.3.8 Overdosing

The findings of this study revealed that 3 (9%) participants in the experimental group reported overdosing on a drug and 1 (3%) participant in the control group reported overdosing at some stage in their life. They reported overdosing on benzodiazepines.

5.3.9 Withdrawal Symptoms

All 70 participants in the study reported experiencing severe withdrawal symptoms. To determine the nature and severity of participant's withdrawal experience, participants were asked to describe their withdrawal experience and symptom presentation. Participants experienced an average of 3 withdrawal symptoms. The symptom presentation as shown in

Table 6 revealed that body pains ranked high amongst the experimental and control group participants, followed by hot and cold flushes, insomnia, nausea and vomiting.

Table 6 Distribution of withdrawal symptoms associated with sugars usage in the experimental group (n =35) and control group (n = 35)

Symptoms	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Body pain	32	91.4	31	88.6
Stomach aches	0	0.0	1	2.9
Nausea/vomiting	7	20.0	4	11.4
Hot/cold flushes	8	22.9	13	37.1
Depression	2	5.7	1	2.9
Feeling weak	3	8.6	1	2.9
Anxiety	1	2.9	0	0.0
Anger	2	5.7	2	5.7
Insomnia	5	14.3	5	14.3

5.3.10 Craving Experience

To understand the craving experience of the sample, their cravings were analysed in terms of the time in the day in which they experienced a craving and triggers associated with a craving for sugars. Participants were also presented with a list of thoughts and feelings and were asked to identify the thoughts and feelings that evoked a craving. Participants experienced intense cravings at particular times in the day, 26 (75%) experimental group participants experienced intense cravings in the morning, 5 (14%) experienced intense cravings in the evening and 4 (11%) experienced intense cravings throughout the day. Of the control group participants, 29 (83%) participants reported experiencing cravings as soon as they had awoken in the morning, 2 (6%) experienced cravings in the day and 4 (11%) experienced cravings throughout the day.

Participants were asked about their internal triggers (subjective sensorial experience of triggers), particularly in terms of what they saw, heard, felt, or tasted when exposed to a trigger in Table 7. Most participants reported experiencing more than one sensorial trigger that induced a craving.

Table 7 Distribution of sensorial presentation associated with sugars craving in the experimental group (n =35) and control group (n = 35)

Triggers (Perceptual)	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Nothing	11	31.4	21	60.0
Sight of cues/paraphernalia	4	11.4	4	11.4
Talking about it	1	2.9	2	5.7
Taste	3	8.6	4	11.4
Seeing others using it	12	34.3	1	2.9
Body sensations	1	2.9	3	2.9
Sounds	1	2.9	0	0.0

Participants were asked to list their triggers for sugars use with most participants reporting an average of two triggers that induced their craving for sugars as shown in Table 8.

Table 8 Distribution of triggers associated with sugars usage in the experimental group (n =35) and control group (n = 35)

Triggers	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Craving	9	25.7	16	45.7
Depression	1	2.9	1	2.9
Using other drugs	2	5.7	0	0
Socialising with drug users	6	17.1	2	5.7
Feeling of intoxication	3	8.6	0	0
Body sensations	2	5.7	0	0
Withdrawal symptoms	3	8.6	2	5.7
Money	2	5.7	0	0
Loneliness	2	5.7	3	8.6
Negative emotions	5	14.3	11	31.4

Participants were given an opportunity to list the triggers that evoked cravings and were presented with a list of thoughts, feelings and experiences of craving triggers for sugars. They were asked to identify and choose craving cues from a list of thoughts, feelings and experiences to better understand their craving triggers as outlined in Table 9.

Table 9 Distribution of thoughts, feelings and experiences associated with craving for sugars in the experimental group (n =35) and control group (n = 35)

Thoughts/feelings that trigger usage	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Anger	31	88.6	27	77.1
Seeing drugs	0	0	0	0
Seeing others using drugs	24	68.6	24	68.6
Boredom	17	5.7	25	71.4
Anxiousness	20	57.1	21	60.0
Sadness	25	71.4	26	74.3
Unable to cope without it	23	65.7	19	54.3
Pain	33	94.3	29	82.9
Feel like getting high	24	68.6	22	65.7
Impulsive temptations	29	82.9	22	62.9
Relationship problems	25	71.4	29	82.9
Fulfill social needs	22	62.9	27	77.1
Feeling ill	4	11.4	1	2.9
Criticism	14	40	15	42.9

5.3.11 Previous Treatment

To understand and determine success of previous treatment experiences, participants were asked whether they received treatment previously, when they received treatment, reasons for receiving treatment previously, type of treatment, length of sobriety post treatment and their patterns of sugars usage post treatment. In the experimental group, 28 (80%) of the participants had previously received some form of treatment and 22 (63%) of the control group participants had previously received treatment to help recover from their addiction. Of the 28 experimental group participants who received some form of previous intervention, 14 (50%) experimental group participants received treatment within a year, 10 (36%) within the past two years and 4 (14%) received treatment within the past five years of being admitted to the rehabilitation

facility. With regards to the 22 participants in the control group that have previously received treatment, 12 (55%) received treatment within a year, 6 (27%) received treatment within the past two years and 4 (18%) received treatment within the past five years of being admitted to the rehabilitation facility.

In trying to ascertain the reasons that motivated previous treatment, 9 (32%) of the experimental group participants stated that their drug usage had become uncontrollable, 17 (61%) stated that they wanted to stop using sugars and decided to get some help and 2 (7%) had been faced with legal problems and consequences. All 22 (100%) participants in the control group that had previously received treatment stated that they engaged in treatment because they wanted to stop using the drug, due to its consequences. They were asked to name the type of treatment they engaged in and participants were found to have engaged in one or more of the following treatments viz, detoxification programme, inpatient programme, outpatient programme and opiate substitution treatment. A large number of participants in the experimental group 19 (68%) received shorter treatments ranging from 1 to 6 weeks, 7 (25%) participants received treatment for a period of 3 to 6 months and 2 (7%) had been in a long-term treatment programme for a year. The control group findings were found to be similar in which the majority of participants, 13 (59%) engaged in programmes and interventions that ranged from 1 to 6 weeks, 6 (27%) attended programmes that ranged from 3 to 6 months and 3 (14%) participants were admitted to a long- term programme for a year.

Participants were questioned about the length of sobriety post treatment. The findings revealed that 11 (39%) experimental group participants remained abstinent for 1 to 7 days, 6 (22%) remained abstinent for 1 to 2 months, 7 (25%) remained abstinent for 3 to 6 months and 4 (14%) remained abstinent for a year. With regards to the control group, 3 (14%) remained abstinent for 1 to 7 days, 7 (31%) remained abstinent for 1 to 2 months, 6 (27%) remained abstinent for 3 to 6 months, 3 (14%) remained abstinent for a period of a year and 3 (14%) remained abstinent for a period of 1 to 3 years. Participants were asked to identify their relapse triggers after a period of sobriety which is outlined in Table 10:

Table 10 Distribution of relapse triggers after a period of abstinence (experimental group (n =28) and control group (n = 22))

Relapse Triggers	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Money	3	10.7	2	9
Friends	5	17.9	5	22.7
No place to live	1	3.6	0	0
Poor support	1	3.6	2	9
Cravings	5	17.9	1	4.5
Use of other drugs/alcohol	2	5.7	1	4.5
Family problems	6	21.4	9	41.0
Using thoughts	1	3.6	0	0
Going back into same environment	4	14.3	2	9

Participants were asked to describe their pattern of drug use after relapsing. Two (7%) experimental group participants reported that they smoked less sugars than they had before going into treatment. Eleven (39%) indicated that their usage was marginally higher than previous usage and 15 (54%) indicated that their usage was significantly higher than they had smoked before receiving treatment. The results of the control group were found to be similar, whereby 4 (18%) participants reported that their drug usage after relapsing was less than previous usage, 5 (23%) reported using marginally higher amounts of sugars and 13 (59%) reported significantly higher amounts of sugars usage upon relapsing post treatment.

5.3.12 Abstinence Efforts

To determine whether participants made any effort to abstain from sugars apart from receiving formal treatment, participants were questioned about personal abstinence efforts, duration of individual abstinence efforts and reasons for maintaining abstinence. Thirteen (37%) of the experimental group and 7 (20%) of the control group participants indicated that they tried to abstain from sugars usage without any formal rehabilitation intervention. Participants from both the groups cited two reasons for their personal abstinence efforts viz, wanting to be drug free and their drug usage being out of control. Nine (69%) of the experimental group participants reported abstaining as they wanted to be drug free and 4 (31%) reported that their drug usage was out of control. Six (86%) of the control group participants reported that their

abstinence efforts were due to them wanting to stop their drug usage and 1 (14%) participant reported that their efforts were motivated by their drug usage being out of control. Of those participants that tried to abstain, the duration of abstinence for the drug varied from a week to a year. Their periods of abstinence are outlined in Table 11.

Table 11 Duration of personal abstinence efforts for experimental group (n =13) and control group (n = 7)

Duration of Abstinence	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
1 week	4	30.8	2	28.6
1 month	2	15.4	2	28.6
1-6 months	4	30.8	1	14.2
7-12 months	3	23	2	28.6

Participants cited various reasons for maintaining abstinence in the time periods outlined in Table 11. Of the 13 participants in the experimental group that tried to abstain without any formal intervention, 3 (23%) of participants stated that their involvement in the church supported abstinence, 1 (8%) stated that a change in environment assisted sobriety and 9 (69%) stated that the use of opiate substitution treatments facilitated their abstinence. Of the 7 participants in the control group that tried to abstain, 1(14%) participant stated that being involved in gainful employment assisted in sobriety and 6 (86%) participants stated that opiate substitution treatments facilitated their abstinence.

Participants were engaged about their relapse triggers following their efforts of abstinence.

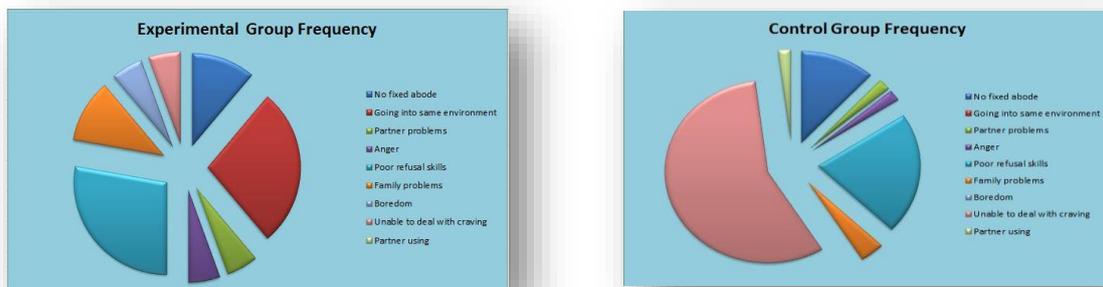


Figure 2 Distribution of Problems that could Trigger relapse in the Experimental Group (n= 35) and Control Group (n=35)

5.3.13 Current problems that could affect participant’s ability to remain sober

Participants were asked about the type of problems that they were experiencing at the time of being admitted to the current rehabilitation programme, as it is likely that if these problems were not dealt with, it could impact on their sobriety upon being discharged. Therefore, participants were asked about their current problems that could affect their ability to remain sober as outlined in Table 13. Some participants identified more than one problem that they were experiencing before being admitted to the programme, and a few indicated that they were not experiencing any problems before being admitted to the rehabilitation programme.

Table 12 Distribution of current problems that could trigger a relapse in the experimental group (n =35) and control group (n = 35)

Current Problems	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
No fixed abode	5	14.3	6	17.1
Going into same environment	5	14.3	0	0
Partner problems	1	2.9	1	2.9
Anger	1	2.9	1	2.9
Poor refusal skills	5	14.3	11	31.4
Family problems	2	5.7	2	5.7
Boredom	1	2.9	0	0
Unable to deal with craving	1	2.9	29	82.9
Partner using	0	0	1	2.9

5.3.14 Fears about future dangers

Participants were asked about their fears relating to future dangers that may trigger a relapse as presented in Table 14.

Table 13 Distribution of participants fears related to sugars usage in the experimental group (n =35) and control group (n = 35)

Fears	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Family members as triggers	3	8.6	0	0
Going into same environment	15	42.9	24	68.6
Peer pressure	7	20.0	4	11.4
Anger	1	2.9	0	0
Family problems	4	11.4	2	5.7
Past disappointments	1	2.9	1	2.9
Loss	0	0	0	0
Unable to deal with emotions	0	0	3	8.6

5.3.15 Addicted family members

Participants were asked if any of their family members or blood relatives have been drug dependent at any time in their lives. Of the participants that answered in the affirmative, 11 (65 %) of the experimental group participants stated that their fathers were addicted to drugs, 2 (12 %) stated that their brothers were drug dependent, 2 (12%) stated that their uncles were addicted to drugs and 2 (12%) reported that extended family members were addicted. Of the control group participants, 10 (71%) mentioned that their fathers were addicted to drugs, 3 (22%) mentioned that their brothers were addicted to drugs, 1 (7%) participant stated that members in their extended family were addicted to alcohol or drugs.

5.3.16 Client treatment goals

An assessment of treatment goals helped to determine participant's readiness to change. Participants were assessed in terms of five treatment goals viz, denial about consequences of substance use, acknowledging negative consequences of substance use, demonstrating some commitment to treatment but no demonstrated ability to abstain, demonstrating commitment to abstain from sugars but not to other drugs and lastly the participant's acknowledgement of the detrimental effects of addiction and commitment to recover from all drugs. Of the experimental group, 1 (3%) participant showed some commitment to treatment but no demonstrated ability to abstain from other drugs, 34 (97%) participants acknowledged the detrimental effects of addiction and were committed to recover from all drugs. Ten (29%) control group participants demonstrated some commitment to abstain from sugars but not to

other drugs or alcohol and 25 (71%) participants acknowledged the detrimental effects of their sugars addiction and were committed to abstain from all drugs.

5.4 RESPONSES ON THE SUGARS CRAVING INVENTORY

The Sugars Craving Inventory was developed to understand and define the craving experience of sugars addicted participants. The analysis of the Sugars Craving Inventory which comprised of a list of symptoms that sugars users experienced whilst craving provides an indication as to whether EMDR therapy is useful in reducing the psycho physiologic intensity of a craving and the changes observed in the symptom presentation of the participants on receiving EMDR therapy and relaxation training. Participants had to indicate by marking a cross in the space provided, as to how much a particular symptom had bothered them during the past two days on a 4 - point Likert scale, which ranged from “not at all” to “a lot”. The list of symptoms comprised of three categories of the craving experience viz, feelings, thoughts and physical symptoms. The feelings category consisted of 4 symptoms, the thoughts category consisted of 6 symptoms and the physical symptoms consisted of 15 symptoms. First, the descriptive statistics of the three scales will be presented which provides an indication of the distribution of items in each scale. Thereafter, frequencies will be presented to determine the distribution of pre and post test scores on each item which will provide useful information on the frequency and intensity of thoughts, feelings and physical symptoms whilst craving.

5.4.1 Feeling scale

The Feeling scale comprised of 4 statements which are reflective of their emotional coping whilst craving.

5.4.1.1 Feeling Scale (Pre- Intervention)

The frequency of feelings experienced before the intervention are presented in Table 15:

Table 14 Distribution of feelings that are experienced when craving in the experimental group (n =35) and control group (n = 35) before the intervention

Feelings	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
I feel worried	6	17.1	9	25.7	7	20	13	37.1	5	14.3	7	20	2	5.7	21	60
I feel things around me are confusing	8	22.9	12	34.3	9	25.7	6	17.1	18	51.4	6	17.1	1	2.9	10	28.6
I feel scared	13	37.1	10	28.6	6	17.1	6	17.1	14	40	10	28.6	0		11	31.4
I feel tense	8	22.9	7	20	10	28.6	10	28.6	11	31.4	12	34.3	1	2.9	11	31.4

5.4.1.2 Feeling Scale (Post Intervention)

The frequency of feelings experienced after the therapeutic interventions are presented in Table 16.

Table 16 Distribution of feelings experienced when craving post intervention in the experimental group (n =35) and control group (n = 35)

Feelings	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
I feel worried	25	71.4	9	25.7	1	2.9	0	0	12	34.3	20	57.1	2	5.7	1	2.9
I feel things around me are confusing	32	91.4	3	8.6	0	0	0	0	22	62.9	13	37.1	0	0	0	0
I feel scared	31	88.6	4	22.9	0	0	0	0	20	57.1	13	37.1	2	5.7	0	0
I feel tense	29	82.9	6	17.1	0	0	0	0	24	68.6	10	28.6	1	2.9	0	0

5.4.2 Thought scale

To determine participants thought processes when craving for sugars, six statements were included that were reflective of the thought processes that accompany a craving experience.

5.4.2.1 Thought Scale (Pre-Intervention)

The type and frequency of thought processes pre-intervention are presented in Table 17.

Table 15 Distribution of thoughts that are experienced when craving in the experimental group (n =35) and control group (n = 35)

Thoughts	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
I am finding it difficult to concentrate	4	11.4	3	8.6	8	22.9	20	57.1	11	31.4	7	20	1	2.9	16	45.7
I think that I will not be able to cope without sugars	5	14.3	6	17.1	4	11.4	20	57.1	10	28.5	9	25.7	1	2.9	15	42.9
I think I am losing control	8	22.9	5	14.3	9	25.7	13	37.1	14	40	2	5.7	3	8.6	16	45.7
I think I am going crazy	15	42.9	6	17.1	6	17.1	8	22.9	21	60	3	8.6	3	8.6	8	22.9
I think I am going to die	22	62.9	7	20	4	11.4	2	5.7	21	60	5	14.3	4	11.4	5	14.3
I fear that something terrible is going to happen to me	12	34.3	7	20	7	20	9	25.7	15	42.9	7	20	5	14.3	8	22.9

5.4.2.2 Thought Scale – Post Intervention

The types and frequency of thoughts experienced whilst craving, after receiving therapeutic interventions are presented in Table 18.

Table 16 Distribution of Thoughts that are Experienced when Craving in the Experimental Group (n =35) and Control Group (n = 35)

Thoughts	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
I am finding it difficult to concentrate	19	54.3	11	31.4	4	11.4	1	2.9	14	40	16	45.7	1	2.9	4	11.4
I think that I will not be able to cope without sugars	31	88.6	3	8.5	1	2.9	0	0	27	77.1	7	20	7	20	0	0
I think I am losing control	35	100	0	0	0	0	0	0	33	94.3	2	5.7	0	0	0	0
I think I am going crazy	35	100	0	0	0	0	0	0	35	100	0		0	0	0	0
I think I am going to die	35	100	0	0	0	0	0	0	34	97.1	1	2.9	0	0	0	0
I fear that something terrible is going to happen to me	35	100	0	0	0	0	0	0	34	97.1	1	2.9	0	0	0	0

5.4.3 Physical Symptoms scale

A list of physical symptoms that describes the physical experience of sugars dependent person whilst craving, comprised of the physical symptom scale.

5.4.3.1 Physical Symptoms Scale (Pre-Intervention)

The types and frequency of physical symptoms experienced pre - intervention are presented in Table 19.

Table 17 Distribution of physical symptoms that are experienced when craving in the experimental group (n =35) and control group (n = 35) (pre-intervention)

Physical Symptoms	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
My eyes are tearing	3	8.6	6	17.1	3	8.6	23	65.7	7	20	3	8.6	0	0	25	71.4
I feel pain and tightness in my chest	10	28.6	5	14.3	3	8.6	17	48.6	13	37.1	0	0	0	0	15	42.9
I feel electric shocks in my body	12	34.3	3	8.6	0	0	20	57.1	17	48.6	3	8.6	0	0	15	42.9
I can feel butterflies/ discomfort in my stomach	7	20	4	11.4	3	8.6	21	60	10	28.6	7	20.0	1	2.9	17	48.6
My muscles feel tight and tense	2	5.7	2	5.7	2	5.7	29	82.3	8	22.9	4	11.4	0	0	23	65.7
I am sweating	1	2.9	3	8.6	5	14.3	26	74.3	7	20	3	8.6	1	2.9	24	68.6
My body is shaking and trembling	9	25.7	2	5.7	4	11.4	20	57.1	14	40	4	11.4	0	0	17	48.6
My legs feel weak	5	14.3	3	8.6	5	14.3	22	62.9	9	25.7	4	11.4	2	5.7	20	57.1
I feel dizzy	12	34.3	9	25.7	2	5.7	12	34.3	24	68.6	3	8.6	0	0	8	22.9
I have pains in my neck and back	2	5.7	6	17.1	2	5.7	25	71.4	8	22.9	2	5.7	0	0	25	71.4

Physical Symptoms	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
I feel cold chills throughout my body	3	8.3	4	11.4	2	5.7	26	74.3	8	22.9	3	8.6	1	2.9	23	65.7
I feel tired and weak	1	2.9	5	14.3	4	11.4	25	71.4	8	22.9	5	14.3	3	8.6	19	54.3
I feel nauseas	8	22.9	11	31.4	2	5.7	14	40	18	51.4	4	11.4	1	2.9	12	34.3
I have pains in my head	16	45.7	6	17.1	3	8.3	10	28.6	18	51.4	4	11.4	1	2.9	12	34.3
I have a runny nose	3	8.6	8	22.9	1	2.9	23	65.7	5	14.3	3	8.6	0	0	27	77.1

5.4.3.2 Physical Symptom Scale (Post Intervention)

The type and frequency of physical symptoms experienced post intervention are presented in Table 20. Both experimental and control group showed a significant reduction in physical symptoms related to their cravings post intervention.

Table 20 Distribution of physical symptoms experienced when craving in the experimental group (n =35) and control group (n = 35)

Physical Symptoms	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
My eyes are tearing	29	82.9	4	11.4	1	2.9	1	2.9	19	54.3	14	40	1	2.9	1	2.9
I feel pain and tightness in my chest	32	91.4	3	8.6	0	0	0	0	24	68.6	10	28.6	0	0	1	2.9
I feel electric shocks in my body	30	85.7	4	11.4	1	2.9	0	0	23	65.7	9	25.7	3	8.6	0	0
I can feel butterflies/ discomfort in my stomach	25	71.4	9	25.7	0	0	1	2.9	23	65.7	10	28.6	2	5.7	0	0
My muscles feel tight and tense	23	65.7	10	28.6	1	2.9	1	2.9	14	40	16	45.7	5	14.3	0	0
I am sweating	31	88.6	4	11.4	0	0	0	0	21	60	10	28.6	4	11.4	0	0
My body is shaking and trembling	33	94.3	2	5.7	0	0	0	0	25	71.4	9	25.7	1	2.9	0	0
My legs feel weak	30	85.7	5	14.3	0	0	0	0	21	60	8	22.9	5	14.3	1	2.9

Physical Symptoms	Experimental Group %								Control Group %							
	Not at all		Somewhat		Moderately		A lot		Not at all		Somewhat		Moderately		A lot	
I feel dizzy	33	94.3	2	5.7	0	0	0	0	26	74.3	5	14.3	4	11.4	0	0
I have pains in my neck and back	27	77.1	6	17.1	2	5.7	0	0	15	42.9	12	34.3	5	14.3	3	8.6
I feel cold chills throughout my body	30	85.7	5	14.3	0	0	0	0	20	57.1	8	22.9	4	11.4	3	8.6
I feel tired and weak	30	85.7	5	14.3	0	0	0	0	16	45.7	15	42.9	2	5.7	2	5.7
I feel nauseas	31	88.6	4	11.4	0	0	0	0	31	88.6	4	11.4	0	0	0	0
I have pains in my head	32	91.4	2	5.7	1	2.9	0	0	26	74.3	8	22.9	1	2.9	0	0
I have a runny nose	32	91.4	3	8.6	0	0	0	0	20	57.1	12	34.3	3	8.6	0	0

5.5. EXPERIMENTAL AND CONTROL GROUP TREATMENT DIFFERENCES

The statistical techniques applied to the data were informed by the nature of the clinical data. Non-parametric tests were used due to the skewness of the data, as well as the small sample size.

5.5.1 Pre and Post Treatment Differences in Findings

Mann - Whitney U tests were conducted to analyse the differences between the experimental and control group on the three subscales that comprised the Sugars Craving Inventory to determine the differences in symptom presentation between the EMDR therapy and relaxation group pre and post intervention.

5.5.1.1 Feeling Scale

The results of the Mann Whitney U test for the post intervention feeling scale as presented in Table 21 revealed significant differences in changes in feelings of both the experimental group (Md =26.3, n=35) and control group (Md =44.7, n=35), U=289, z=-3.95, p=.000, r=0.5. The probability value (p) of .000 is less than 0.05, yielding a significant result. Based on the above, there is a statistically significant difference in the feeling scale for both groups post intervention. Using Cohen's criteria, an r of 0.5 is considered to be a large effect size.

Table 18 Mann Whitney U Test for differences in feelings experienced when craving post intervention in the experimental group (n =35) and control group (n = 35)

	U	Z	P	Median		R
				Exp (35)	Control (35)	
Pre-Intervention feeling scale	594	-.218	.83	36.0	35	0.03
Post Intervention feeling scale	289	-3.946	< .001	26.3	44.7	0.5

5.5.1.2 Thought Scale

The results of the Mann Whitney U test for the post intervention thought scale as presented in Table 22 revealed no significant differences in changes in thoughts of both the experimental group (Md =31, n=35) and control group (Md=40, n=35), U=455, z =1.96, p=0.05, r = 0.23. The probability value (p) of 0.05 is equal to 0.05 indicating that there is no statistically significant difference in the thought scale for both groups post intervention. Using Cohen's criteria, an r of 0.23 shows a medium effect size.

Table 19 Mann Whitney U tests for differences in thoughts experienced when craving post intervention in the experimental group (n =35) and control group (n = 35)

	U	Z	P	Median		R
				Exp (35)	Control (35)	
Pre-Intervention thought scale	500	-1.325	.18	38.7	33	0.16
Post Intervention thought scale	455	-1.954	.05	31.0	40.0	0.23

5.5.1.3 Physical Symptoms Scale

The results of the Mann Whitney U test for the post intervention physical symptom scale as presented in Table 23 revealed significant differences in changes in physical symptoms of both the experimental group (Md =24.7, n=35) and control group (Md=46.3, n=35), U=236, z =-4.5, p=0.00, r = 0.53. The probability value (p) of 0.00 is less than 0.5 indicating that there is a statistically significant difference in the physical symptom for both groups post intervention. Using Cohen's criteria, an r of 0.53 shows a large effect size.

Table 20 Mann Whitney U test of physical symptoms experienced when craving post intervention in the experimental group (n =35) and control group (n = 35)

	U	Z	P	Median		R
				Exp (35)	Control (35)	
Pre-Intervention physical symptom scale	459	-1.811	.07	39.9	31.1	0.22
Post Intervention physical symptom scale	236	-4.491	<.001	24.7	46.3	0.53

5.5.2 Differences between Time Periods (pre and post intervention) for the Experimental and Control Group

To determine whether there was a change in scores on the craving inventory pre and post intervention, the Wilcoxon Signed Rank Test was conducted. The Wilcoxon Signed Rank Test was used as the participants were measured on two occasions before and after receiving intervention. The Wilcoxon Signed Rank Test converts scores to ranks and allows for comparison at two different time intervals.

5.5.2.1 Feeling Scale

The Wilcoxon Signed Rank Test as shown in Table 24 revealed a significant reduction in feelings following participation in the EMDR therapy and relaxation session, $z = -3.946$, $p < 0.05$, with a large effect size ($r = 0.47$). The median score on the feeling scale decreased from pre EMDR therapy ($Md = 36.0$) to post EMDR therapy ($Md = 26.3$) and increased in the control group from pre relaxation ($Md = 35$) to post relaxation ($Md = 44.7$).

Table 21 Wilcoxon Signed Rank test of feelings experienced when craving pre and post intervention (Experimental Group (n =35) and Control Group (n = 35))

	W	Z	Asymp.Sig (2 – tailed)	Median		R
				Exp (35)	Control (35)	
Pre-Intervention feeling scale	1224.0	- 2.18	.83	36.0	35	0.26
Post Intervention feeling scale	919.50	-3.946	.000	26.3	44.7	0.47

5.5.2.2 Thought Scale

As shown in Table 25, the Wilcoxon Signed Rank Test did not reveal a reduction in thoughts following participation in the EMDR therapy and relaxation group, $z = -1.954$, $p > 0.05$ with a medium effect size ($r = 0.23$). The median score on the feeling scale decreased from pre EMDR therapy (Md =38.7) to post EMDR therapy (Md = 31.0) and increased in the control group from pre-relaxation (Md =33) to post relaxation (Md = 40). Therefore, we can conclude that there is no significant difference in the scores of the thought scale pre and post intervention.

Table 22 Wilcoxon Signed Rank test of thoughts experienced when craving after the intervention in the Experimental Group (n =35) and Control Group (n = 35)

	W	Z	Asymp.Sig (2 – tailed)	Median		R
				Exp (35)	Control (35)	
Pre-Intervention feeling scale	1130.0	- 1.325	.185	38.7	33	0.16
Post Intervention feeling scale	1085.0	-1.954	.051	31.0	40	0.23

5.5.2.3 Physical Symptoms Scale

The Wilcoxon Signed Rank Test revealed a significant reduction in physical symptoms following participation in EMDR therapy and the relaxation session, $z = -4.491$, $p < 0.05$ with a large effect size ($r=0.54$) as presented in Table 26. The median score on the physical symptom scale decreased from pre EMDR therapy (Md =39.9) to post EMDR therapy (Md=24.7) and increased in the control group from pre-relaxation (Md=31.1) to post relaxation (Md=46.3). Therefore, we can conclude that there is a significant difference in the scores of the physical symptom scale pre and post intervention.

Table 23 Wilcoxon Signed Rank test of physical symptoms experienced when craving after the intervention in the experimental group (n =35) and control group (n = 35)

	W	Z	Asymp.Sig (2 – tailed)	Median		R
				Exp (35)	Control (35)	
Pre-Intervention physical symptom scale	1088.50	- 1.811	.07	39.9	31.1	0.22
Post Intervention physical symptom scale	865.5	-4.491	.00	24.7	46.3	0.54

5.6 SUBJECTIVE UNITS OF CRAVING (SUC) SCALE

The SUC scale is a single item instrument that was used to assess participant’s level of subjective craving on a scale of 0 to 10, where 0 is no craving and 10 is the highest level of craving pre and post intervention.

5.6.1 SUC ratings pre EMDR therapy

As shown in Table 27, participants’ subjective level of craving prior to administering EMDR therapy ranged from 7 to 10, demonstrating that the disturbances associated with the craving experience were significant.

Table 24 Subjective Units of Craving assessment pre EMDR therapy

No of experimental group participants (n=35)	Subjective Units of Craving (0-10) (pre EMDR therapy)
18	10
6	9
7	8
4	7

5.6.2 SUC ratings post EMDR therapy

The SUC ratings demonstrated a reduction in craving disturbance in the EMDR therapy group as presented in Table 28. On completion of the EMDR therapy sessions, a large majority of participants (91%) rated the intensity of the craving disturbance to be 0 and the remaining 8% demonstrated a reduction in their SUC rating, although it did not go down to a 0.

Table 25 Subjective Units of Craving assessment post EMDR therapy

No of experimental group participants (n=35)	Subjective Units of Craving (0-10) (post EMDR therapy)
32	0
2	3
1	2

5.7 CONCLUSION

This chapter presented the results of the quantitative study using the SPSS statistical package. An in-depth discussion of the quantitative data which includes the demographic findings and variables related to participant's addictive profile and the statistical differences between the experimental and control group, as well as effects of time on the craving experience will be presented in the following chapter.

CHAPTER 6

DISCUSSION

This chapter discusses the findings of the research study, which is presented as background characteristics obtained from the intake interview. The discussion also focuses on the statistical differences between the EMDR therapy group and the relaxation group, to determine the effects of both the treatment approaches on cravings and craving management.

6.1. DISCUSSION OF QUANTITATIVE FINDINGS

The media and persons addicted to sugars as cited in the Mail and Guardian newspaper (Tolsi, 2006) and Indianspice (September, 2014) have characterised sugars as “the most addictive” drug ever experienced in communities in which it is commonly used. A search for a better understanding of the basic common processes, as well as factors that are responsible for the initiation and maintenance of sugars addiction has pointed the researcher to several variables that interact in creating and maintaining the addictive state. Due to the nature of opiates, these factors include both the psychotropic and physical effects of the drugs, as well as the psychosocial factors that are prevalent in sugars using communities. Carnes (1992) and Hunts (2014) definitions of addiction encapsulates the nature of the addictive process in a sugars addict, where they described an addiction as not just a behaviour in compulsivity, but an entire pattern of maladaptive behaviours, cognitions, belief systems, consequences and affect, which are evident in the findings of this study.

6.1.1 Education and Employment status

Environmental variables and the way these environmental factors influence sugars addiction is key to understanding the precipitating and maintaining factors of the addictive process. The level of educational attainment and employment status affects the socio - economic functioning of a community and has encouraged the use of sugars in the sample population. The sample in this study was drawn from a low - income population that could not afford rehabilitation costs,

therefore a common risk factor that may be associated with poor educational attainment and employment status is the socio - economic disadvantage that is characteristic of the sample.

It was found that less than half of the participants completed grade 12. The study findings in relation to educational attainment and sugars addiction is consistent with previous research by Silins et al. (2015), who found that drug use is correlated with the level of educational attainment, with a positive correlation between drug use and lower educational attainment. The choice and patterns of drug use have been found to be influenced by the socio-economic status of the user (Melchior et al., 2015), which explains the onset and the continued use of a cheaper derivative of heroin in the sample population, that is characterised by socio - economic disadvantage. A possible explanation for not completing grade 12 may be due to the early onset of sugars usage in the affected communities, in which more than half the sample reported the onset of usage to be before the age of 15 years, thereby providing support for studies that demonstrated that early onset of drug usage is correlated to poor educational attainment (Hemphill et al., 2014; Lee et al., 2013). Twenty percent of the experimental and the control group participants alike received post school education on completion of grade 12, in the form of basic technical training. Poor educational attainment and low educational aspirations in the sample population could be due to educational disturbances related to sugars usage, and the neurophysiological effects of the drug on CNS development. The high possibility of educational and cognitive disturbances in the sample population is consistent with research conducted over the past 10 years, where cognitive assessments revealed that a substantial number of drug users suffer from impairments across various cognitive domains (Cadet et al., 2014). Furthermore, neuroimaging studies of the frontal cortical areas and the limbic structures of drug using individuals have demonstrated that learning, memory and concentration are negatively affected by drug usage (Ersche et al., 2013), thereby resulting in cognitive and thus educational disturbances.

Poor educational attainment in turn affects employability, which could be a reason for the high level of unemployment and free time amongst the affected communities, which in turn encourages the use of sugars as a recreational past time to combat boredom. This finding has been supported by anecdotal evidence cited in the Mail & Guardian newspaper (Tolsi, 2006), where one of the interviewees stated that he began using sugars socially due to boredom. One

of the criteria outlined in the DSM V classification of substance use disorder is that important occupational activities are given up or reduced when an individual is in a state of active addiction (APA, 2013). Therefore, addiction in the sample population could be both a cause and outcome of economic stress. The sample of sugars dependent persons presented with a high level of unemployment, with more than half the sample population being unemployed, which is characteristic of the socio-economic functioning of this community. This finding corroborates with the addiction literature that communities affected by sugars usage have a high rate of unemployment (USAID, 2016), and that drug addiction is associated with employment status (Melchior et al., 2015). Therefore, the results suggest that demographic factors such as educational and employment status are likely to affect addiction treatment outcomes and should be taken into consideration when developing treatment plans and community interventions.

The findings of this study revealed that almost three quarters of the control group and experimental group participants alike reported that sugars usage had negatively affected their work productivity. The participant's reasons for being dismissed from work provides an understanding of factors that impacted on their work functioning viz, absenteeism, theft and sugars usage during work hours. It was found that less than a third of the experimental and control group participants alike were dismissed due to using drugs at work, which may be attributed to their inability to cope with cravings and withdrawals in their workday. This behaviour is indicative of "loss of control", as they were unable to cope with the psycho-physiologic intensity of cravings and withdrawals in environments that are regulated against the use of any addictive substance. A significant number of participants were dismissed due to absenteeism (23% of the experimental group and 40% of the control group), where high rates of absenteeism could be potentially attributed to various reasons such as health challenges associated with drug use (Bond & Witton, 2017; Reimer et al., 2016), not having the financial means to get to work as their salaries were used on drugs (Roddy & Greenwald, 2006) and poor motivation levels associated with depression (Ekthiari & Paulus, 2016). The results of the study revealed that a less than ten percent of the experimental and control group alike lost their jobs due to theft as the cost of sustaining a sugars habit was cited in Vitacare (2012, August 23) as ranging from R100 to R200 a day on average, which results in some sugars users having to resort to theft as a means of maintaining their cash flow. Furthermore, heroin being a mood-altering substance impairs judgement and encourages poor self - control (Hou et al., 2016),

placing people at risk for social deviance, as their mental state impairs their ability to think of the consequences of stealing. The findings of this study are consistent with Greenwald (2007), explanations for poor productivity amongst addicted persons, where it was found that the associated physical and psychological instability accompanying an addiction contributes to poor productivity in the form of absenteeism, quitting jobs, stealing and poor motivation. The following explanations that deserve additional research attention could provide an understanding of the association between unemployment and sugars addiction. A pre - existing sugars addiction may increase the likelihood of losing employment due to the associated disturbances, alternatively the experience of being unemployed could lead to an increase in sugars usage, which potentially influences the individual's chances of finding employment and sets in motion a vicious cycle of unemployment and addiction, and a third explanation is related to underlying traits such as impulsivity, antisocial traits, stress reactivity or poor motivation levels that may encourage both addiction and unemployment.

6.1.2 Course and Length of Drug Usage

Onset and length of drug usage are factors that have important implications for choice of treatment and treatment success. Length of drug usage impacts on addictive phenomenon such as tolerance, which develops over time with progressive increases in drug intake. More than three quarters of the sample indicated that their drug usage developed before the age of 15 years, which is the early stage of adolescent development. This finding correlates with media reports by Vitacare (2012), that sugars is a preferred choice of drug in persons aged 13 to 22 years in the Chatsworth area. Therefore, the predictive basis for the use of sugars in the sample population could be due to the early onset of sugars usage in the sample population, as research has shown that persons who initiate drug use before the age of 14 years are at a greater risk for developing substance dependency in adulthood (SAMSHA, 2014), and even brief exposure to drugs in adolescence can promote habit formation in later years (Hinton et al., 2014). There are specific factors which places adolescents in sugars using communities at a greater risk for addiction and must be taken into consideration when developing preventative efforts within this community. Adolescents often feel invulnerable to harm and despite receiving factual information on the dangers of sugars usage, they tend to minimise the harmful effects of a drug, especially if they have positive expectations of the drug (Jester et al., 2015). This is especially so in poorer socio-economic communities where opportunities for development and recreation are limited and drugs become a convenient way to bridge the gap. Furthermore, in the affected

communities, adolescents are encouraged and lured in the world of drugs by drug peddlers who offer drugs free of charge at parties and social gatherings (USAID, 2016), thereby creating an association with sugars use and enjoyment or pleasure and allowing for operant conditioning processes related to the pleasurable effects of sugars to reinforce drug seeking and drug taking behaviour. In order to understand the motivational processes that transition casual drug use to an addiction, it is crucial to examine the behavioural processes of sugars using adolescents, which can provide insight into the way in which they transition from experimental behaviour to active usage of sugars.

The length of drug usage correlates with severity of addiction, complications related to drug usage and challenges faced in recovery. In this study, participants confirmed that they were admitted to the rehabilitation facilities due to their sugars usage being out of control and having a negative impact on their lives, a finding that is consistent with studies that have shown that the earlier the age of first use, the more likely the development of an addiction and associated future problems (Hinton et al., 2014). At the time of being admitted to the rehabilitation centre, less than half of the experimental group reported using sugars for a period of 6 to 10 years and a third of the sample reported usage for a period of 1 to 5 years. The control group differed slightly from the experimental group with more participants using sugars for a longer period of time, a third of the control group reported using sugars for a period of 6 - 10 years and almost half of the control group participants reported using sugars for a period of 11 - 20 years. These findings provide support for conditioning theories and the principle of reinforcement, which can account for the association between the length of addiction and associated challenges. According to operant conditioning principles, the association between the length of addiction and drug effects impacts on the user's ability to interrupt or abstain from sugars usage and prevents deconditioning. Therefore, the greater the time period for a stimulus to be paired with a response, the greater the challenges experienced in disrupting the stimulus-response bond (Thompson et al., 2019).

6.1.3 Subjective symptomatic experience

Participants were asked about their subjective symptomatic experience when using sugars, as well as the effects and perceived benefits of usage. The effects and benefits of sugars usage helped to identify the control that the drug exercised over the behaviour of the user and its

impacts on drug seeking and drug taking behaviour. Research demonstrates that addictive substances stimulate the pleasure centres in the brain allowing for the positive reinforcement of drugs (Muller, 2013), and in the case of sugars usage the effects of the drug have been reported to evoke feelings of relaxation, sleep and intense pleasure (Hafajee, 2014). An analysis of behavioural and emotional cues that characterised the samples addictive profiles were as follows: body pains, mood changes, relaxed feeling, escaping from reality, increased confidence and feelings of intoxication. The positive effects of sugars were experienced as follows : feelings of relaxation (20% of the experimental group and 26% of the control group), escaping from reality and problems (20% of the experimental group and 40% of the control group), increased confidence levels (11% of the experimental group and 20% of the control group) and enjoying the feeling of intoxication (14% of the control group), all of which were pleasurable states that reinforced the efficacy of the drug and helped to cope with the problems that they had been experiencing. The abovementioned findings demonstrate that the process of positive reinforcement, which allows for the association of salient cues with rewards of drug use plays a pivotal role in cue reactivity and cue-elicited cravings. Sugars like any other drug that is abused for its pleasure producing properties affects the electronic circuits of the brain, and the progression from use to addiction can be explained by the neurobiological pathways outlined in the addiction memory theory, where the use of the drug sensitises the mesocorticolimbic dopamine pathway (Paulus & Stewart, 2014). The sensitisation of the mesocorticolimbic dopamine pathways in turn encourages connections between the dopamine and endorphin connected pathways of the hippocampus (Volkow et al., 2012). The memory of addiction is considered to be an episodic memory because of pre - frontally stored experiences (Huhn et al., 2019), and the emotions attached to drug use are considered to play an important role in creating the episodic memory for continued drug use (Muller, 2013), which correlates with motivation and activity (Ekhtiari & Paulus, 2016). Therefore, based on the addiction research mentioned above, state dependent learning, which is based on pleasurable states that are associated with sugars usage may pose problems in rehabilitation, thereby providing support for interventions that specifically target conditioning as a result of positive reinforcement.

Apart from sugars addiction being positively reinforced, it can also be motivated by negative reinforcement, which is supported by media reports cited in *Indianspice* (September, 2014) that sugars is frequently used to alleviate unpleasant feelings that are associated with withdrawals.

In the current study, participants stated that they continued using sugars despite the accompanying difficulties as it helped to alleviate and cope with negative symptoms and presentations. Body pains (40% of the experimental group and 23% of the control group) and reduction and alleviation of angry feelings (26% of experimental group) ranked high amongst the reasons provided for the continued use of sugars, which supports the literature presented by Hafajee (2014) that at the point of an addiction, heroin is used to avoid the pain associated with withdrawals or to seek the effects of the drug. Therefore, internal stress that is experienced during withdrawals can facilitate drug seeking and drug taking behaviour in sugars addicted persons during periods of withdrawal, providing support for Thompson et al. (2019) findings that interoceptive states and the effects of the drug encourages cravings. The awareness of the effects and impact of physical and emotional interoceptive states on drug cravings are crucial in recovery and should be incorporated in treatment programmes.

The progression from use to abuse to addiction may also be due to the user's expectancy that the repetitive use of sugars is a way of dealing with untreated emotions or it may be as a means of self - medicating the negative emotional symptoms of stress, thereby resulting in intake escalation and reinstatement of drug seeking. Therefore, addictive behaviours can be viewed as learned habits that are reinforced by rewards, whereby a motivational stimulus (escaping from the negative physiological responses and feeling states) associated with withdrawals, strengthens a behavioural response (continued drug usage). These findings support neurobiological research by Mohammed Ahmadi et al. (2016), where it was found that the neurobiological effects of drug usage and the accompanying psychological and behavioural consequences between a drug - naïve and a drug experienced person may differ due to the repeated pharmacological actions of a drug or due to the learning process that accompanies drug usage. The abovementioned findings relating to the symptomatic experience of the sample, shows that both negative and positive reinforcers perpetuate sugars usage and that both direct reinforcement (euphoric effects) and indirect reinforcement (avoidance of stress) tends to complement each other (Károly et al., 2013). This simultaneous process can lead to significant disruptions in self - awareness, which according to Ekhtiari et al. (2016) hampers an individual's ability to notice internal mental states and emotions, which in turn impairs awareness of their condition, need for treatment, and their desire for the drug. Therefore, it is important that recovering persons are made aware of their individual reinforcers and its role in

perpetuating the addictive cycle and find ways of minimising and dealing with these reinforcers.

6.1.4 Physical facets and experiences

This study builds on the extant literature that highlights the enormous burden that heroin usage places on users (Bond & Witton, 2017; Kadam et al., 2017), therefore it is important to closely evaluate the reasons for the continued use of sugars in the sample population, despite the challenges associated with being addicted to it. This study identified strong physical facets and experiences that encouraged participant's dependency on sugars viz, cravings, withdrawals, loss of control and physical tolerance. The amount of sugars used was measured by the number of straws of sugars used daily, in which participants reported using 3 to 30 straws a day, which provided an index of the severity of their addiction and was reflective of the tolerance levels for sugars. Apart from the number of straws used daily, time of usage in the day provided a clearer picture of patterns of sugars usage. In relation to participant's usage, almost three quarters of the experimental group reported using sugars throughout the day and more than three quarters of the control group reported using sugars three times a day. The above findings demonstrate that the use of sugars in the sample population is characterised by a high frequency of usage and can therefore be categorised as compulsive use, which is in keeping with media reports by Tolsi (2006) and literature (Hafajee, 2014), that characterises sugars usage by loss of control. The amount and patterns of usage are mostly related to being unable to cope with cravings and withdrawals, as sugars users struggle to cope with the physical and emotional aspects of cravings and withdrawals, which results in them having to consume drugs at particular times in the day to avoid the associated discomfort and pain. The results of this study demonstrate that the lives of the sample population are regulated by their need for sugars and their daily behaviours are centred around seeking and using the drug, which results in lost efficiency.

6.1.4.1 Loss of self-control

Loss of self - control is a common subjective experience which is used to explain the nature of the addictive process as outlined in Hunt (2014) description of an addiction, where she described an addiction as a complex, progressive behaviour in response to the repeated exposure to a drug. The time associated with loss of control that outlined the paths from abuse

to dependence in the sample population differed between the two groups, with less than half of the experimental group reporting that their sugars usage progressed to uncontrollable usage within 2 to 4 years of onset and almost a third of the control group reporting loss of control between 6 and 10 years. Family problems were most commonly reported in both the experimental and control group at the time of losing control of their usage, which corroborates with research findings that drugs are often used as a coping mechanism to deal with emotions or cope with stressful situations (Jester et al., 2015). Loss of control and compulsive usage can be explained by the principle of reinforcement, in which an addictive behaviour can be viewed as a learned habit that develops over time in relation to positive and negative reinforcement. Neurobiological factors also play a role in the progression of an addiction and loss of control, where neurobiological changes following regular drug usage disrupts the brains homeostasis and increases an individual's sensitivity to negative physical and emotional stimuli (Muller, 2013), thus impacting on the drug user's ability to remain abstinent. The abovementioned findings can also be explained by Knowlton's (2015) explanation of the link between learning and addiction, where an individual employs purposeful behaviour when initially seeking the drug, however following extensive repetitive usage and the rewards associated with usage, drug using becomes autonomous and can be performed with little attention or cognitive effort, thus constituting a habit.

In the current study, all 70 participants had reached a stage of compulsive use and loss of control, where they were unable to minimize or abstain from sugars usage for any length of time, thereby supporting treatment literature that one of the critical aspects of heroin addiction is the challenge of being unable to stop substance use on one's own volition (Bond & Witton, 2017). This was supported by the research findings, where most participants reported using sugars on the day of admittance as they were unable to cope without using sugars. Griffiths (2013) highlighted two aspects of loss of control which was evident in the findings of the study, the first aspect is when the drug user is unable to control the amount or time period of compulsive usage and the second is when the sugars user experiences loss of control over when he is going to engage in an addictive behaviour. In the intake interview, all 70 participants from the experimental and control group reported that sugars usage became the focus around which all else revolved, and their need for treatment was motivated by their inability to control or stop their usage, even in the face of negative consequences. Therefore, loss of control was evident, where an unending interest in the drug was accompanied by a shift in attitude and loss of

interest in daily activities thereby supporting anecdotal evidence cited in the Mail and Guardian (Tolsi, 2006), that the primary focus in the daily life of sugars dependent persons revolved around acquiring and using sugars, even in the face of personal, family, social, employment and the legal problems that it created.

Loss of control of sugars is linked to tolerance, which is a key feature of heroin addiction, where the body requires increasing amount of sugars over time to get the desired effect, which in turn leads to increased exposure and greater frequency of administration. The results of this study demonstrated that tolerance affected the frequency and probability of sugars use, where the effects of sugars served to reinforce the need for the drug. The repetitive usage of sugars resulted in progressive decreases in pleasurable effects with most of the experimental and control group participants stating that over time they needed increasing dosages to produce the same effects. The concept of tolerance can be explained by neurobiological processes, where the biological effects of a drug results in neuroadaptation, a process that results in changes to the chemistry and synaptic transmission of the brain (Károly et al., 2013). These biological adaptations of the drug results in sugars users increasing their dosage and frequency of administration as an attempt to try and reproduce the initial effects of sugars. At the time of entering the rehabilitation programme, the majority of participants stated that despite the quantity of the dosage, they were unable to experience the euphoric effects of sugars, which is in keeping with the literature on tolerance that states that with time larger doses are required to achieve the initial effects of heroin (NIDA, 2018). Therefore, the results of this study support Károly et al. (2013) findings and demonstrates that if an individual reaches this stage of usage, drug seeking and drug taking is no longer controlled by “liking” the drug, but by an absolute need and irresistible craving for the drug.

6.1.4.2 Withdrawal

Sugars users experience physiological and psychological distress when abstaining from regular usage known as a “withdrawal”, which often results in sugars addicted persons maintaining the use of sugars to avoid discomfort. All 70 participants in the sample stated that they continued using sugars because of the withdrawals and that they needed to smoke regularly to tide over the “withdrawal” effects, therefore the reinforced repetitive use was an attempt to ameliorate the unpleasant effects which motivated their continued use of sugars. These findings are based

on the operant conditioning perspective, where addiction can be seen as a learned response that is sensitive to their own consequences and can be viewed as an operant behaviour, where the maintenance of drug use is controlled by contingencies of reinforcement. Therefore, in relation to sugars withdrawals, negative reinforcement mechanisms which involve the use of sugars to alleviate the unpleasant feelings of withdrawals is a contingency that reinforces sugars use in the sample population. These finding corroborates with interviews conducted on sugars addicts in the Chatsworth area as cited in the Mail and Guardian (Tolsi, 2006) and the literature presented by Bond and Witton (2017), which states that the withdrawal process is one of the biggest hurdles that heroin users face in quitting the drug, and that the only reason that addicts continue using sugars is to be able to cope with the negative effects of withdrawals. These findings could be further explained by neuroimaging studies that have found that frontal cortical structures such as the orbitofrontal cortex and the anterior cingulated gyrus, which are connected to limbic structures that regulate motivation and reward systems are deactivated during the withdrawal process (Wang et al., 2012), which in turn impacts negatively on self - regulation of emotions, cognitions and behaviours during the withdrawal process (Ersche et al., 2013), and increases the user's vulnerability for sugars whilst withdrawing.

Sugars withdrawal occurs in addicts within hours of the last dose and is accompanied by observable physiological withdrawal effects, which can range from mild flu like symptoms to more severe reactions that include aching of the bones and muscles, cold sweats, vomiting, agitation, skin irritation and headaches (Amato et al., 2013). In determining the nature and severity of the withdrawal presentation, participants reported experiencing an average of 3 withdrawal symptoms. Body pains, hot and cold flushes, insomnia, nausea and vomiting mainly characterised the symptom presentation of the sample population whilst withdrawing from sugars. Therefore, sugars addiction may be due to the reinforcement of repetitive subjective experiences of wellbeing that provides relief when using sugars, which in turn reinforces the need for sugars. These findings are consistent with information provided by Hafajee (2014), who stated that the participant's experience of the physical discomfort and disruptive effects of discontinuing the use of sugars, challenges their ability to recover and perpetuates their addiction.

6.1.4.3 Craving Experience

Cravings are an important construct that perpetuates an addiction, so a thorough understanding of the phenomenon as it relates to sugars addiction is crucial in developing and utilising treatment modalities for this population. In determining whether cravings perpetuated participant's addiction to sugars, a third of the experimental group and almost half of the control group participants identified cravings as a trigger for sugars usage, a finding which supports research that states that cravings play an important role in the acquisition and maintenance of an addiction, and that cravings and substance intake are mostly cue controlled (Bossert et al., 2013; Tiffany & Wray, 2012). In the current study, a large number of experimental and control group participants reported experiencing intense cravings upon awakening in the morning, which suggests that their day begins with thoughts of needing a drug, a finding which corroborates with media reports cited in *Indianspice* (September, 2014) that cravings and withdrawals are worst when an addict wakes up after an eight-hour sleep. Learning theories such as the classical conditioning theory emphasises the role of conditioned responses in eliciting a craving and provides an explanation as to why participants reported experiencing intense cravings at particular times in the day. The repetitive use of sugars at a particular time in the day reinforces the need to use sugars upon awakening in the sample population, where the usage at a particular time in the day becomes associated with cravings for sugars. An alternate explanation could be based on the physiological effects and lifespan of heroin, where the effects of heroin lasts for a duration of 4 to 6 hours (Bond & Witton, 2017). This relatively short life requires administration upon awakening, as the user will start to experience cravings for the drug to avoid unpleasant withdrawals effects.

Environmental cues and its effect on cravings impact and maintain an addiction, as emphasized by the Pavlov's (1927) classical conditioning theory. This study was able to identify variables that influenced cravings amongst the sample population and provides supports for the cue reactivity paradigm, which is useful in identifying and determining the effect of sensory cues in eliciting a craving. The results obtained on cravings demonstrated that visual stimuli were triggers for cravings, in which a third of the experimental group participants reported that seeing others using a drug elicited a craving and a tenth of the experimental group participants reported that the sight of cues and paraphernalia related to sugars usage elicited a craving. Visual and olfactory sensorial experiences also served as triggers for sugars usage in the control group, with a tenth of the control group participants reporting that exposure to cues and

paraphernalia related to sugars and the imagined taste of sugars triggered a craving. The above findings are reflective of the impact and influence of the addiction memory on cue reactivity which can be further accounted for by Robinson and Berridge (1993) “incentive-sensitisation model” that proposes that stimuli like the sight and smell of alcohol becomes tightly associated with drug reinforcing properties. These sensorial stimuli become stronger through repetitive associative learning processes and acquire the potential to evoke drug like or drug opposite responses, thereby perpetuating the need for sugars. These findings relating to the impact of sensory cues on cravings further supports the Elaborated Intrusion Theory (Kavanagh et al., 2013) explanation of a craving, that describes a craving as an affective cognitively laden event in reaction to substance related stimuli. Based on the Elaborated Intrusion Theory, antecedents such as external cues and cognitive associations with sugars can initiate thoughts about sugars and trigger other associations with sugars, which results in elaborated thoughts of the drug. The findings on participant’s subjective sensorial experience of triggers, and the association between sensorial cues and cravings provides support for stimulus discrimination treatment programmes that are aimed at exposing sugars users to sensorial triggers, without the opportunity to carry out the addicted behaviour.

The findings of this study support cognitive models of craving, which states that cue reactivity activates information related to drug usage (May et al., 2014), and contends that emotions, expected outcomes and interpretation of experience (Marlatt & Gordon, 1985) influences cravings. In the current study, less than a quarter of the experimental and control group participants cited internal cues such as negative emotions as a trigger, which suggests that a craving may be due to the substance user wanting to alleviate unpleasant emotional states. The thoughts, experiences and feelings that were reported to induce a craving were as follows: anger (89% of the experimental group and 77% of the control group participants), seeing others using drugs (69% of the experimental and control group participants alike), anxiety (57% of the experimental group and 60% of the control group) and sadness (71% of the experimental group and 74% of the control group). These responses were indicative of negative emotional states, therefore craving for sugars may be as a result of the user wanting to increase the short-term positive effects of drug usage or escaping from an unpleasant emotion, suggesting that the use of sugars served a purpose to the sample population, thereby encouraging the repetitive use of the drug. The use of sugars or more specifically the early usage of sugars is usually experienced as pleasurable, as drugs operate via the pathways of the brain known as the reward centres

(Volkow & Morales, 2015), and heroin can increase dopamine transmission (Karoly et al., 2013). Therefore, when a sugars user is faced with negative feelings and experiences, it encourages craving for sugars, due to the association between sugars use and pleasurable feeling and states. The results of this study suggest that stabilising an individual's affective vulnerability may be a useful treatment target in craving management that can help in reducing and eliminating avoidance coping. State dependent learning and the episodic memory associated with sugars use affects an individual's ability to recover, therefore treatment programmes that aims to stabilise or teach sugars user to deal with their negative emotions could assist in reducing avoidance coping mechanisms and cravings.

More than half of the research participants stated that impulsive temptations triggered their desire to use sugars, suggesting that they had no control over their ability to deal with cravings. It is evident that the sample population experienced phasic shifts in relation to their cravings for sugars, which are described by Tiffany and Wray (2012) as relatively short acute craving periods of fast onset in response to conditioned sugars related cues. The role of impulsive temptations in triggering sugars usage can be accounted for by the Elaborated Intrusion theory (May et al., 2004), which states that the automatic associative processes that operate outside of an individual's consciousness, breaks into consciousness when faced with other cognitive demands, allowing for thoughts about drugs to be subjectively perceived as spontaneous. In relation to cravings, triggers and cues give rise to cognitive activity below the threshold of awareness, which triggers other associations that break into awareness as spontaneous intrusive thoughts, as prior processing has been taking place beneath awareness. The "addictive personality" concept is an alternate explanation for impulsive temptations and the strongest evidence for the association between addiction and personality traits is based on trait impulsivity (Verdego - Garcia, 2008). The results of the study demonstrate that sugars addicted persons present with disinhibition, lack of constraint and/or a need for immediate gratification, therefore when sugars users experience cravings they act impulsively without giving thought to the negative consequences of their behaviour.

The findings of this study support the concept of social pathways in the development and perpetuation of an addiction, where more than half of the participants linked their desire to using a drug to fulfilling social needs and belonging to a social group, a finding that is

consistent with anecdotal evidence that sugars usage is related to group cohesion and identification in communities in which it is commonly used (Hafajee, 2014). These findings provide support for Bandura's (1997) theory that social group factors and common social characteristics in an environment serve as social pathways to addiction, which have been further substantiated by longitudinal studies (Jester et al., 2015), that demonstrated that individuals that are favourably predisposed by social and peer influences to a drug, will be more inclined to use the drug. These findings provide support for concepts that underpin the social cognitive theory such as outcome expectancies, modelling of substance use and coping skills, suggesting that the individual, environment and behaviour interact simultaneously in the initiation of sugars addiction. The abovementioned findings suggest that is important to factor the type and magnitude of social influences in sugars affected communities in order to develop culture specific interventions and programs for the affected communities.

Addiction is sometimes viewed as a psychological mechanism for coping and temporarily reducing the personal anguish caused by internal or external conflict (Reimer et al., 2016), therefore addiction can sometimes be regarded as a maladaptive effort to solve personal problems and escape from emotional pain. In this study, more than three quarters of the experimental and control group participants stated that relationship and family problems were a trigger for sugars usage, supporting research by Kelly et al. (2017) that heroin usage is associated with family dysfunction and interpersonal difficulties. A popular socio cognitive model in the addiction literature known as the outcome expectancy model (Marlatt & Gordon, 1985) can be used to explain maladaptive ways in which a substance user deals with problems, where it postulates that an addictive substance is used as relief from an intolerable emotional state or to suppress their emotional pain. The results of this study show that environmental cues can trigger powerful expectations about the effects of sugars, and cravings are mediated by expectations about the positive effects of sugars, such as calmness and tension reduction. There is a growing body of literature focusing on expectations in drug use and the development of addictions, where the decision to use a drug may be influenced by desirable or undesirable consequences, such as "tension relief" or "escapism" (Blume & Guttu, 2015; Jester et al., 2015). Therefore, a person addicted to sugars can be defined as an individual who adapts to conflicts that they are unable to cope with by a pattern of substance use. This suggests that there is a relationship between cravings and interpersonal difficulties, which is further

compounded by socio-cognitive concepts such as “learned helplessness” and poor “self - efficacy”.

The abovementioned discussion shows that addiction is a motivated behaviour in this population of treatment seekers, where sugars usage may be initiated and motivated due to its rewarding capacity, which provides the motivation to continue using sugars. It is apparent from the above findings that conditioned stimuli are individualized and that cravings are experienced in different ways and in varying severity by sugars users. Therefore, a thorough understanding of risk and preventative factors, as well as strategies that enhance coping mechanisms whilst craving should be considered when developing treatment programmes for sugars users.

6.1.5 Previous Treatment

Recovery patterns and participant’s treatment history revealed that a significant number of participants had previously received some form of treatment for sugars addiction. This demonstrates that a large part of the sample had undergone varying periods of sobriety and needed more than one treatment episode, suggesting that the sample population is at a high risk of relapse. Treatment experiences reported in the intake interview ranged from self - help groups, formal rehabilitation treatment, personal abstinence efforts without any form of help and the use of opiate substitution treatments. An analysis of treatment experiences shows that those that have previously sought treatment may have been exposed to an intervention or programme that was based on availability and affordability and did not address recovery in totality. El Gluebally’s (2012) definition of recovery, which incorporates various domains of recovery that are necessary for healing viz; abstinence, physical healing, psychological healing and re - integration serves as an indicator of aspects that should form part of the recovery experience of sugars users in order for recovery to be successful. Therefore, the recovery experiences of previous treatment seekers show that they may have been exposed to programmes that did not deal holistically with the challenges that sugars addicted persons experience in recovery and that the treatment process of sugars addicts should include intensive, multidimensional recovery programmes.

In an attempt to understand the motivational factors that informed the previous treatment experiences of participants in the experimental group, just over a quarter of the participants stated that their sugars intake became uncontrollable and a little less than half of the participants stated that they wanted to stop smoking due to the negative consequences of usage. This finding is in keeping with NIDA's (2013) description of the features of an addiction viz; compulsive use of a substance and the inability to stop using substances on one's own accord. The 22 participants in the control group that had previously received treatment stated that they engaged in treatment due to the negative consequences of their usage, indicating that "loss of control", "tolerance" and the accompanying instability, provided the motivation for seeking treatment and behaviour change. A reason for the high rate of recidivism amongst this group of treatment seekers could possibly be that the initial motivation to recover may have weakened over time as the adverse reasons that prompted behaviour change dissipated, resulting in treatment seekers reverting to old patterns of behaviour. The weakened motivation to remain sober could be attributed to the neurological processes that maintain an addiction, where treatment research has found that the ongoing presence of maladaptive thoughts and feelings encoded in linked associative networks contributes to the allure of the addictive substance (Felitti & Anda, 2014), thereby encouraging the relapse process. Based on the above findings, treatments that are designed to promote the use of healthier, non- substance related strategies and the use of alternative means to fulfil the motivation related to sugars use may be useful in increasing a drug user's motivation to remain abstinent.

Due to the nature and severity of the withdrawal process and the challenges associated with abstinence efforts, the duration of treatment is crucial for successful recovery. Of those that previously received treatment, most of the participants received shorter treatments ranging from 1 - 6 weeks, just over ten percent of the experimental and control group participants received inpatient treatment for a period of 3 - 6 months and less than ten percent of the experimental and control group participants were admitted to a long term program for a year. The high rate of relapse amongst the sample population in the early stages of recovery may be attributed to the bio psychosocial complexities associated with sugars usage, therefore intensive programmes comprising of varied treatment modalities and longer treatment programmes with extended support are needed for treatment to be effective. This is supported by the treatment literature on the effects of longer treatment programmes, where it has been

found that longer treatment retention is associated with a lowered relapse risk (Veilleux et al., 2010).

6.1.6 Relapse

Relapse is the single most destructive dynamic to the recovery process and the prevalence towards relapse is greater than the prevalence towards sustained abstinence (Heydari et al., 2014). Previous treatment success is suggestive of a high rate of relapse amongst the research population, with the vast majority of experimental and control group participants that attempted recovery remaining abstinent for less than 6 months, supporting research that heroin users often enter and struggle with a repetitive cycle of rehabilitation and relapse (USAID, 2016). A minority of participants remained abstinent for a period of a year before relapsing. The high rate of relapse in the sample population may be correlated to their poor educational attainment, as recent genetic research has found that carriers of the DRD2 A1 allele are at an increased risk of relapse and the same gene variant is associated with lower educational attainment (Blum et al., 2014). The experimental and control group cited uncomfortable life situations and environmental cues as the reasons for relapsing or perpetuating their drug use, which replicates the findings by Witkiewitz et al. (2014) that drugs are used to cope with emotions and stressful situations.

Family problems were commonly reported by the experimental and control group participants as a relapse trigger. It was evident from their responses that most participants struggled to cope with family problems and although it was not part of the set of questions that comprised the intake interview, participants were engaged about the nature of family problems, of which they reported marital difficulties, loss of children and lack of family support. The extent to which family and marital factors account for the association between stress and relapse appears greater in relation to other psychosocial factors, aligning itself to research findings that heroin usage is associated with family dysfunction (Kelly et al., 2017). These findings suggest that family problems should be regarded as an important relapse trigger and family therapy should form an integral part of treatment, supporting the treatment literature on the need to incorporate family therapy in treating addictions (Lauder, 2013; Timko et al., 2015).

Social factors, cravings for the drug and going back into the same environment were to a lesser degree identified by the research participants as relapse triggers. These findings support Marlatt & Gordon's (1985) relapse model, suggesting that high risk situations and lack of social support impacts on the individual's sense of control and increases the risk of relapse. The factors that influenced relapse can be explained by elements of the social cognitive theory viz, self-efficacy and outcome expectancies. Social factors and cravings can be explained by outcome expectancies, which relates to a person's belief that their involvement and engaging in activities within a social circle creates a sense of belonging, thereby perpetuating their use of sugars. The second concept which is self - efficacy, plays a significant role in treatment outcomes and is perceived as a cognitive-motivational force that affects an individual's coping level under pressure, which is reflected in the way in which a sugars user conceives their ability to control their behaviour or cope in high risk situations (Nikmanesh et al., 2017). The type of self-efficacy relevant to the findings of this study is self-efficacy regarding resistance, which is related to an individual's belief in their ability to resist cravings and social pressure. Given that social factors and self - efficacy play a significant role in treatment outcomes, the impact of these factors on sugars use and recovery should be taken into consideration in treatment planning. On the other hand, sugars usage in the sample population maybe a marker for underlying problems and contexts such as peer affiliations or problematic environments that increase the risk of sugars usage.

The amount of sugars smoked on relapsing was an indication that sugars usage increased upon relapsing with almost a third of the experimental group and just over a tenth of the control group reported using marginally larger amounts of sugars post relapse and just over a third of the of the experimental and control group reported using significantly larger amounts of sugars upon relapsing. This finding can be explained by the "abstinence violation effect", which is a key element of the relapse process outlined in Marlatt and Gordon's (1985) cognitive behavioural model. The abstinence violation effect states that when a person experiences a lapse, it intensifies negative feelings such as guilt, shame and failure, and the individual's attempt to cope with these negative thoughts and emotions in turn intensifies the need to use sugars. The incremental effects of heroin use upon relapsing could also be as a result of the suppression of cravings during recovery periods, where research findings have shown that suppressing a craving can lead to increased responsivity to drug cues when exposed to them (Rogojanski et al., 2011), thereby resulting in increased sugars usage upon relapsing. The

finding of this study in relation to the incremental use of sugars upon relapsing could be explained by Boenings' (2001) addiction memory concept, and further substantiated by studies that demonstrated that the "addiction body memory" triggers and encourages addictive behaviour (Goodman & Packard, 2016). Therefore, the episodic memory and the intense desire and want of the associated feeling state of previous sugars usage could encourage the incremental use of sugars.

6.1.7 Abstinence Efforts

Personal abstinence efforts are important in determining a recovering user's motivation and ability to abstain from sugars. In the current study, less than half of the experimental and control group participants made prior efforts to abstain, with the duration of abstinence ranging from 1 week to 12 months. In trying to understand their motivation for previous abstinence efforts, a third of the experimental group and a fifth of the control group participants stated that their efforts to abstain were based on the need to be drug free, as their usage was out of control. The support structures that assisted in maintaining abstinence were as follows: church, engaging in gainful employment and opiate substitution treatment prescribed by a general practitioner. The choice of utilising the abovementioned support structures, rather than attending a formal rehabilitation programme may be due to the lack of treatment options that are available to people that are unable to afford rehabilitation costs (USAID, 2016). Of the reasons provided for relapsing, less than a fifth of the experimental and control group participants identified cravings as a reason for relapsing after a period of abstinence, thereby supporting treatment effect studies that cravings play a part in triggering drug use after a period of sobriety (Conklin et al., 2015; Galaj et al., 2016; Kavanagh et al., 2013). The research findings support Marhe et al. (2013) findings that increased cravings during periods of abstinence in heroin addicts are associated with increased rates of drug use and relapse.

6.1.8 Current Problems

It was important to determine the nature and severity of psychosocial problems that participants were experiencing on admittance to the centres and its impact on their emotional functioning, so that the therapist could determine the effects of these psychosocial problems on the outcomes of the interventions that they received. The current concerns reported by the sample population that posed challenges to their recovery were as follows: less than a quarter of the

sample had no fixed abode, almost a tenth of the experimental group and a third of the control group were concerned that they had poor refusal skills, and most of the control group participants had concerns about not being unable to deal with cravings), thereby identifying a need for preventative efforts in this population. These findings provide support for the inclusion of social learning theory concepts such as environmental challenges, modelling behaviours, coping skills, self - efficacy and outcome expectancies and their role in recovery and relapse. Based on the abovementioned findings, the following should be taken into consideration when designing a coping skills programme: chaotic environments, poor social coping skills, perceived external approval of drug use, affiliation with deviant peers, poor self - efficacy and external locus of control. Factors that could reduce the risk of addiction within this community will therefore be as follows: feeling connected and valued within an environment, stability within their living environment, strong bonds with social institutions in the community and religious institutions, personal disapproval of drug use tied to the belief that drug use is dangerous and harmful, internal locus of control and the intense management of cravings.

6.1.9 Future dangers

Participants were asked about future dangers that they could possibly experience post discharge, due to the possibility that these dangers could emerge during reprocessing. Participant's fears included both internal and external cues that affected their ability to abstain from sugars usage. Many participants reported that they were afraid to go back into the same environment, and fewer participants reported being afraid of peer pressure, family problems and the inability to deal with emotions post treatment. These findings replicated results from the DARA (2015) programme, which identified similar factors such as peer pressure and relationship problems that perpetuated future fears of recovery and kept addicted persons trapped in their addiction. The concerns relating to future dangers are indicative of internal and external sugars related cues that may have encouraged helplessness and perpetuated their addiction before entering treatment. The literature on sugars using communities shows that this community is characterised by negative relationships, boredom, poor motivation, poor coping skills, high levels of apathy, dysfunctional families and poor support structures, and that the disintegration of this community may impede or stifle an individual's recovery (Tolsi, 2006; USAID, 2016; Vitacare, 2012). These findings identify an important target population for a holistic treatment programme that deals with intrinsic and extrinsic fears within the context of their living environments and social settings. Based on the above findings, the future resources

that are needed for maintaining sobriety in the sample population should include strategies such as family therapy, emotional regulation techniques, positive coping mechanisms and strategies that alleviate their fears relating to lifestyle changes and recovery.

6.1.10 Genetics

This study builds on the extant literature on the role of genetics on drug abuse and addiction, which have been substantiated by previous research that endorses the role of genetics as a contributing factor to addiction (Agrawal et al., 2012; Juli & Juli, 2015; Kendler et al., 2003; Vassoler & Sadri, 2014). The findings of this study are consistent with previous genetic studies, where it was found that a little less than half the sample population had family members or blood relatives that were addicted to a drug, which suggests that environmental history and the influence of significant others could have contributed to their vulnerability and propensity to become dependent on sugars. The present study confirms the role of environmental influences on the sample population but was unable to provide information about the specific genetic and epigenetic factors underlying sugars usage. Further research is required to obtain a better understanding of genetic and heritable influences on sugars addiction, which can impact on more effective and targeted interventions.

Apart from a genetic vulnerability to an addiction, growing up in a family that is characterised by an addiction can affect a child's development in negative and long - lasting ways and these environmental experiences which are context based predisposes them to drug usage (Hou et al., 2016). Learning theories have emphasized the process of socialization as one of the most important aspects of learning (Bandura, 1997), and states that the adoption of behaviours through imitating and modelling shapes an individual's learning and development, which in turn affects the way a child experiences themselves and views their world. Constant exposure to family instability in families that are characterised by an addiction may disrupt the developmental process and increases the risk of developing problems with cognitive functioning, emotional ability and behaviour (Kelly et al., 2017; Launder et al., 2013), which poses a further risk for the sample population. Therefore, factors that could reduce the risk of sugars addiction within the affected communities will be as follows: feeling connected and valued by family and significant others, as well as emotional and physical stability within the home environment.

6.1.11 Treatment Goals

In determining readiness to change, participant's treatment goals were assessed using Prochaska's (1984) stages of change model, which provided an indication of their readiness to change. The stage of change of a recovering person serves as an indicator of their motivation and commitment to recover. The importance of a client's readiness and motivation to change cannot be underestimated when it comes to the use of EMDR therapy with addicted persons, therefore the stages of change model (Prochaska & DiClemente, 1984) serve as a useful construct when using EMDR therapy with addicted persons to help them move towards active engagement (Abel & O'Brien, 2014). Most participants were in the action stage of change in both the experimental and control groups, thereby acknowledging the detrimental effects of addiction and being committed to recover. A small percentage of participants in both the experimental and control groups demonstrated some commitment to abstain from sugars, but not to other drugs or alcohol. The results of this study demonstrated that most of the sample population displayed readiness to change and readiness for treatment, which may be a consequence of the devastation that they experienced due to the loss of control of sugars usage. In relation to the stages of change model, readiness for treatment is characterized by motivation to seek help and to engage in treatment, as well as compliance and outcome, suggesting that the sample population was highly motivated to engage in treatment and recovery. The inextricable link between the stages of change and motivational factors underlies goal driven treatment, and treatments that incorporate motivational goal directed principles have been found to increase treatment retention and abstinence in treatment seekers (Kopetz et al., 2013)

6.1.12 Summary

The findings of this study show that addiction to sugars is generated and perpetuated by multiple causes viz; social, biological, neurological and psychological factors. The presentation of sugars addicts is characterised by an inability to abstain, cravings, impairment in behavioural control, physical challenges such as tolerance and withdrawals, interpersonal problems, dysfunctional emotional coping skills and diminished recognition of the compulsive aspect of their condition. It is evident from the study that the problems relating to sugars addiction are pervasive, devastating, painful and long standing, therefore it is important to identify and deal with issues that perpetuate the addiction and impede abstinence efforts. An investigation into

factors which helps to understand the addictive process and accompanying phenomenon prior to the administration of any intervention is crucial to successful treatment outcomes, as the goal of treatment should be to reduce known risk factors and promote protective factors amongst sugars addicts. This research study has identified complex factors and a range of inter-related issues related to sugars addiction at an individual and community level that places sugars users within this community at an increased risk for maintaining and perpetuating an addiction, therefore an understanding and the relationship between these factors and the way in which they actively reinforce an addiction is imperative for the development of treatment interventions. The discussion that follows will focus on the analysis of the sugars craving inventory, pre and post treatment, which provided a measure of participant's craving experience.

6.2 ANALYSIS OF SUGARS CRAVING INVENTORY (pre and post treatment)

The sugars craving inventory which was developed to measure participants craving experience pre and post intervention comprised of feeling statements, thought processes and physical symptoms, that were reported as frequencies and percentages.

6.2.1 The Feeling Scale

The feeling scale comprised of four feeling statements viz; "I feel worried", "I feel things around me are confusing", "I feel scared" and "I feel tense". More than half of the participants in both groups reported feeling scared and tense whilst craving, feeling states that are associated with high levels of anxiety. These findings are consistent with the literature on cravings and craving management which states that cravings and cue induced triggers evoke extreme anxiety and perpetuates the cycle of addiction (Huhn et al., 2016a; Nosen et al., 2012). These findings have been further substantiated by Hafajee (2014), who stated that the euphoric effect of sugars lasts for about 15 to 20 minutes, which is followed by feelings of agitation and restlessness. The findings of the feeling scale clearly demonstrate the link between cognition and affect and confirms that recovering sugars users struggle with high anxiety and related feelings such as fear and tension that perpetuate their cravings. Socio cognitive concepts such as expectancies can be used to explain the need for desired changes in affective states, whereby an individual

that is feeling scared or tense whilst craving will be more inclined to use sugars based on their belief that the use of sugars will result in positive outcomes viz, calmness and tension reduction and improve and enhance their overall functioning. The high levels of anxiety that have been observed in the sample population could be as a result of drug related neurochemical changes, as recent advances in neurobiological research have found that chronic drug use causes anxiety (Ekhtiari et al., 2017), which then reinforces the need for the drug in an attempt to relieve negative emotional stimuli.

The frequency and intensity of negative feelings that were experienced whilst craving in both experimental and control groups had significantly decreased post intervention, demonstrating that both interventions were able to reduce participant's anxiety levels. An analysis of both pre and post assessment scores of the feeling scale indicates that both EMDR therapy and relaxation therapy are effective in reducing anxiety, thereby providing support for the use of these modalities in craving management and the treatment of sugars addiction. The changes in the feeling scale suggests that the sample population will benefit from interventions such as EMDR therapy that will challenge their expectations of the perceived positive affective effects of sugars, as well as techniques such as relaxation training that would be useful in reducing their anxiety whilst craving. A central concept in drug abuse research is that increased dopamine in mesolimbic brain regions, which are considered as important in emotional processing are associated with reinforcing the effects of drugs (Muller, 2013; Paulus & Stewart, 2014), thereby providing evidence for the neurobiological basis of an addiction. The positive symptomatic changes observed on implementation of the therapeutic techniques used in the study suggests that modalities such as EMDR therapy and relaxation training, that demonstrates the ability to reduce or reverse modifications to the mesolimbic dopamine systems of the brain, should be considered in the treatment of addictions.

6.2.2 The Thought Scale

The thought scale comprised of 6 statements which are reflective of the thought processes that are associated with a craving viz; "I am finding it difficult to concentrate", "I think I will not be able to cope without sugars", "I think I am losing control", "I think I am going crazy", "I think I am going to die" and "I fear something terrible is going to happen to me". A large number of participants in both groups struggled with two thoughts in particular that were

positively correlated with their cravings viz; “I think I will not be able to cope without sugars” and “I think I am losing control”, which indicates that negative thoughts related to their inability to cope without sugars and loss of control further intensified their craving for sugars. The support for a causal link between negative thought processes and cravings is provided by several aspects of these findings. The finding is reflective of cognitive accounts of craving and expectancies, where the informational component that relates to specific beliefs about drug effects (e.g., I think I will not be able to cope without sugars) encourages cravings. The beliefs that people have about the effects of sugars and the association of those beliefs in the current study is consistent with research that states that thoughts related to the expected outcomes of drug usage intensify cravings and predict drug use (Noel & Thomson, 2012). The thoughts that research participants struggled with most, further demonstrate that sugars users are characterised by low self - efficacy in drug using situations, which in turn is related to thoughts of lack of control and a sense of helplessness in being able to control their urges for sugars. The responses on the thought scale show that over the years of using sugars, participants developed inaccurate and unhealthy mental frameworks that was accompanied by associated emotions, relating to the purpose that sugars served in their lives and their inability to cope without it. This finding that cravings are controlled by cognitive and emotion processing systems provides support for incorporating aspects of cognitive models such as the Dual - Affect - Model (Baker et al., 1987), and the Cognitive Processing model (Tiffany, 1990) in craving management and addiction treatments.

A significant number of participants in both groups stated that they were finding it difficult to concentrate, which could be attributed to changes in neurotransmitters as a result of sugars usage (Hunt, 2014), or changes in the neurochemistry of the hippocampus and frontal cortical areas of the brain, which impact on an individual’s concentration level (Ersche et al., 2013). The frequency and intensity of negative thoughts related to the craving disturbances had shown a slight improvement post intervention, suggesting that both EMDR therapy and relaxation therapy had a minimal impact on participants thought processes. A possible explanation for the abovementioned finding is that the therapeutic modalities used in the study may be more effective in dealing with the physical and affective aspects rather than the cognitive aspects of a craving. The intensity of negative thoughts related to sugars cravings and the inability of the treatment modalities to significantly impact on the thought scale items of the sugars inventory, may also be as a result of the nature and strength of reinforcement learning on the thought

processes associated with sugars cravings, thereby resulting in thoughts associated with cravings as being resistant to change. Based on the above findings and explanations, therapeutic strategies that target cognitive reinforcement mechanisms associated with sugars addiction need to be implemented with this treatment population.

6.2.3 The Physical Symptom Scale

The physical symptom scale comprised of 15 statements that were reflective of the physiological disturbances that sugars users experienced whilst craving. The pre-intervention scale showed that all 15 symptoms were experienced in varying severity, but mostly of high intensity in both the experimental and control groups. This study provided evidence that physiological disturbances experienced whilst withdrawing are a huge challenge for recovering sugars addicts, which is similar to the anecdotal evidence cited in the Mail & Guardian (Tolsi, 2006), and the treatment literature on the physical challenges that are experienced by heroin addicted persons (Bond & Witton, 2017; Merchant & Dorkings, 2005). An analysis of the physical symptom scale showed that both groups experienced a marked decline in the frequency and severity of physiological disturbances post treatment, a finding that is important in treating sugars addiction as the literature states that sugars addiction causes significant physiological disturbances (Hafajee, 2014), and media articles such as Indianspice (September, 2014) stated that one of the biggest challenges for sugars addicts is overcoming the physical and psychological need for sugars. During processing, all aspects of the craving experience should shift simultaneously, however in the case of sugars users, the physiological disturbances dominated in consciousness, which is indicative of their challenges and inability to overcome the physical aspects of cravings and withdrawals. The researcher based on her experience with sugars addicted persons has observed that recovering sugars addicts struggle most with the physical symptoms of cravings and that withdrawal related distress increases drug cravings, and recovering persons often report experiencing physical cravings well into their recovery. These observations can be explained by neurological and behavioural studies that have indicated that brain structures involved in learning and memory contributes to the physical and emotional aspects of opiate addiction, such as withdrawals and physical dependence (Koob et al., 2014; Muller, 2013; Volkow et al., 2012), which impacts on motivation and addictive behaviour. Therefore, the changes observed in the physical symptom scale post intervention demonstrates that these modalities can impact on the neural mechanisms of learning and memory, which brings on positive changes in behaviour and motivation.

An analysis of the physical symptom scale revealed that both groups showed a reduction in the frequency and intensity of physical symptoms post intervention, however the experimental group participants demonstrated marked changes in symptom reduction, with a larger number of experimental group participants as compared to the control group participants stating they were not experiencing any physical symptoms post EMDR therapy. This finding suggests that EMDR therapy is more effective than relaxation therapy in reducing the physiological intensity of the craving experience. Despite the marked positive shifts noted in the physical scale of the sugars craving inventory, the changes should be interpreted with caution, taking into consideration that withdrawal symptoms peak on the second or third day of drug cessation and disappear within a week of abstinence (Amato et al., 2013), which may allow for the physical symptoms of cravings to overlap with physical withdrawal symptoms. Furthermore, it is possible that the changes noted in physical disturbances may to some extent be related to time effects. The findings that emanated from the physical symptom scale show that addiction to sugars is accompanied by pronounced physical disturbances that challenges the recovery process and provides support for the use of efficacious pharmacotherapeutics such as Suboxone and Naltrexone that can address the biological consequences of sugars addiction whilst craving and withdrawing. The use of pharmacotherapeutics in conjunction with complementary psychotherapeutic techniques supports studies that have demonstrated that recovering persons will benefit from multimodal intervention programmes (Bond & Witton, 2017; Hall et al., 2006; Schwartz, 2016). The preceding discussion focussed on the pre and post treatment analysis of the three scales that comprised the sugars craving inventory in conjunction with the research literature and anecdotal evidence related to the use of heroin addiction. The following discussion entails an evaluation of the efficacy of the two treatment modalities administered in the study.

6.3 COMPARISON OF THE EFFICACY OF TREATMENT APPROACHES

This study examined the efficacy of EMDR therapy in reducing cravings. The sugars craving inventory was a tool that was developed to measure the intensity of a craving at baseline and follow up to determine whether the treatments that were administered evoked changes in the participant's level of craving. It was observed that both the treatments that were administered were well tolerated by participants and although many participants from the EMDR therapy

group reported experiencing varying levels of physical discomfort whilst processing, they were able to tolerate the discomfort. Group differences in relation to participants craving experience were analysed and compared pre and post treatment. There were no differences observed in the pre - treatment assessment of both treatment groups in relation to their craving symptomatology. Participants in both conditions showed a significant decline in their craving symptoms post treatment, which demonstrates that both EMDR therapy and relaxation training had significantly reduced the intensity of craving symptoms, thereby providing support for the use of both these modalities for the treatment population.

The results of the Mann - Whitney U test and the Wilcoxon Signed Rank test on the feeling and physical symptom subscales of the Sugars Craving inventory indicated that both EMDR therapy and relaxation training were effective, and that neither were significantly more effective than the other in reducing the psycho physiologic intensity associated with a craving for sugars. Repeated measures of the feeling scale and physical symptom scale indicated a significant reduction in the intensity of feeling and physical symptom items associated with a craving. The marked changes in the feeling and physical symptom subscales as compared to the thought presentation subscale, demonstrated that specific craving symptoms are more responsive to the interventions used in the study. Furthermore, the positive shifts in the feeling and physical symptom scales shows that the mechanisms involved in the therapeutic modalities may be more body and affectively based, rather than cognitively based.

The results of the Mann – Whitney U test and the Wilcoxon Signed Rank test on the thought processes subscale of the Sugars Craving inventory differed from the other two subscales, where it was found that there were no significant changes in the items of the thought presentation scale in both the EMDR therapy and relaxation training groups. The thought scale did not demonstrate a significant reduction in thought processes associated with a craving experience, following the therapeutic interventions. A possible explanation for the observed similarities in responses on the thought subscales in both groups pre and post treatment could be as a result of participants being unaware of the cognitive processes underlying a craving for sugars, as they may have been preoccupied or overwhelmed with the dominant accompanying emotional and physical craving disturbances. The research on heroin, although related to withdrawals demonstrates that heroin users upon cessation of the drug manifest a range of

physical and affective symptoms, which range from mild flu like symptoms to more severe and persistent symptoms such as: aching of bones and muscles, diarrhoea, excessive sweating, insomnia, extreme anxiety, involuntary spasms and depression (Amato et al., 2013). The findings relating to the craving symptoms of the sample population demonstrates that physical and affective triggers have greater precedence and weighting than cognitive triggers, which is consistent with research on alcohol cravings by Schmidt et al. (2013), that cognitive triggers are less important when somatic triggers are more acute. Therefore, based on the findings of this study, somatic and affective triggers were more important and distressing than cognitive triggers in sugars dependent patients, and the intensity of the physical and affective triggers may have not allowed for the participants to focus on the less precedent cognitive triggers.

The “Sugars Craving Inventory”, which was developed by the researcher for the purposes of this study was found to be a reliable measure of craving based on its psychometric properties. The thought subscale demonstrated good internal consistency, which provides some support for the criterion validity of the thought subscale, therefore it must be noted that the lack of changes in the thought subscale was not due to the scale being a poor measure of craving. The therapeutic modalities used in this study were unable to demonstrate any significant effects on the thought presentation subscale, suggesting that therapeutic modalities that focus specifically on identifying and changing cognitive processes viz, CBT techniques and cognitive reappraisal training may be better suited and yield better outcomes in coping and changing the thought processes associated with a craving for sugars, as compared to the therapeutic modalities used in the study. This study has a limited capacity to explore or explain the underlying cognitive mechanisms that may be operative in perpetuating an addiction to sugars in the sample population, suggesting that future research is warranted to address the underlying cognitive mechanisms that support this group of treatment seekers. To develop a better understanding of significant and insignificant changes of the sugars craving scale, and to be able to make fine grained conclusions about treatment effects, careful consideration should be given to factors that contribute to the course of change as well as process observations.

The current study demonstrated that both EMDR therapy and relaxation therapy are capable of substantially reducing craving symptoms, however a lack of treatment differences between the two groups needs to be interpreted cautiously. Although no significant differences were found

between the treatment groups, differences cannot be excluded as the study may be underpowered, and non - parametric statistical techniques are less sensitive in detecting relationships or differences amongst groups. In psychotherapy research, a small sample size contributes to weak power and inadequate or weak power is a plausible interpretation for the absence of statistically significant differences between conditions (Kazdin, 2008). The similarities in the reduction of craving disturbances in both groups could also be due to time effects and an overlap in the symptom presentation of craving and withdrawal processes, in which sugars users experience similar thoughts, affective and physical symptoms whilst craving or withdrawing from sugars. The above explanations suggest that positive effects and changes in craving symptoms may have also been influenced by the length and nature of the withdrawal process. Another potential explanation for the similarities in treatment findings may be due to the study comprising of participants that did not present with any mental health comorbidities, and the absence of comorbidities allowed for the recovery process to be less complicated and for similar treatment outcomes in both groups. In KwaZulu Natal, 46% of admissions to rehabilitation centres have been diagnosed with mental health problems (Dada et al., 2015), therefore further research should explore the association and the extent to which mental health comorbidities may be related to treatment outcomes of EMDR therapy and relaxation training in treating cue reactivity.

The lack of significant treatment differences that were found between the EMDR therapy group and the relaxation group do however obscure the differences in the frequency distribution on some items of the Sugars Craving Inventory, where item frequencies demonstrated a reduction in the intensity of certain symptoms, and more specifically a reduction of physical symptoms in the EMDR therapy group as compared to the relaxation group. Apart from the frequencies of item scales, the researcher observed marked differences in treatment outcomes between the EMDR therapy group and the relaxation group, in favour of the EMDR therapy group. The experimental group participants demonstrated a better understanding and gained more insight into their craving experience, specifically with regards to changes in thoughts, feelings and physical symptoms. These observations were consistent with numerous studies and reports that confirmed the efficacy of EMDR therapy in treating addictions (Abel & O'Brien, 2010; Knipe, 2015; Kullack & Laugharne, 2016; Marich, 2009a; Muller, 2013; Zweben & Yeary, 2006).

The observed changes in craving symptoms are consistent with the treatment literature on EMDR therapy and relaxation therapy, where both methods were found to be efficacious in reducing craving symptoms. A possible explanation for the lack of significant differences between the results of the treatment and control group could be due to the relaxation response that is evoked in EMDR therapy. The neurological mechanism of relaxation has been identified as contributing to the efficacy of EMDR therapy, a finding which has been supported by Shapiro (2018) who stated that the action of the bilateral stimulation activates the parasympathetic nervous system and induces a relaxation response. However, it must be noted that the small sample size in this study could have yielded similar results in the experimental and control group as clinical interviews demonstrated a clearer difference in the EMDR therapy group, who presented as more confident and more aware of the processes that perpetuated their need for sugars as compared to the relaxation group. The observed changes in the craving experience of the EMDR therapy group is consistent with a study done by Hase et al. (2008), whose research findings demonstrated that subjects who received EMDR therapy demonstrated a reduction in craving symptoms. The changes in the craving symptoms of the control group are supported by research conducted by Melemis (2015), who reported that relaxation training allows for calming of the mind and body and has been found to be useful in helping addicted persons reduce their anxiety and cope with exposure to cue related stimuli.

The above findings show that there may be a significant advantage to integrating psychotherapeutic interventions such as EMDR therapy and relaxation training to treatment programmes, more specifically to assist with the affective and physical aspects of sugars cravings. EMDR therapy helped to desensitise and reduce the intensity of the craving experience and to reprocess the craving experience at an early stage of inpatient treatment in sugars addicted persons. Relaxation training allowed for participants to learn a method that produced a basic relaxation response that reduced their anxiety, eliminated tension from their body and to feel a deep sense of relaxation, which was useful as the craving experience is often accompanied by high levels of anxiety (Amato et al., 2013). These findings and observations suggest that sugars cravings involve many aspects of an individual's functioning, and that various techniques can have a positive effect and allows for positive changes in recovering persons, thereby providing support for treatment research that states that addicts are most likely to recover when exposed to a variety of strategies that facilitate and enables their recovery process (Schwartz, 2016). The results of this study also demonstrated that some sort of therapy,

be it a simple or complicated therapy can help to reduce the psychophysiological changes in cravings, thereby enabling the recovery process. Future research should be conducted to determine whether EMDR therapy and relaxation training are more effective in reducing craving disturbances in conjunction with rehabilitation programmes, as compared to control groups that are only exposed to treatment as usual. The preceding discussion focussed on the Sugars Craving Inventory which were administered to both the experimental and control groups and served as a measure of participant's craving experience. A discussion of the findings of the Subjective Units of Craving Scale, which was the instrument used to measure the participant's subjective level of craving pre and post EMDR therapy will follow.

6.4 SUBJECTIVE UNITS OF CRAVING (SUC) SCALE

This scale which is an adaptation of the subjective units of disturbance scale provided an index of participant's subjective level of craving and helped to determine whether there was a reduction in craving symptoms post EMDR therapy. It was found that 32 of the 35 experimental group participants rated their craving level at 0 by the end of the two EMDR therapy sessions, 2 participants rated their level of craving to be 2 and 1 participant rated their level of craving to be 3. Most participants stated that they were not experiencing any craving symptoms post treatment, which confirms that EMDR therapy was useful in extinguishing the psychophysiological intensity of their craving experience and that the disturbances related to the craving had been cleared. The 3 participants who reported that their SUC did not go down to a 0 were not exposed to any further processing, as the reasons provided for experiencing mild disturbances were ecologically valid. The 3 participants whose subjective units of craving were not able to go down to a 0 had provided reasons for experiencing some form of disturbance which they attributed to their craving for sugars viz, 1 participant stated that he was still experiencing headaches, 1 participant reported experiencing mild back aches and 1 participant stated that he was still thinking about his family problems.

The abovementioned reasons are not relevant to the craving experience but are due to the physical and social challenges associated with withdrawal symptoms, and the social difficulties that they were experiencing due to their sugars usage. This shows that people in recovery view their addiction to sugars as an experience in its totality and are unable to differentiate between

the various addictive phenomenon that characterise a sugars addiction, and the way in which they relate to each other. An important aspect of treatment would therefore be to educate recovering persons on the various aspects that characterize an addiction (viz, physical, cognitive, emotional and social), and to help them to be able to differentiate between the different addictive processes, phenomenon and stages, as well as its effect on their functioning and their ability to recover. The overall results of the SUC scale was positive, demonstrating that EMDR therapy was able to reduce and extinguish the psycho physiologic symptoms of sugars cravings, thereby providing support for the use of EMDR therapy in craving management and addiction treatment. The results of this study provide support for studies that have found that EMDR therapy is effective in reducing cravings and addiction symptoms (Brown et al., 2015; Hase, 2010; Knipe, 2015)

6.5 CONCLUSION

The findings from the intake interview demonstrates that the reasons for sugars usage and the development of addiction in affected communities is multifaceted and numerous. It is not just the physical addiction that creates and perpetuates the “sugars addiction”, but the factors that precede, accompany and stem from the use and abuse of sugars, which highlights and supports the bio psychosocial components in its causation and consequences. The quantitative findings show that the conceptualisation of sugars addiction requires a broad understanding of various interrelated factors such as learning, memory, reward and motivation, which should inform evidence based interventions and treatment that should operate from this comprehensive conceptualisation of sugars addiction.

The quantitative analysis of the research instruments used in the study demonstrated that both EMDR therapy and relaxation training are effective in reducing cue reactivity and craving management, however the item analysis of the sugars craving inventory demonstrated the superiority of EMDR therapy as compared to relaxation training in reducing physical craving symptoms. Future research using larger samples, longitudinal research processes and two distinct methods needs to be conducted to determine the effectiveness of these treatments in craving management. The following chapter will provide an in - depth discussion of the

qualitative findings of the study, which focuses on the findings of the semi structured interviews of the EMDR therapy group and their experiences of the EMDR therapy process. The chapter will also focus on the clinical impressions and observations of the EMDR therapy and relaxation groups.

CHAPTER 7

QUALITATIVE FINDINGS WITH INTEGRATED DISCUSSION: EXPERIMENTAL GROUP

In this chapter the qualitative analysis of the semi structured interviews, which were conducted on the experimental group will be discussed. Clinical findings and observations in relation to the EMDR therapy experience and the relaxation session will also be discussed. Lastly, observations and explanations provided by the sample population as to how and why EMDR therapy worked for them in reducing and extinguishing cravings will be presented.

The EMDR therapy group were interviewed on completion of the two EMDR therapy sessions, using a semi structured format, which provided an understanding of the interviewee's subjective experience of their EMDR therapy experience and the efficacy of EMDR therapy in treating cravings for sugars. Thematic analysis was used to understand the participant's experience of EMDR therapy and its impact on their recovery and overall functioning. The discussion that follows emerged from the interviews and is guided by the literature on addiction, the addiction memory concept and the EMDR therapy process and outcomes of therapy. The interview questions could have been extended, and it often seemed like further probing was required from the responses, however the researcher chose to limit qualitative probing due to the psychosocial and contextual limitations of the participants in general, which could be partly attributed to developmental disturbances and poor educational attainment as suggested by Blum et al. (2014). Therefore, some of the text that is presented may appear to be sparse but nevertheless provides an indication of significant factors and processes in terms of the participants' therapeutic experience.

7.1 THEMES

The experiences of the experimental group can be understood and explained through four psychological themes: 1) coping skills, 2) therapeutic safety, 3) hope, and 4) perceptions of

therapy. Within these themes, subthemes were identified that highlighted key aspects of the participants' therapeutic journey.

7.1.1 Theme 1 - Coping Skills (Participant's perceptions of their ability to cope with challenges in recovery)

The first question in the qualitative analysis was related to psycho physiologic changes on receiving EMDR therapy, in which participants were asked whether they noticed any changes in themselves after receiving EMDR therapy. The response categories, based on the participants' subjectively perceived changes after receiving EMDR therapy were divided into 3 domains viz; thinking, feeling and physiological changes as outlined in Table 29.

Table 26 Psycho physiologic changes post EMDR Therapy

Have you noticed any changes in yourself after receiving EMDR Therapy	
RESPONSE	N
Thinking	
Cope Better	4
Clearer	15
More confident about recovery	7
Realised pain is psychological	2
More motivated	3
Changed perspective on needing the drug	4
Feelings	
Calmness	13
Stronger	7
Happy	10
No fear	2
Less tense	3
Physiological changes	
No pain	19
No craving	4

No shivers	1
Feeling energized	2
Sleeping patterns improved	2
Body feels lighter	11

The results of the current study show that an EMDR therapy protocol, targeted at craving management was useful in reducing and extinguishing the psycho physiologic intensity of participant’s craving for sugars. It is often difficult to assess changes in intrapersonal factors and experiences, as participants may be unaware or unable to describe these changes. Based on the responses of the experimental group as outlined in Table 29, the observed psychophysiological changes of participant’s cravings in response to EMDR therapy, improved and enhanced their coping skills.

Changes in Thinking - Participants reported that after receiving EMDR therapy, their thinking was clearer and that they felt more confident about their recovery, thereby creating healthier cognitive associations that changed their perspective on needing sugars to cope. The findings of this study show that a mindset of being confused, unclear and poorly focused is common amongst sugars users, who are preoccupied with smoking sugars and finding the financial means to support their usage. This mindset may be affected by the impact of addictive phenomenon such as “loss of control” and “obsessive compulsive craving” (Volkow et al., 2016), which prevents sugars users from having a clear and rational mindset that focuses on the negative consequences of sugars usage or solutions to their problems. EMDR therapy allowed for participants to develop a clearer mindset, with just a little less than half the respondents (N=15), indicating that post treatment they experienced clarity in thinking and positive thoughts about their recovery and future. This finding suggests that the restoration of the altered cognition in relation to drug use is essential when dealing with the addiction memory. Some of the responses related to clarity in thinking were as follows:

“I am thinking clearer, and I know what I am going to do now”

“My mind feels blank”

“I can focus, before this I couldn’t think properly”

“I am more clear about the future”

“It helped me to think about how to move forward”

It is clear from the above responses that reducing and alleviating a craving had a positive impact on the participant's focussing and concentration, which in turn encouraged solution focused thinking. The observed changes in thinking and the shift from a negative to clearer focussed thought presentation can be explained by Tiffany's (1990) cognitive processing model, which states that whilst drug usage becomes an automatized process, craving is a non - automatic process which requires mental effort that taxes an individual's cognitive resources and is limited to a person's coping ability. Therefore, when a sugars user is craving, they will be unable to deal with craving related challenges and cognitively demanding tasks, due to their limited mental capacity for coping. The shift and changes from a negative to a clearer and focussed mindset provides support for the notion that cravings are associated with disturbing thoughts and images. The observed changes in maladaptive thoughts can be explained by Andrade et al. (1997) description of the mechanisms of EMDR therapy process, where it was suggested that EMDR therapy reduces the vividness of distressing images or thoughts by disrupting the functions of the visuospatial sketchpad of the working memory.

EMDR therapy helped clients recognize important dysfunctional beliefs and identify negative self-statements that perpetuated their addiction, which in turn allowed for introspection into their craving experience and related behaviours. EMDR therapy also encouraged cognitive restructuring by replacing negative cognitions with more accurate, positive thoughts related to their ability to recover (Bivonia et al., 2014; Shapiro & Forest, 1997). On completion of the desensitisation phase, it was evident that EMDR therapy allowed for the processing of information that was stored in memory networks, allowing for participants to start thinking positively about their ability to refuse sugars with an emergence of new insights and empowering thoughts related to their ability to recover. Positive changes were noted in the way in which they responded to their addiction post EMDR therapy, which in turn impacted on their previous perceptions of the purpose that sugars served in their lives, thereby providing support for the proposition of Shapiro (1994) that EMDR therapy is used to incorporate new coping skills and assist in learning more adaptive behaviours. It can therefore be concluded that

participants' usage of sugars was based on their negative perceptions relating to their inability to abstain from sugars, which were transformed through EMDR therapy into positive thoughts such as:

"Now I know I can let go of sugars"

"It changed my thinking about needing sugars"

"It is as if I don't have to smoke anymore"

"I am stronger now"

"I have changed the way I look at sugars, it is not needed"

"I am more positive"

"I began thinking about the negatives things of sugars"

Positive cognitions impacted on participant's attitude towards recovery, which was strongly associated with motivation to recover and corroborates with the treatment literature that links motivation to treatment compliance and positive outcomes (Kopetz et al., 2013). A reduction in distress levels helped participants develop a sense of control and improve their coping skills. An improvement in coping skills is crucial due to the apparent deficits in the sample population and may also be useful in minimizing the impulsive nature of sugars usage and relapse prevention. The current study has demonstrated that a clear mindset is positively correlated with higher motivation to recover.

"I am motivated to stay away from sugars and to find work"

"It is as if I never used sugars before, I am stronger and I can reject it"

The positive changes in their thinking did not only improve their motivation levels and commitment to recover, but provided insight and a better understanding of their current hurdles in recovery, as evidenced in the following statements:

"I have stopped thinking about the outside, I am only thinking about my recovery"

“I can say no to sugars, even if there is nobody there for me”

The aforementioned thought processes provide support for psychological constructs that are associated with sugars usage such as poor self - control, low levels of self - efficacy, poor motivation and low self - confidence, suggesting that there is a need to integrate these psychological constructs in therapy. These findings are aligned to other studies which show that negative beliefs relating to lack of confidence, poor self - control and low levels of self-efficacy characterize the addicted person and are associated with poor treatment outcomes (Ibrahim et al., 2011; Nikmanesh et al., 2017). Therefore, the impact of these constructs on abstinence and recovery deserves careful assessment in clinical settings that treat sugars addiction and should be incorporated within individual and programmatic interventions. In trying to understand the association between participant’s thought patterns and their levels of self - confidence and self - efficacy in relation to sugars usage, it was difficult to ascertain whether their thought presentations were as a result of negative life experiences prior to the intake of sugars usage, or due to the compulsive use of sugars over a length of time that may have eroded their concept of self, or whether it is due to a combination of these factors. EMDR therapy helped to process, unprocessed information that was stored in memory networks and despite the reasons for their cognitive distortions, the processing of memories related to sugars usage allowed for participants to identify their cognitive distortions and defence mechanisms, which allowed for a better understanding of their craving experience and its role in continued drug usage. This observed benefit of EMDR therapy in treating sugars addiction provides support for the Resource development installation protocol (Korn & Leeds, 2002), that should be used to assist addicted persons to strengthen resources and qualities that are needed in recovery. Rehabilitation programmes should therefore consider incorporating therapeutic modalities such as EMDR therapy into their programmes, as they facilitate and encourage changes in thinking, and just as importantly incorporate strategies that maintain the changes in thinking.

Cravings for sugars is accompanied by intense physiological disturbances (Hafajee, 2014), and based on the researcher’s experience on treating sugars addicted persons, varying presentations of physical pain have been reported even on cessation of sugars usage. The ongoing experience of physical pain indicates that information related to a craving experience is held in memory in

a dysfunctional form. The following statement proves that perceptions of pain can be psychological and perpetuates the cycle of addiction:

“It helped me to cope better with my recovery, I realized the pains are in my head and not because of sugars”

EMDR therapy helped participants realise that their negative thoughts have developed due to conditioning processes and did not represent reality. Research on animal and human studies (Edwards & Koob, 2012) provides a plausible explanation for the above finding, highlighting the role of conditioning processes in the development and resistance of addictive behaviours. The pain experienced by sugars addicts in the early stages of recovery is not solely related to their withdrawals but may in part be due to an induced “addiction body memory” (Boening, 2001; Frederiksen et al., 2012) for pain, which perpetuates and maintains their addictive state.

Changes in Feelings – The literature on coping skills states that the inner world of an addict is often characterized by unpleasant emotional states e.g. sadness, shame, loneliness, worthlessness, anger and fear. The use of a psychoactive compound like heroin alters the transmission of signals in the neural circuits of the brain, which leads to changes in the emotional state and behaviour of the drug - user (Karoly et al., 2013). In the current study participants reported feeling happier and calmer after receiving EMDR therapy, which were feeling states that helped them to feel more in control of their recovery process. This emotional presentation has important implications for treatment, as neurobiological research has demonstrated that changes in the neurochemistry of the brain are linked to feelings that may reinforce the need for a drug and the emotions attached to drug use play an important role in creating the episodic memory for continued drug use (Muller, 2013). The relaxation response that participants presented with post EMDR therapy may be due to participants being able to vent and release distressing thoughts, feelings and bodily sensations. The emotions associated with the craving experience post EMDR therapy are encapsulated in the following responses:

I feel happier and not angry anymore”

“I feel happier”

“I feel confident”

“I am calmer”

“My anger is less now”

“I don’t feel scared anymore”

“Because I felt calmer, I realize now that I can do without it”

The above responses show that emotions that were commonly experienced by experimental group participants were feelings of sadness, anger, fear and tension, which formed part of their drug using experience. These emotional states influence contextual learning and provides insight into the reward systems that may be operative in sugars addiction. Negative emotional states increase the addict’s vulnerability to use a drug (Huhn et al., 2016), and in the case of the sample population exerts pressure on the user to continue using sugars as the actions of the drug may induce or suppress fear, anxiety, aggression, excitation, sedation, euphoria and dysphoria. The descriptions from the data clearly indicate that negative emotional states and the inability to deal with the emotional pain encouraged participants to continue using sugars as a coping mechanism. This finding has support in the literature pertaining to psychophysiological studies that have demonstrated that stimuli or cues associated with a negative emotional state in drug dependent patients correlates positively with drug urges (Ekhtiari & Paulus, 2016). Learning processes and operant conditioning principles provides an explanation for this correlation, where the user learns the effects of the drug and associates using a drug or a pattern of several administrations with positive changes in emotional and motivational functioning, an outcome that is expected with repeated usage (Edwards & Koob, 2012). The sugars user learns to find pleasure or comfort in drug use through successive usage, where the desire or need to change their current emotional state into a preferred emotional state becomes tightly associated with drug usage. Therefore, the belief that they can deal with emotional reactions without a drug is an empowering one for persons in recovery, as it challenges their previous beliefs relating to their inability to cope with their emotions without sugars. The abovementioned findings provide support for the Affect tolerance protocol (York & Leeds, 2001), which has been developed to teach persons in recovery to tolerate intense feelings and affect management to prevent relapses.

Anxiety is frequently reported as a significant contributor to cravings and relapse (Goodman & Packard, 2016), therefore a reduction in anxiety is crucial to recovery. It is also common for drug users to experience severe anxiety when craving or withdrawing from a drug, which can present as fear, tension or a sense of apprehension, as reflected in the quantitative findings of the study. In the current study, 13 participants reported feeling calmer and 3 participants reported feeling less tense, which are physiological states that are associated with a reduction in anxiety. It is physiologically impossible for a person to feel tense and calm at the same time, therefore participant's reports of calmness demonstrated a reduction or extinction of anxious feelings. These findings are consistent with studies (Courtney et al., 2015; Huhn et al., 2016) that demonstrated that cue reactivity in alcohol and drug dependent patients are influenced by the emotional state and anxiety levels of the research subjects. The induced sense of calmness brought on by EMDR therapy may be due to the bilateral movement component of EMDR therapy, which has been found to reduce extreme emotional agitation and induce a calming effect (Shapiro, 2018). The research on the procedural elements of EMDR therapy demonstrates that bilateral movements affect the brain, in some cases stimulating it and in others relaxing or numbing it from anxiety and stress (Amano & Toichi, 2016).

Participant's responses and dysfunctional reactions are characterised by a high level of emotion and an associated negative cognition, which demonstrates that it is often difficult to separate the emotion from the cognition. The linkage between cognition, affect and motivational responses that have contributed to sugars usage are encapsulated in the following responses:

“I feel stronger and I am not thinking about the drug”

“I feel calmer, relaxed and determined to stay away from sugars”

The responses above demonstrate that the train of associations linked to a craving cue often makes it difficult to separate the emotion (calmer) or cognition (I'm determined to stay away from sugars") from the trigger, which is the drug. Irrational beliefs are the cornerstone of negative cognitions and emotions, which becomes triggers for a relapse and fuels an addiction (Kedzior & Laeber, 2014). Feeling stronger and calmer is in contrast to participant's negative thoughts associated with their addiction, where feeling stronger is in contrast to the negative belief “I am weak” and feeling calmer is in contrast to the negative belief “I am tense or

anxious”. A reduction in participant’s distress levels helps participants develop a sense of control, strength, calmness and manageability, which are qualities that enable the recovery process. The above - mentioned findings in relation to the association between thoughts and feelings are encapsulated in Shapiro’s (2018) description of the outcomes of EMDR therapy, where she stated that by activating the AIP mechanism, a valid cognition emerges which allows for useful information to be learnt and stored with an appropriate affect that is then made available for future use.

Bodily changes (physiological) – Media articles as cited in the Mail and Guardian (Tolsi, 2006) and Indianspice (September, 2014) have reported that a common struggle amongst sugars users is the physiological discomfort that they experience when craving or withdrawing from sugars usage, and persons that abstain from sugars are mostly preoccupied with physical disturbances and bodily pain. Participants in the study reported a major shift in their pain levels with more than half the participants (N=19) reporting that they were not feeling any pain and 11 participants reporting that their bodies felt lighter and calmer as evidenced in the following statements:

“There is no pain and my body feels calm”

“I feel light and my roster is gone”

“Body and head feel lighter and better”

Participant’s experiences and their perceptions of their bodies feeling lighter or calmer may be due to a reduction in their pain levels. Five of the 35 participants experienced hyper arousal and an intensification of withdrawal symptoms whilst reprocessing, in the form of bodily pains and disturbances, which gradually subsided through sets of bilateral stimulation. This finding provides support for Boenings’ (2001) addiction memory theory, as it demonstrates that the physical sensations experienced whilst craving are stored in the nervous system and emerged as the dominant thread within the associative sequence whilst reprocessing. The above finding provides support for the addiction memory concept and supports studies on cue reactivity that have been reviewed by Jasinka et al. (2014), that physiological changes such as severe and excruciating physical pain that were experienced whilst craving were to some extent

determined by participants thoughts relating to their inability to cope with the physical pain and previous challenges associated with abstaining from sugars. Based on the addiction memory concept, physical sensations experienced whilst craving are locked into the nervous system and the discomfort associated with a craving is most often experienced in the part of the body in which the physical sensations were originally felt. A possible explanation for re-experiencing physical craving symptoms has been proposed by van der Kolk (2014), who stated that disturbing situations and the accompanying physical sensations are maintained due to inappropriate storage in short term memory rather than long term memory and the elements are stored in motoric rather than narrative systems, thereby allowing for the manifestation of physical craving sensations.

The responses below highlight the nature of the physical discomfort that was experienced whilst craving, which creates challenges in recovery, as participants sometimes continue to experience pain even after sugars usage is discontinued.

“I am not shivering anymore”

“I have more energy”

“I don’t have body pains and am not tearing a lot”

“I am not feeling weak, I feel strong”

“I don’t have body pains and my sleep has improved slightly because I don’t feel so worried anymore”

“I am sleeping better”

Sugars users are often “psychologically stuck” and preoccupied with the physical discomfort associated with cravings for sugars, which demonstrates that an addiction is experience based and is closely linked to pain, distress and negative emotions. On completion of EMDR therapy, 19 of the 35 participants reported that the absence of physical discomfort and pain allowed for their recovery process to become easier and more bearable. EMDR therapy helped to move the unprocessed memory from a frozen, stuck state to a memory in consciousness and then to a memory from the past. This finding that has been supported by research literature which states

that EMDR therapy allows for disturbing material to adaptively resolve itself and the reprocessing allows for patients to experience previous disturbances in a neutral manner (Else & Kindt, 2017; Shapiro, 2014a). Therefore, based on the aforementioned responses, EMDR therapy allows for the physiological reconsolidation of memory (Else & Kindt, 2017), where the memory of active sugars usage and the accompanying disturbances were changed through the associative processes and stored in an altered state or neutral form within an appropriate contextual memory network.

The psychophysiological changes that were observed in the experimental group provides support for the role of memory networks as associatively linked chains of information (Goodman & Packard, 2016). The distressing craving memory may be one of the aspects of the entire addiction profile that is stored in a particular or isolated channel, which in keeping with the addiction memory concept suggests that an addiction involves an individualised specific imprinting process (Torregrossa & Taylor, 2016), which despite time effects allows for the drug user to retain the negative cognitions, emotions and physical sensations of earlier drug using experiences. Furthermore, the inappropriate storage of disturbing elements being maintained in short term (motoric) memory rather than long term (narrative) memory (van der Kolk, 2014), allows for the distressing craving memory to be experienced in state dependent form. van der Kolk (2014) states that EMDR therapy processing allows for information to move from motoric to narrative, allowing for the body sensations and negative feelings associated with a craving to be consciously experienced, which in turn allows for specific aspects of the craving experience to come into consciousness as body sensations, aspects of self or as flashbacks of incidences and situations in their lives. The procedural elements of the EMDR therapy process and the accompanying psycho - physiologic responses observed in the study, allowed for associative patterns to emerge, with each association resulting in the resolution of dysfunctional material that was specifically related to an individual's craving experience. The kinds of shifts reported by the participants shows that processing affects all aspects of the targeted memory and can progress in many ways, where participants reported visual images and provided in depth sensory descriptions which included thoughts, smells, tastes, emotions and bodily disturbances. The findings of this study and the re - emergence of participant's sensorial presentations demonstrates that cravings are experienced in a state dependent form, which creates challenges to the recovery process. The study findings also provide support for extinction training and cue exposure elements in dealing with cravings, both of which are

elements that are incorporated in EMDR therapy. Participant's feedback from the EMDR therapy experience can be used to determine the types of targets that must be addressed and the type of person that will benefit from EMDR therapy.

The observed changes in thoughts, feelings and physical symptoms can be explained by the Adaptive Information Processing (AIP) model (Shapiro, 2018), which states that within each person is an inherent information processing system that operates outside a person's conscious awareness, that transforms, integrates and transmutes disturbing experiences to a healthy adaptive resolution. When a drug user experiences a craving as distressing or unbearable, the innate processing system breaks down and their perceptions of being unable to cope with the psycho physiologic intensity of the craving experience unbalances or blocks the nervous system, resulting in the craving memory being experienced in a state - dependent form. Participants' responses confirmed that focusing on particular aspects of a craving allowed for their craving to be experienced in a state - dependent form with identical emotions, physical sensations and thought processes that were present at the time of the initial or earlier craving experience. The current study demonstrated that the conscious act of reprocessing, together with the use of bilateral stimulation allowed for the craving experience to be brought into consciousness and processed in its entirety. The findings of this study confirm that the therapeutic target should be the stored disturbing memory, as it was evident through sets of processing that the previous dysfunctional stored memory sets the target for the present dysfunction. This deconditioning process is supported by literature presented by Shapiro (2018), where she stated that "essentially EMDR therapy allows for the dysfunctional information to undergo a spontaneous change in its meaning, incorporating insights and affect that are enhancing rather than self-denigrating to the client". This study further demonstrated that once the disturbing memories were reprocessed with EMDR therapy, they were no longer able to evoke the physical, cognitive and emotional disturbances that contributed to the onset and maintenance of sugars usage, The findings relating to the reprocessing of the addiction memory and memory of the craving supports the use of the Cravex Protocol (Hase, 2010), that was developed to target the addiction memory and to help decrease craving urges, which in turn assists and enhances the recovery process.

The abovementioned findings demonstrate a strong relationship between the psychophysiological intensity of the craving experience and sugars usage, and the need for positive coping skills in recovery. The findings of the three aforementioned categories indicates that EMDR therapy processing improved the coping skills of recovering sugars addicts with positive changes noted in the cognitive, emotional and physiological domains, thereby demonstrating that EMDR therapy can process information at multiple levels. This finding differentiates EMDR therapy from other therapies in the field of addiction treatment and has been supported by qualitative evidence which shows that EMDR therapy does not only improve the participant's level of insight, but also provides a better understanding of the psychophysiological processes that induced cravings. The information obtained from the intake interview coupled with observations and quantitative findings, was suggestive of poor insight in the sample population which may be due to disruptions in their educational attainment and cognitive distortions related to their drug usage. Therefore, EMDR therapy may be the missing link that facilitates insight and a better understanding of their craving disturbances with as minimal effort as possible, thereby providing support for the use of EMDR therapy as an effective modality in treating the sample population.

7.1.2 Theme 2 - Therapeutic safety (Does reprocessing of a craving allow for other issues to surface that are contributing to an addiction?)

The second set of questions were related to a sense of safety, nature of discomfort experienced because of the process and processing, and types of disturbing issues that surfaced during EMDR therapy.

Table 30 Safety and discomfort experienced during EMDR therapy

Safety and Discomfort	
Response	N
Did you feel safe/ comfortable when EMDR therapy was administered?	
Yes	35
No	0
Was there any discomfort that you experienced as a result of	

EMDR therapy?	
Yes	32
No	3
Types of Discomfort	
Pains	5
Negative thoughts	1
Withdrawal symptoms	7
Withdrawal symptoms intensified	5
Felt the experience of using	2
Where there any other disturbing issues that surfaced using EMDR therapy?	
Family problems	5
Behaviour whilst using drugs	2
Nothing	26
Anger	2

In order to experience the recovery process in a non-threatening manner, participants needed to feel a sense of safety whilst experiencing EMDR therapy, therefore creating a sense of safety was crucial to the therapeutic outcome as substantiated by Ulberg et al. (2016), who stated that a safe therapeutic relationship is a robust predictor of successful psychotherapy. Within this thematic category, three subthemes explained the combination of factors that are needed to establish a safe context and contribute to the effectiveness of the EMDR therapy modality viz, therapeutic relationship, therapeutic preparation and therapeutic alliance.

In this study, reprocessing a craving allowed for other issues to surface that contributed to their addiction, with 32 of the 35 participants reporting emotional, cognitive and physical disturbances, as they journeyed through the EMDR therapy process. Most participants reported feeling discomfort and adverse bodily sensations whilst reprocessing such as stomach aches, body pains, joint pains, flashbacks of using sugars and negative memories of related behaviour through sets of reprocessing. A few participants (N=5) reported experiencing extreme discomfort and an intensification of their craving symptoms whilst reprocessing, which

subsided through further sets of reprocessing. The elements of the sugars craving experience in the form of images, affect and physical sensations were re - experienced as affects, physical symptoms and memories that were experienced during periods of active usage. The responses to previous disturbances may have been triggered by present stimuli or due to the attempts of the information processing mechanisms to resolve the disturbing state. Therefore, EMDR therapy allowed for an associative process that was evident in the intricate connection to earlier using memories associated with sugars use, that was triggered by focussing on present stimuli.

Despite experiencing distressing and uncomfortable sensations and the disturbance between sessions being high, all 35 participants reported feeling safe when receiving EMDR therapy, which suggests that the therapeutic environment provided some degree of safety and structure. The researcher observed that the therapist's unconditional positive regard for the client's background experience in the intake session and throughout the EMDR therapy process helped to create and enhance a safe environment. Therefore, based on observations and participant's responses, it was evident that the relational issues between client and clinician in a population that often feels rejected and misunderstood impacts on the outcome of the therapy. This finding supports Shapiro's (2018) view that establishing the therapeutic alliance and developing rapport is crucial to the outcomes of EMDR therapy, as it allows for an essential interaction between client, method, and clinician. The findings on the importance of the therapeutic alliance and the success of EMDR therapy have been further substantiated by Duncan et al. (2009), who stated that the collaborative, therapeutic alliance between client and clinician is a primary factor in determining successful therapeutic outcomes and even more important than the specific execution of therapeutic protocols.

In the current study, apart from the psycho physiologic craving experience, participants recalled other memories that evoked high levels of emotion. At the end of each set of processing, participants were given the opportunity to verbalise their thoughts, feelings and experiences in a non - threatening and non - judgemental manner. The participant's responses showed that memories are stored in fragments and the EMDR therapy process helped to forge appropriate connections amongst the various disturbing aspects related to their sugars usage and distressing events in their lives. Disturbing intra and inter - personal issues surfaced through sets of reprocessing as indicated by the following:

“I felt more anger towards myself for what I did”

“I thought about my mother’s death”

“I don’t have anyone that is there to help me”

These findings have interesting clinical implications for craving management by using patient centred therapeutic approaches. Participants’ life experiences based on their drug usage resulted in them feeling mistrustful, invalidated, angry, rejected and stigmatized, therefore creating a sense of safety allowed them to feel heard, affirmed, understood and respected. A similar finding was reported by Marich (2010), where she founds that female research participants that were in recovery regarded safety as an essential element that needed to be in place for them to experience good results with EMDR therapy, thus linking the therapeutic relationship to therapeutic outcomes.

The fear of re - experiencing a craving without access to sugars is indicative of poor coping mechanisms, and the findings of this study affirms the need for coping mechanisms such as stability and support whilst reprocessing. Drug cues can elicit dysfunctional images, cognitions, emotions, or sensations, either as full flashbacks or as partial arousal of the dysfunctional material, known as an “echoflush”, which provides support for the role of episodic memories in drug seeking. Two participants reported experiencing a flashback of a complete smoking episode as described below:

“I felt like I was using the drug, I could smell it and felt high”

“I am amazed that I could feel the situation like I am out there using although I have nothing and am at a rehab”

The abovementioned responses suggest that the triggering of dysfunctional memories evoked similar feelings, physical disturbances and negative self - attributions that were experienced when clients were in active usage. This supports Volkow et al. (2012) findings that a repeated stimulus can be remembered independent of its context, even if the new stimulus differs slightly to the previous one. Non-declarative memory systems such as the episodic memory and

priming are operative in drug flashbacks, which are based on remembering similar situations or previous patterns of the craving experience (van der Kolk, 2014). It is important for the therapist to be aware of this and to provide a safe and supportive therapeutic relationship as an “echoflush” can be extremely distressing and can result in feelings of helplessness. Therefore, it is important for the therapist to develop a supportive relationship with the client and to be equipped with the knowledge and therapeutic tools that are required to manage such experiences, as heroin addicts are prone to an episodic “addiction fit” (Koya et al., 2006). These irresistible urges on exposure to heroin related cues could result in a relapse if the cravings are not appropriately dealt with. Furthermore, based on type of implicit and explicit memories that emerged whilst processing, it is imperative that participants should have a good understanding of the implementation of safety and stabilisation resources, as affect regulation strategies can be useful in empowering and enhancing participant’s emotional stability before and after processing.

The EMDR therapy experience was not just confined to participant’s cravings or drug related phenomenon, but also allowed for the emergence of distressing psychosocial issues. Nine of the 35 participants reported that the EMDR therapy experience allowed for feeder memories and for other social and behavioural issues to emerge, which increased their awareness of the negative consequences of their usage, as well as the negative impact of sugars on their relationships. This finding provides support for the addiction memory to be viewed as an episodic type of memory and suggests that an addiction may be maintained due to the abnormal engagement of a long term associative memory. These findings suggest that sugars addiction is encouraged by the social and behavioural context of the user.

“I felt more pain and I thought about how I lost my children”

“I am so sad about what I put my family thru”

“Realised the pain and suffering drugs caused in my life”

These findings support the quantitative findings of this study that sugars usage creates family dysfunction, and the negative emotions associated with family difficulties encourages the use of sugars a coping mechanism. It is evident that the effect of marital and relationship stress on

the coping ability of the research population appears greater in relation to other psychosocial stressors. Clients were motivated to stop using drugs by the realization that their addiction to sugars did not only negatively impact themselves but also significant others, an awareness that they had no insight of previously. This was useful in helping recovering persons see the need to change their lifestyles and reintegrate into family and society, as the treatment literature states that drugs shape memories of active usage and of preceding situations and behaviours related to drug usage (Muller, 2013).

7.1.3 Theme 3 - Hope (Confidence, Self - efficacy and Internal locus of control)

The third set of questions were related to the participant’s capacity to withstand a craving, the nature of improvements or changes, as well as participant’s perceptions about needing sugars to cope as presented in Table 31.

Table 27 Capability to withstand a craving post EMDR Therapy

Has your capability to withstand a craving improved as a result of EMDR therapy?	
Responses	N
Yes	35
No	0
If yes, explain why	
Feeling more confident about recovery	18
Feel assured that I can recover	6
Will be able to deal with craving	2
Felt that if I am exposed to sugars I can say no (self - efficacy)	15
Do you think EMDR therapy makes recovery easier	
Yes	35
No	0
Did EMDR therapy change your perspective about needing the drug	
No	0
Changed mind set	14
Made me feel like I can stay without the drug	17

Changed my life	1
Made me realize the pain and suffering caused by the drug	3

In this thematic category, a combination of 4 subthemes highlighted the factors that contributed to being hopeful of abstinence and recovery, such as an increase in self - confidence, improved self - efficacy, perceived mastery and internal locus of control, which collectively impacted the participant’s ability to withstand a craving. The findings of the current study demonstrated an overall improvement in participants’ confidence levels in relation to their ability to abstain from sugars, with all 35 research participants reporting that their EMDR therapy experience improved their ability to withstand a craving. All 35 participants reported feeling more hopeful about their ability to recover, and more than half of the participants (18 of the 35 participants) were confident that they would be able to abstain from sugars if they were exposed to it. This finding is indicative of the restructuring and reframing of negative cognitions into positive cognitions and is consistent with literature that states that EMDR therapy facilitates associations with adaptive information that contradicts the previously held negative beliefs (Bivona et al., 2014). The following statements reflect improvements in their confidence levels and high levels of self - efficacy in relation to their need for sugars:

“It made me feel that I can do without a drug”

“This thing you did changed me”

“If the craving comes up on the outside, I will be able to deal with it”

“It changed my thoughts, made me feel stronger that I can do without a drug”

“It made me feel stronger”

The reported changes in participant’s confidence levels could be due to a reduction in their distress levels and an increase in the validity of the positive cognition. Clients began to feel more confident regarding their coping mechanisms and felt stronger about their ability to refuse sugars after receiving EMDR therapy, suggesting that their previous beliefs related to their inability to fight a craving or abstain from a drug free lifestyle could have been a factor that perpetuated their sugars addiction. These findings highlight the relationship between refusal self - efficacy and abstinence which are consistent with studies (Abdollahi et al., 2014;

Nikmanesh et al., 2017), that demonstrate that refusal self - efficacy is important in addiction treatment. The Adaptive Information Processing model (Shapiro, 1994) postulates that psychological dysfunction and associated elements such as lack of self - confidence and poor self - efficacy are caused by dysfunctional information that is stored in the nervous system, which can result in pathology. The study demonstrated that EMDR therapy accessed, processed and adaptively resolved the dysfunctional information, after which a positive cognition related to the craving experience was inserted into the memory network, which then allowed for the material to generalise throughout the memory network. Thereafter, on exposure to craving cues, positive cognitions emerged into consciousness, that allowed for information regarding their positive beliefs in overcoming a craving to be associated with previous challenges that they experienced whilst craving. Therefore, based on the abovementioned findings, EMDR therapy does not only involve the transmutation of dysfunctional stored experiences into adaptive resolution but also incorporates coping skills and assists in learning more adaptive behaviours, thus supporting Shapiro et al. (1994) explanation on the observed benefits of EMDR therapy.

Traditional recovery programmes often focus on the patient's experience within the treatment setting and not on skills that need to be generalized to their environments post discharge (Epstein et al., 2010). The findings of this study suggest that in order for recovery to be successful, recovering sugars addicts would have to learn strategies that makes them feel more confident and assured of their ability to abstain from sugars, and to learn to implement alternative coping strategies on exposure to craving cues or when placed in high risk situations in the future. Based on the above and the observed benefits of installing a strong and valid positive cognition, which is a crucial stage of EMDR therapy, an important step in recovery would be for the client to identify and incorporate positive self - statements in their daily life. This positive statement should consist of an alternative view of their ability to abstain from sugars.

The feeling of being empowered to fight their addiction provided participants with the confidence to deal with their craving disturbances and to feel more in control of their recovery, thereby encouraging behaviour change. An increase in participant's confidence levels and the belief in their ability to abstain from sugars was an excellent stimulus in improving their coping

ability and internal locus of control, which supports Miller & Guidry (2001) view that EMDR therapy allows for profound shifts in self - concept and self - acceptance and results in positive, realistic perceptions of self in healing. The statements below are reflective of an internal locus of control, where after receiving EMDR therapy participants began looking within themselves for mental resources that helped to improve their coping skills and to overcome their sugars addiction. The transmutation of information allowed for the changing picture to correspond with changes in affect, which then became the way in which the craving experience was stored.

“I felt more in control after receiving therapy”

“Now that I think about sugars, it is not needed and useless”

“I feel I can say no to sugars”

“I can do without it”

“Made my mind more powerful”

“Going thru the experience, I can say no. It is like I had sugars with me and I said no”

“It made me realize that I can cope and live without it”

“I now feel I can cope, and I don’t want to think about it anymore”

The above statements are reflective of past helplessness and a negative attributional style, where previous maladaptive responses in relation to cravings were possibly as a result of an imbalance or blocking of the processing system, which had negatively affected their perception of self as a sugar’s user. Therefore, constructs such as high self - confidence and high levels of self - efficacy are crucial in eliciting the desired change and allowed for their internal locus of control to steadily increase during EMDR therapy. These constructs have been observed to enhance treatment effects in the treatment literature (Marlatt & Gordon, 1985), and are aspects of recovery that must be factored into treatment modalities. Future research should focus on measuring participant’s internal locus of control prior to administering EMDR therapy, which should help to determine whether participant’s pre - treatment understanding of their internal locus of control impacts on the outcomes of EMDR therapy.

Participant's beliefs relating to their ability to recover helped them to persevere in recovery and to overcome sugars usage, thereby allowing for a sense of perceived mastery. EMDR therapy helped to access and increase participant's awareness of personal internal triggers such as feelings of inadequacy, that could be attributed to the challenges associated with previous experiences of cravings and sugars usage.

"Now I don't have to smoke sugars and I don't feel I need it"

"I am not thinking about sugars anymore and I can do without it"

"I now feel I don't need it because I can cope without it"

"I now believe I can do without it"

"I know I can stay without it"

"I feel I don't need sugars"

The findings of the study demonstrate that memories associated with drug cues and drug usage that were accessed post EMDR therapy presented as positive cognitions with an appropriate affect. This finding is important in addiction treatments, as it implies that certain aspects that clients had previously seen as hurdles in recovery from their addiction were amenable to change. The knowledge that they have the tools to cope with a craving and the experience of being able to cope with a craving, resulted in a sense of perceived mastery. A possible explanation for their perceived mastery in dealing with a craving is due to EMDR therapy's ability to shift from dysfunctional to functional forms of cognition, affect and sensory experiences within the neuro network. In other words, the changing picture brought on by EMDR therapy resulted in changes in affect and self-assessment, which provided a new way for the experience to be stored in the neuro network, supporting the treatment literature that EMDR therapy encourages a positive association process and helps to store functional information within appropriate contextual memory networks (van der Kolk, 2014; Walker & Stickgold, 2010). Therefore, the concept of self - healing was apparent at the end of the EMDR therapy process, which according to the AIP model is the natural tendency of the information processing system to shift towards a state of mental health.

Two of the respondents indicated that they tried to recall a craving experience or an experience of using sugars post EMDR therapy and discovered that it was difficult to evoke a craving. The inability to recall the craving experience or thoughts about the craving further strengthened their belief in their ability to cope with a craving, as suggested by the following statements:

“After my session, I tested whether I had the willpower to overcome sugars and I found that it was hard for me to think about it”

“This thing must be used in the rehab because it changes your mind, I even tried thinking about sugars at night and I couldn’t get the feeling or think about the roster”

The abovementioned statements are suggestive of “memory extinction” and have support in the literature pertaining to the associative memory network of EMDR therapy, where access to negative material is often found to be blocked after receiving EMDR therapy (Shapiro, 2001). The reprocessing of the disturbing craving experience resulted in experiencing the craving in a more neutral form, which was accompanied by positive thoughts, appropriate emotions and the absence of physical disturbances. Thereafter, exposure to internal or external cues that previously triggered a craving from within the addiction memory network no longer accessed the dysfunctional information and cravings were then associated with more positive aspects of the neuro network, thereby creating a sense of perceived mastery and improvements in their internal locus of control. These findings support studies by Bossini et al. (2011, 2017), that recommend that EMDR therapy should be an integral part of addiction treatment as it addresses biological and neurological processes relating to an addiction.

7.1.4 Theme 4 - Perceptions of therapy

The last question was related to participant’s thoughts on the use of EMDR therapy in reducing cravings as seen in Table 32.

Table 28 Perceptions related to the use of EMDR therapy in craving management

What are your thoughts about using EMDR therapy to reduce cravings	
Responses	N
It should be used	35
Very effective in recovery	20
Will recommend to people	4
Effective because it changes thinking	2
Helps to reduce cravings	10
Makes me feel stronger in recovery	5
Helps change perspective about needing the drug	2

In trying to determine whether rehabilitation centres should consider incorporating EMDR therapy into their programs, participants were engaged about their subjective perceptions and experiences of the therapeutic modality. All 35 participants stated that EMDR therapy made recovery easier and it changed their perception about needing a drug, with positive shifts in mindset and an increase in the belief of their ability to cope in recovery. Participants were engaged about their thoughts relating to the use of EMDR therapy in reducing and managing cravings, in which all EMDR therapy group participants (35) stated that it should be used in rehabilitation centres, and more than half of the participants (20) stated that they found EMDR therapy to be very effective in reprocessing a craving and assisting with recovery. These findings support research findings and case studies that EMDR therapy is an effective modality in treating addictions (Abel & O'Brien, 2014; Brown et al., 2015; Knipe, 2015).

Given that all participants recommended the use of EMDR therapy, careful consideration should be given to the purpose it served in recovery. They expressed the value of EMDR therapy by validating its efficacy, with some of the references being as follows:

“It should be used because it benefitted me”

“It should be used to stop using sugars”

“I will recommend this to people, I have lots of friends who smoke and they need this”

“It is a good technique to use”

“It should be used for sugars addiction”

“It can help people feel stronger in recovery”

Participants expressed positive sentiments about EMDR therapy and credited EMDR therapy to be a crucial component in craving management and addiction treatment. Similar findings were reported by Hase et al. (2008) who found that participants experienced less cravings for alcohol and coped better in recovery after receiving EMDR therapy. The association between participant’s perception of EMDR therapy and the purpose it served is evident in the following statements:

“It should be used because it makes you calm”

“It should be used with sugars craving because it helped me to get better”

“It works because it changes your thinking”

“It made it easy, I don’t want to think about sugars”

“The technique is genuine; the rehabs must use it”

The addiction cycle allows for an addiction to take a life of its own, as the user’s daily activities are completely focused on obtaining and consuming sugars to the exclusion of everything else (NIDA, 2013), which is due to the chronic search of the drug for reward and relief (Bossert et al., 2013; Torregrossa et al., 2011). Some of the responses demonstrated that participants felt engaged and inspired by an experience that they were unfamiliar with, and that the therapeutic process was a new experience for them:

“It is very effective, if you take it seriously and concentrate on it, it is very effective”

“It should be used with sugars craving because it helped me to get better, I never experienced something like this”

“It helped me to understand that I can fight the cravings”

“It can help to fight cravings, I never knew there was something that could do that for you”

“Changes your thoughts and feelings, changes focus from sugars to a better life”

“Technique can help, it helped to convince me that life can be normal without it”

The rehabilitation programmes used in this study followed a therapeutic community programme, combined with spiritual and Narcotics Anonymous principles. The nature and composition of the rehabilitation programmes allowed for group interventions rather than individualised one to one intervention. The participants’ positive perceptions of EMDR therapy may be due to it being a one to one intervention that brought on shifts in their cognitions and affect, as well as a better understanding of the nature of the addictive process and accompanying disturbances, which served as a novel and unusual experience to the experimental group participants. The participants in this study were not able to compare the therapeutic modalities used in this study with other therapeutic interventions as they were exposed to a very basic programme, therefore the positive shifts that emanated from EMDR therapy may have magnified their perception of the intervention.

7.1.5 Conclusion

The information that emerged from the qualitative analysis provided an understanding of the patient’s subjective experience of a craving for sugars and supported the efficacy of EMDR therapy in addressing cue reactivity and addiction treatment. The qualitative findings of the study suggest that an addiction to sugars is accompanied by intense and uncontrollable drug cravings, along with compulsive drug seeking, which takes precedence over activities of daily living and persists despite devastating consequences that affects all aspects of their overall functioning. The qualitative findings describe cravings as an experience that was readily triggered by interoceptive and exteroceptive stimuli associated with drug use. It was evident that drug associated cues are highly connected to the Addiction memory that helps to maintain drug seeking craving and addictive behaviour.

The experimental group participants had an overall positive experience with EMDR therapy as part of their addiction treatment and cited a combination of factors that contributed to successful treatment outcomes, because of their EMDR therapy experience. Therapeutic

benefits of EMDR therapy as observed in the study were manageability and elimination of craving symptoms, the ability to self soothe, feel full range of emotions in a protected and safe environment, create and maintain a sense of awareness relating to triggers, generating thoughts that increased self - confidence, self - efficacy, perceived mastery, and lastly the development of adaptive coping mechanisms that enhanced recovery and would help to positively reintegrate into society. The discussion that follows includes the researcher's clinical impressions and observations of both, experimental and control group participants' therapeutic processes.

7.2 CLINICAL IMPRESSIONS AND PROCESS FINDINGS

The observations and findings of the experimental and control group will be discussed in accordance with the researcher's observations and process notes.

7.2.1 EMDR Therapy experience (experimental group)

The use of EMDR therapy in addressing cue reactivity amongst the experimental group participants was explored using an adapted EMDR therapy protocol. Participants were asked to focus on their craving experience by describing the thoughts, feelings and bodily sensations associated with their craving experience, which was useful in understanding the subjective experiences of the experimental group participants.

Preparation and Safety - Establishing a safe climate was crucial in getting participants to feel comfortable with EMDR therapy and to discuss their drug related experiences. It was observed that many participants were numb or unaware of their feelings and became distressed, shocked or confused when they were suddenly flooded with painful emotions, thoughts and bodily disturbances. The emotions that emerged unexpectedly included reminiscing about failures and losses, shameful situations and feeling an overwhelming sense of internal tension. The safety and stabilisation techniques that were implemented prior to administering EMDR therapy were useful, as it allowed for participants to feel comfortable with the process and to make use of safety and stabilization techniques as required. The intense preparation stage was useful in preparing participants for what was to be expected and allowed for the researcher to build rapport with participants, as well as to establish herself as a familiar and trusted professional.

Participants reported that the “safe place” exercise provided a self - help tool that helped them to relax and cope with negative emotions before and after receiving EMDR therapy, hence this body-based strategy provided a resource that assisted with body and mind connectedness.

The Process and Treatment Effects - During the EMDR therapy process, patients moved from one episodic memory to another, which comprised of cognitive, body - oriented, emotional and experiential matter. Participants reported that the EMDR therapy experience allowed access to information and memories that they would have been unable to retrieve on their own. Although cravings were the targets for EMDR therapy, participants referred to core issues that affected them through their years of addiction viz; the impact of their addiction on their families, neglect of family, criminal behaviour associated with usage and loss of personal self. Participants were screened for traumatic histories in the assessment phase, as exposure to trauma was listed as an exclusion criteria. However, some participants recalled traumatic experiences that they had encountered whilst using drugs, as well as the pain afflicted on their families due to their usage. Therefore, EMDR therapy did not only address the craving experience but also helped to access and deal with drug related experiences and traumas related to their drug usage. The findings of this study demonstrate that EMDR therapy was able to access emotional issues that were related to the participant’s addiction and related behaviours.

The therapeutic process allowed access to previously inaccessible feelings and thoughts which resulted in positive changes, a clear mindset and for the reduction and extinguishing of the discomfort associated with a craving. The process desensitised participants to the emotional pain associated with drug associated disappointments in life. EMDR therapy was observed to be useful in deconditioning the effects of sugars craving stimuli and in increasing mindfulness related to the underlying mechanisms of a craving. Following the initial session of EMDR therapy, most experimental group participants appeared to present as more confident and self-assured regarding their ability to recover, and participants reported that they no longer felt overwhelmed and overcoming a craving did not seem insurmountable anymore.

Brief exposure to the actual craving experience in a protected setting, allowed for participants to evoke and develop better insight into the thoughts, feelings and physiological states

associated with their craving. These state specific aspects demonstrated that effective processing could occur whether or not the craving information is released as an image into the client's conscious awareness. Participants experienced discomfort that ranged from mild to severe, and although the discomfort was sometimes heightened, they were able to tolerate the discomfort. Repeated sets of bilateral stimulation allowed for the distressing experiences to become less intense and in most cases, there was a complete relief of the distressing symptoms. Addressing these issues were part of an intensive cathartic experience that helped participants understand the underlying processes that underpinned their craving experiences and possible reasons for being unable to previously interrupt the addictive process. On completion of the reprocessing phase, it was found that previously disturbing triggers no longer evoked a craving, and new positive and adaptive responses became apparent.

Underlying and Disturbing Issues - Of the 35 experimental group participants, 2 participants accessed negative childhood memories. Most participants experienced an emergence of feelings and thoughts of critical life experiences whilst in active addiction, which shows that EMDR therapy can forge appropriate connections amongst various bits of traumatic material or memories that were insufficiently processed or stored in fragments. Participants accessed thoughts related to negative external factors that affected their recovery e.g., no fixed abode, legal issues, low self - confidence and poor self - concept. The inner discomfort experienced whilst craving mostly presented as physical symptoms of varying severity through the processing stages of EMDR therapy.

Cognitive Restructuring - The most commonly chosen negative self-beliefs related to cravings and the usage of sugars in the experimental group were: *"I cannot cope without sugars"*, *"I cannot deal with a craving"* and *"I am nothing without my addiction"*. EMDR therapy did not only neutralise the negative physical symptoms and bodily discomfort, but also made the negative beliefs less valid. EMDR therapy helped participants access and neutralize negative beliefs that fuelled their addiction, as a result EMDR therapy helped with breaking down cognitive barriers that prevented or impeded recovery. Although EMDR therapy was administered to target and reprocess cravings, it was also found to be useful in improving motivation to change and in increasing coping resources.

Processing Difficulties - It was observed that whilst processing, participants sometimes appeared to be stuck at certain points, commonly known as “looping”, where they would dwell and struggle to move past a thought, feeling or body sensation through repeated sets of stimulation. This occurs when participants block psychological material to prevent further processing as the emerging material may be painful or threatening, which results in the person’s defence mechanisms kicking in to provide a sense of safety. In these instances, the researcher had to apply techniques that facilitated further processing so as to facilitate the movement of psychological material e.g. interweave statements or increasing the speed of the bilateral stimulation. There were instances where “positive” drug effects had surfaced soon after processing began, with some participants presenting with feelings of calmness and wellbeing in the early stages of therapy. Further processing of these responses resulted in the emergence of negative affect and bodily disturbances, which demonstrated that the initial calmness was not the end of the channel but rather a positive memory of the drug effects or feelings that were previously experienced by sugars usage.

Coping ability between sessions - Participants were exposed to a second session after two days of receiving the initial session of EMDR therapy. At the beginning of the second session, participants were engaged about their experiences between the initial and second session of EMDR therapy. Most participants reported that they felt a sense of relief and had noted positive changes in mind and body within themselves between the first and second session. Participants managed intense feelings between sessions with the safe place exercise, which indicated that they were able to use the safe place exercise in times of need.

Perspective Shifts - Although a large number of participants struggled to provide elaborated verbalisations of the positive changes that they were experiencing, most experimental group participants stated that they were feeling a lot better after receiving EMDR therapy. Apart from EMDR therapy allowing for participants to become more hopeful and improving their confidence in their ability to recover, it also indirectly impacted on their motivation levels, whereby some participants stated that after receiving EMDR therapy they felt more empowered and emotionally stronger to take on the challenges of recovery. The feedback received from

participants post EMDR therapy showed that the technique enhanced the participants adaptive functioning and improved their coping mechanisms.

By the end of the second session, most participants reported a positive outcome with EMDR therapy. In keeping with the factors outlined by Shapiro (2018) that should be taken into consideration at the end of each session, certain aspects that the researcher reflected upon suggests that the administration of EMDR therapy was effective in reducing and eliminating cravings. These aspects are as follows: individual targets were resolved, associated material was dealt with and resolved and the targets were reprocessed taking into consideration the past, present and future consequences. At the end of EMDR therapy, participants demonstrated perspective shifts in their ability to overcome their addiction and increased responsibility for changes that were required of them e.g., lifestyle changes or increasing their levels of spirituality, which is suggestive of adequate assimilation within a healthy social system. Their perspective of self and relationship with sugars was altered by the EMDR therapy process to varying degrees, therefore EMDR therapy did not only allow for challenges associated with a craving to become more bearable but also changed their perception of self.

7.2.2 Relaxation Session (control group)

The control group was exposed to a relaxation session and the script used in the present study was Ego Strengthening by D.C. Hammond (appendix I). The guided imagery served as a stabilisation technique, where the sensorial based coping skill provided the clients with a safe place to access when needed. Participants were able to relax and visualise the process with ease, as observed by physical changes such as deeper breathing, decrease in restlessness and reduced twitching of the eyes.

The preparation stage which allowed for the participants to be introduced to the researcher and be made aware of the relaxation process and what was to be expected from the process, created a sense of trust and safety. The preparation was important for participants to relax and trust the process.

Treatment Process - A few participants experienced bodily disturbances whilst undergoing the relaxation process. Participants were encouraged to make use of the technique after the initial session or if they experienced any discomfort or disturbance. Many participants used the technique and reported affective shifts and a reduction in the original disturbance at the beginning of the second session. Three participants reported that they struggled to imagine or recreate their safe place exercise. They stated that they were unable to relax or reconstruct their safe place as the noisy rehabilitation facility and peers prevented them from developing internal focus.

The relaxation session allowed for participants to focus on relaxing imagery and to evoke a sense of calmness, but unlike EMDR therapy, it did not allow for episodic cravings or traumas to emerge. The relaxation session as compared to the EMDR therapy session did not allow for the participants to recognize or identify the specific thoughts, feelings and body sensations associated with a craving experience. The researcher observed that although the control group participants reported feeling calmer and less tense, they did not seem as confident and self-assured as the experimental group participants in overcoming a craving. This observation suggests that EMDR therapy was more effective and improved the experimental group participants' level of confidence and self - efficacy in their ability to abstain from sugars and to overcome their addiction.

7.3 MECHANISMS OF THERAPEUTIC CHANGE

The preceding discussion focussed on the researcher's impressions and observed changes of both the therapeutic modalities used in the study, where it became apparent that the EMDR therapy group displayed perspective shifts and a change in cognitive schemas that were not evident in the relaxation group. Therefore, in trying to explain the effects of EMDR therapy on cue reactivity, qualitative findings, as well as the researcher's experiences and observations will be integrated in the discussion below. The discussion henceforth will first address the observed mechanisms of EMDR therapy in relation to the reprocessing of cravings, and the second part of this discussion includes the observed procedural elements of EMDR therapy that are common to other psychological modalities.

The literature on EMDR therapy demonstrates that the technique is a comprehensive holistic psychotherapeutic approach that enhances the overall psychosocial functioning of recovering persons in their environment (Shapiro, 2018). When dealing with the sample population, it was important to consider background variables, participants understanding of the impact of cognitions and emotions, its impact on their ability to delineate the target into specific components in the assessment phase and their understanding of the EMDR therapy process. The protocol for the current study which was guided by the standard EMDR therapy protocol (Shapiro, 2006), helped to simplify and facilitate participants understanding of their craving disturbances by delineating the targets for this study. This allowed for participants to break down the distressing craving experience into psychophysiological aspects, thereby allowing for the current disturbances associated with their craving experiences to be brought into consciousness.

The EMDR therapy group participants were instructed to focus on specific components of the craving experience, which were then effectively targeted using the bilateral stimulation. Effective targeting facilitated the process of consciousness raising, which is a process that is highlighted in the TTM model of change (Prochaska & DiClemente, 1984), that allowed for participants to understand and gain knowledge about their craving experience and the implementation of the EMDR therapy process. Conscious raising is a process whereby sugars users developed insight and awareness into intrapersonal triggers, which was crucial in the sample population, as many of them were unaware or unable to recognize the intrapersonal determinants of cue reactivity by themselves. Apart from increasing their knowledge of dysfunctional internal responses, conscious raising allowed for participants to develop an internal locus of control in managing their cravings by increasing their awareness of the causes, negative consequences and solutions to their addictive behaviour.

An understanding of recovery and associated challenges in recovery from an AIP perspective is central to the implementation of the EMDR psychotherapeutic approach. EMDR therapy developed on the foundation that disturbances are physiologically stored memories that are unprocessed, and that the reprocessing of memories allows for both dysfunctional and positive memories to emerge in treatment (Shapiro, 2018). Therefore, from an AIP perspective, EMDR therapy should result in a greater understanding of cue reactivity and the addictive process in

the sample population. Observations and qualitative findings demonstrated that the EMDR therapy procedure triggered a physiological state that assisted with information processing and allowed for a broad range of psychosocial constructs to have surfaced in relation to their sugars usage, such as low self - confidence, family and social challenges. In this study, the disturbances associated with sugars cravings were experienced in the form of disturbing thoughts, affects and physical disturbances, of which the thoughts and affects were often found to be out of the participant's conscious awareness. This observation is consistent with the Adaptive Information Processing model (Shapiro, 2018), suggesting that disturbing information related to their psychophysiological need for sugars are isolated in its own neuro network and stored in its originally disturbing state and specific form, which prevents new learning from taking place as it is unable to link associatively with adaptive information. Positive changes and an increase in consciousness were due to the activation of the AIP mechanisms, which allowed for the linking of the two disparate neuro networks, thereby activating and maintaining the information processing system in a dynamic form.

In the current study, a transmutation of information was observed after each set of bilateral stimulation, which allowed for disturbing material associated with a craving to come into their conscious awareness to be linked up and reshaped into positively oriented information. Therefore, the desensitization process and the installation of the positive cognition allowed for positive thoughts and feelings that were useful to be learnt and stored, thereby creating positive perceptions of their ability to abstain from sugars and to cope with the challenges in recovery. The process of adaptive resolution allowed for participants to connect their craving experience to appropriate associations by creating positive shifts in the emotional and cognitive schema of participants, which in turn impacted on psychological constructs that are needed in recovery such as motivation, self - efficacy, confidence and internal locus of control.

It was observed that some participants experienced an intensification of physical pain whilst focusing on their craving experience. This may be due to EMDR therapy being able to access earlier or previous memories related to the physical aspects of a craving that was held in a distressing and excitatory specific form. The accompanying physical pain associated with the distressing craving experience blocked specific neuro networks and neurologically maintained the craving experience in its disturbing state. EMDR therapy was able to access this disturbing

state, allowing for the addiction memory to be experienced in its original disturbing form. The key to psychological change is to encourage information processing which creates healthier associations and connections, and EMDR therapy allows for the dynamic processing of memories and for the innate processing mechanisms to be kept active, which is in sharp contrast to the static recall of verbal therapies. Based on the above observations, EMDR therapy has the potential to access past experiences that sets the groundwork for present dysfunction, whether it is due to the storage of addictive behaviour in memory or to an imbalance in the nervous system as a result of changes in neurotransmission.

The observed positive therapeutic effects demonstrate that various therapeutic mechanisms and modalities are involved in processing and bringing about changes in the craving experience, which suggests that EMDR therapy is an artful blend of psychotherapeutic techniques. The mechanisms observed whilst reprocessing a craving demonstrates that EMDR therapy is a psychotherapeutic approach that integrates the salient aspects of many of the major psychological modalities as suggested by the following:

- Neurobiological changes were apparent throughout the EMDR therapy process. Shifts in the brain state brought about by sets of bilateral stimulation activated and strengthened weak associations, indicating that physiological processes such as network activation allowed for previously blocked information to be replaced in consciousness by new accurate information. Network activation allowed for a process of reconsolidation (Nieuwenhuis et al., 2013), where the brain discarded the negative subjective associations of a craving and then allowed for a positive cognition of their current ability to cope with a craving and a corresponding emotion to emerge and be incorporated within the adaptive informational network. This linkage of the two disparate neural networks which is a major outcome of EMDR therapy, provides further evidence of the neurobiological processes of EMDR therapy. These observations support Shapiro's (2014a) statement that the major outcome of EMDR therapy is the physiological reconsolidation of memory, whereby the memory is changed through associative processes and stored in an altered state within an appropriate contextual memory network (Else & Kindt, 2017). The identification and reframing of dysfunctional cognitions related to the addiction facilitated the therapeutic process by creating associations with adaptive information that

contradicted the negative beliefs associated with drug usage, thereby providing support for cognitive reframing as being a salient aspect in EMDR therapy processing (Bivona et al., 2014).

- The dual focus of attending to a target and bilateral stimulation helped to maintain disturbing information in its dynamic form, like the free – association process of psychodynamic therapy (Freud, 1955), which allowed for the salient aspects of the memory network to be accessed and processed. In the current study, participants were asked to focus on their craving experience, thereby creating a link between consciousness and the site where the disturbing information was stored in the brain. The administration of the dual stimulation allowed for the information processing system to be activated and for the spontaneous emergence and movement of information by a process of free association. The shift in brain states activated and strengthened weak associations. This abovementioned observation substantiates the proposed theory on the mechanisms of EMDR therapy, where it has been postulated that the alternating bilateral stimulation enhances communication between the left and right brain, and the rapid powerful flow of EMDR therapy processing intensifies communication and connections between the structures of the brain (Amano & Toichi, 2016a; Nieuwenhuis et al., 2013; Jung et al., 2016).
- EMDR therapy also helped to disrupt the relationship between substance and user by weakening the bond and participant’s perceptions of the drug, thereby challenging and disrupting the participant’s relationship with the object. The objects relation theory of the psychodynamic approach states that the bond between an object and person intensifies the relationship, therefore the accompanying positive or negative reinforcement associated with sugars poses a challenge to the addicted person in relinquishing their drug of choice. The findings of this study demonstrated that the process of EMDR therapy allowed for state specific disturbances to be linked to corrective information through the introduction of positive cognitions and emotions.
- Rapid treatment effects were observed in the study, whereby the technique allowed for delayed learning to take place at a rapid rate. In EMDR therapy, the disturbing information was released at an increased rate along the appropriate neurophysiological pathways, allowing for previously isolated disturbing information to be brought into consciousness and be held with current adaptive information. The fast - paced adaptive resolution evident in EMDR therapy, allowed

for the use of cognitive behavioural strategies in identifying dysfunctional beliefs and self - control techniques to improve participant's coping skills, which in turn had a positive impact on behavioural constructs such as self - confidence, self - efficacy and motivation to recover. Constructing and dismissing disturbing imagery and cognitive reframing allowed for negative beliefs to be restructured and reframed into positive cognitions, which resulted in a sense of perceived mastery (Bivona et al., 2014).

- Interrupted exposure, a technique that emanated from behaviourism is an important procedural element in EMDR therapy. Participant's exposure to the disturbing craving experience in EMDR therapy differed from standard exposure therapies, where brief exposure to high levels of the craving disturbance was alternated with cognitive debriefing (van der Kolk, 2014). This type of interrupted exposure enhanced a sense of safety and allowed for greater tolerance of distressing thoughts, feelings and sensations, thereby encouraging rapid treatment outcomes. Based on observations of the sample population, it was evident that the intense overwhelming fear of the craving disturbances strengthened the avoidance response and prevented healing. EMDR therapy allowed for repeated exposure in a non - threatening manner, which is an important aspect in overcoming cue reactivity as it is impossible to experience exposure and avoidance simultaneously. It was the exposure to a craving in a non-threatening environment that allowed for shifts in state or restructuring of the craving experience. This process is indicative of classical conditioning (Pavlov, 1927), in which the participant is repeatedly exposed to the craving experience in a non-threatening manner, thereby creating a paired effect and allowing for the craving experience to be paired with positive or neutral affects or thought processes.
- In the mode of reality therapy, EMDR therapy focused directly on helping participants practice responsible and effective behaviour and to move towards setting constructive goals that facilitated recovery, which was observed in responses such as “ *It helped me to think about how to move forward*”; “ *I am thinking clearer*” and “ *I know what I am going to do now*”.
- Therapeutic attunement (van der Kolk, 2003) and the therapeutic relationship which are important elements of the client - centred approach, impacted on the success of EMDR therapy. Participant's trust and confidence in the therapist and the EMDR therapy process, as well as the therapist's unconditional positive regard for their drug

related experiences helped them to feel more at ease when sharing their experiences. During EMDR therapy, the therapist facilitated an understanding of negative thoughts, affects and resultant behaviour in a non - directive manner to guide the client away from dysfunctional stored information. This process is like therapeutic attunement and collaborative empiricism. The view that therapeutic attunement is central to the ability to process information has been substantiated by the treatment literature, which indicates that therapeutic alliance and attunement are important mechanisms that facilitate meaningful change in EMDR therapy (Bond & Witton, 2017), thereby providing support for the client - centred approach to therapy. The researchers' observations relating to the nature of the relationship between client and therapist throughout the EMDR therapy process can be described as "collaborative empiricism" (Kazantzis, 2018), where the therapist works collaboratively with the client to help them recognise factors that contribute to their addiction and to test the validity of their thoughts, beliefs and assumptions and to make the needed or desired changes.

- The "calm after the storm" was observed and supported by the statements of many research participants, who reported feeling much calmer after receiving EMDR therapy. EMDR therapy's ability to evoke a sense of calmness helped to facilitate the recovery process as drug cravings are often associated with high levels of anxiety, which challenges the recovery process (May et al., 2015). The literature on EMDR therapy suggests that the relaxation response may have been induced by both neurophysiological and psychological processes. From a psychological perspective, the relaxation response may be due to the deconditioning of distressing material or the "letting go" of unexpressed thoughts and emotions. The process of focusing on the craving disturbance for short periods of time, which were alternated with reassuring therapeutic statements resulted in counterconditioning and the "letting go" of distressing material. Breath work may also have contributed to a feeling of relaxation, where participants were asked to take a deep breath after each set of reprocessing, thus aiding in calming and relaxing the body. Physiological evidence on EMDR therapy suggests that the bilateral stimulation induces a relaxation response (Shapiro, 2018), and that the bi hemispheric activation may function as a pacemaker for the limbic system by facilitating down regulation of negative thoughts and emotions (Bossini et al., 2017).

- Mindfulness and its application to EMDR therapy allowed for a non-evaluative awareness of participants subjective craving experience. EMDR therapy does not work on assumption but involves the identification of a specific target. In this study, participants were asked to focus on specific aspects of a craving through the observer stance, thereby allowing for them to be indirectly guided into a state of mindfulness, which according to Witkiewitz et al. (2013) facilitates the processing of emotional information. Neurobiological research has found that visualising an image activates an aspect of the memory in the occipital cortex (Shapiro, 2001), therefore it is not known whether mindfulness is due to the direct alteration of the physiological substrate of the targeted network or through engendering a state of mind that helps them to be in the present moment and to assimilate information. The findings of this research support the findings by Bowen et al. (2014) that mindfulness helps participants become less reactive and deal with their craving experience with a better understanding.
- The changes that were observed after receiving EMDR therapy may be due to memory extinction. Extinction was observed in participant's responses such as "*I even tried thinking about sugars at night*" and "*I couldn't get the feeling or think about the roster*", which demonstrates that a completely new memory had formed. The extinction of the craving memory and the disappearance of craving symptoms increased their perceived mastery in relation to their ability to cope with and overcome a craving.
- Whilst reprocessing, some participants reported experiencing a heightening of discomfort before it subsided, which is similar to behavioural treatments such as the implosion (flooding) technique, where a client is exposed to extreme discomfort so that they can tolerate and reduce their fears by facing their disturbances in the most extreme form. The emergence of extreme discomfort and the retrieval of information related to the participants drug usage and craving experiences at a high level of disturbance shows that information is being held in a dysfunctional form and is indicative of a blocked memory network. The alternating process of observing and attending to the craving experience and then dismissing the distressing craving experience helped to strengthen the participant's internal locus of control and self – efficacy, relating to their ability to overcome a craving. Repeated exposure allowed for a reduction in discomfort and distress levels as indicated by participant's scores

on the subjective unit of craving scale, which was administered at various intervals of the EMDR therapy process. These observations support the AIP model and broadens our thinking on recovery processes by suggesting that an addiction may be maintained due to dysfunctional stored information and can be assimilated through a dynamic activated processing system.

7.4 CONCLUSION

This study suggested that EMDR therapy, which is guided by the adaptive information processing (AIP) model is an effective therapeutic method for reducing cue reactivity and craving management and can therefore be useful in the treatment of addictions. EMDR therapy processing demonstrated that the addiction memory is embedded in the episodic memory which are stored in isolated networks. The EMDR reprocessing promoted an associative process which allowed for the disturbing craving experience to be linked to more adaptive information, resulting in new associations and the adaptive resolution of the distressing craving targets. The adaptive resolution allowed for the emergence of positive insights, emotions and physical sensations, which in turn impacted on crucial psychological and behavioural constructs that are needed in recovery. The research findings and observations have demonstrated that EMDR therapy is an integration of various core elements of old and new treatment methods. The findings and observations in this study, in conjunction with the research and treatment literature suggests that EMDR therapy is the combination of active and passive therapeutic strategies in a non-threatening environment. The transmutation of dysfunctional stored experiences into an adaptive resolution in EMDR therapy, provides opportunities to build on qualities and constructs that are considered essential in recovery, such as self - efficacy, sense of calmness, perceived mastery, hope, locus of control and self - confidence.

CHAPTER 8

CONCLUSION AND RECOMMENDATIONS

The main aim of this study was to investigate the effects of EMDR therapy on cue reactivity and to establish whether there will be any changes in craving symptoms after receiving EMDR therapy in a sample of Indian men, within the greater Durban metropolitan area. The EMDR therapy model developed by Francine Shapiro, and the addiction memory concept provided the context for the study.

Chapter 6 and 7 provided a detailed discussion into the results of this study. The quantitative and qualitative findings inclusive of clinical interviews and observations provided an in depth understanding of factors that precipitate, perpetuate, and maintain an addiction to sugars, as well as the efficacy of EMDR therapy and relaxation training in treating cue reactivity. This chapter will focus on the conclusion, recommendations, programmatic interventions, and avenues for future research. It also highlights the limitations of the study so that they can be avoided in future research.

8.1 SUMMARY OF FINDINGS

Drug usage in KwaZulu - Natal, South Africa, specifically the use of a heroin - based drug, called “sugars” has become a tragedy which is ravaging individuals, families and communities in the lower socio economic areas in the province. Sugars usage and addiction in affected communities are deep rooted and on - going and have negative implications for the functioning of affected communities, as confirmed by the findings of the current study.

The broad aim of this research is to contribute to the overall field of research on treatment efficacy and to more specifically determine whether EMDR therapy can reduce cue reactivity in a sample of sugars addicted persons and be considered a key element in the treatment of addiction, so that the findings can assist treatment practitioners in addressing and managing cue reactivity and cue resistance amongst this population. The current study addressed the question as to whether EMDR therapy can assist in reducing cue reactivity in sugars addicted

persons by comparing the effectiveness of EMDR therapy to relaxation therapy. The findings of this study provide support for the use of both EMDR therapy and relaxation therapy amongst a homogenous sample of sugars addicted inpatients, demonstrating that both these treatments can make a positive contribution to cue reactivity and addiction treatment, thereby confirming the benefits of implementing treatments that assist in reducing and eliminating cravings in sugars addicted persons. Clinical observations and item analysis of the “Sugars Craving inventory” showed a difference between EMDR therapy and relaxation therapy for efficiency, however more rigorous research with large heterogenous samples are needed to confirm the superiority and effectiveness of EMDR therapy in relation to relaxation therapy when treating sugars addicted persons. This finding supports literature that research and investigations in addiction recovery must use large representative samples and sophisticated statistical techniques to elucidate processes at work (Shapiro, 2018). The abovementioned findings are limited in its generalizability and must be interpreted with caution as the sample was from the Indian population group and was drawn from just two treatment centres that were thoroughly screened for the presentation of mental health comorbidities as mentioned earlier. South African surveillance studies (Dada et al., 2015), and the researcher’s experience of working with sugars addicted persons has pointed to a high level of mental health comorbidities in this population, which hampers and challenges the recovery process due to the strong association between addiction and mental health. The exclusion of a dual diagnosis in the current study allowed for the participants to be more receptive and less distracted throughout the therapeutic processes and for better treatment outcomes, a finding which supports the treatment literature that individuals without a dual diagnosis have better treatment outcomes (Collizi et al., 2016; Morisano et al., 2017). This finding must not go unrecognized when motivating for the use of these modalities in the general population of sugars addicted persons.

The study demonstrated that specific factors and individual therapeutic processes impacted positive treatment outcomes by reducing cue reactivity and enhancing the recovery process, suggesting that there is a significant advantage when integrating psychotherapeutic interventions such as EMDR therapy and relaxation training at an early stage of treatment in sugars addicted persons. EMDR therapy seemed to have reduced and extinguished cravings, assisted participants in examining their own belief systems, enhanced emotional regulation skills, reduced the intensity of physical disturbances, increased hope and the desire to recover. The focused information processing aspect of EMDR therapy allowed for negative affect, imagery, beliefs and physical sensations to become weaker and less valid, whilst positive

thoughts, affects, imagery and physical sensations strengthened and dominated the neuro network. Relaxation therapy helped to evoke calm and relaxing feelings by reducing participants' anxiety and providing a self - help tool to be used when craving or dealing with stressful situations. These findings are important as they point to the usefulness and functions of EMDR therapy and relaxation therapy in dealing with cravings and in maintaining long term sobriety. The addiction memory concept (Wolfgramm, 2000), and the AIP model (Shapiro, 2001) was highly useful in understanding the neurobiological aspects and reward systems involved in the initiation and maintenance of sugars cravings and addiction. These theoretical models also provided an understanding of the mechanisms of EMDR therapy as an addiction treatment that was useful in altering the addiction memory and reducing the psycho physiologic intensity of a craving experience. The linking of adaptive information to previous dysfunctional stored information is an important aspect of craving management, which is a distinguishing feature of the Adaptive Information Processing model. The researcher also observed that relaxation training impacted on physiological processes that encouraged calmness and showed positive effects in reducing the anxiety associated with a craving, thereby allowing for the recovery process to become more manageable.

To date, there has mostly been media articles and very little research conducted on sugars addiction, despite it being described as an epidemic in KwaZulu - Natal. The study has contributed to this gap and provided a step on the road to more rigorous research to understanding the full topography of the problem and providing appropriate treatments for affected communities. The quantitative and qualitative findings in conjunction with the existing body of knowledge on heroin addiction highlighted the deficits in psychic infrastructure, developmental challenges, poor insight and negative behaviours due to family instability and the early onset of sugars usage. The impact of the above - mentioned factors is considered crucial to the outcome of any study or preventative effort related to sugars addiction. The current study identified a combination of factors that regulate and perpetuate the need and loss of control of sugars usage in the sample population viz; cravings, effects of altered states, perceived inadequacies, tolerance, withdrawal, poor coping strategies, social group factors, genetic commonalities and behavioural constructs. The positive and negative reward systems operative in sugars addiction were highlighted throughout the EMDR therapy process, and important behavioural constructs such as confidence building, self - efficacy, internal locus of control and perceived mastery were found to be crucial to a recovering sugars user's belief in their ability to recover. This study also broadened our understanding of factors and skills that

are needed for the optimal functioning of recovering sugars users post discharge, such as fears related to their ability to cope upon discharge and a lack of support, suggesting that the sample population may belong to social environments that are unsupportive and emphasizing the role that the environment plays in their ability to remain sober. The lack of a supportive social system and associated feelings of helplessness can be addressed by providing recovering persons with the tools that they need to cope with the challenges of the recovery process and by implementing the information that emerged from the themes of the qualitative study, which relates to the needs of this population in recovery.

The qualitative study which comprised of semi structured interviews of the EMDR therapy group provided an in depth understanding of participant's subjective experience of EMDR therapy and allowed for several themes and subthemes to emerge. The themes and subthemes that emerged suggest that cognitive, emotional and physiological cues are linked to the participant's inability to abstain from sugars. These findings support the DSM 5 (APA, 2013) explanation of a substance use disorder as a cluster of cognitive, behavioural and physiological symptoms which encourages the use of a substance despite adverse consequences. The themes that emerged highlighted important characteristics that are needed in recovery viz, positive coping skills, safety, hope and perceptions of therapy. The findings of the semi structured interviews dovetail with the findings of the intake interview, providing a comprehensive account of intrapersonal and interpersonal factors that contribute to challenges in craving management and recovery. The study demonstrated that individual and systemic issues perpetuate sugars usage and that a positive attitude towards recovery is central to a successful recovery. These findings can direct treatment centres and treatment professionals towards important aspects of treatment that can facilitate and enhance the recovery process in sugars addicted persons.

The effectiveness of any therapeutic modality is influenced by the degree of safety within a therapeutic environment. This study suggests that therapeutic safety based on the therapeutic relationship, preparation and therapeutic alignment should not go unrecognized as important constructs that facilitate a sense of recognition in a population that feels stigmatised and invalidated. Participant's perceptions relating to the usefulness of EMDR therapy in addressing cue reactivity and the need to incorporate the modality into rehabilitation programmes, coupled with the researcher's observations shows that the treatment experience was purposeful and

beneficial in addressing craving management and enhancing the recovery process of the sample population. Participants' perceptions of the treatment modality resulted in them recommending the use of EMDR therapy, in which all the experimental group participants recommended that EMDR therapy should be used to deal with cravings and challenges experienced whilst in recovery.

The findings of this study demonstrated that the use of sugars is not just dangerous because a person has become addicted to it but due to the dire consequences of the drug to the individual and society. The development of the Sugars Craving Inventory, a 25 item self-report questionnaire that was developed for the purposes of this study is a useful contribution to the field of sugars addiction, as it helps to evaluate the nature and severity of the specific aspects of sugar craving experiences and can assist in determining the type of interventions that are required in individualised treatment. The feedback received from the sample population coupled with the researcher's observations has highlighted the precipitating, perpetuating and maintaining factors of sugars usage in affected communities. The use of EMDR therapy in reducing cue reactivity provided a modality that explored and demonstrated the relationship of internal experiences and interpersonal factors in keeping with neurological accounts of addiction, thereby challenging the theoretical underpinnings of treatment programmes that currently dominate the field of addiction treatment and motivating for the use of EMDR therapy as the missing piece in treating sugars addiction. Based on the above findings of this study and previous research and treatment literature, EMDR therapy can be described as a therapeutic modality that focuses on the holistic individual, reaffirms the importance of the relationship between therapist and client, is informed by evidence and incorporates aspects from various therapeutic modalities to achieve recovery and optimal psychological functioning. The discussion below pertains to the implementation of findings and implications for future research, as it relates to observations and feedback on the therapeutic modalities used in this study.

8.2 IMPLEMENTATION OF FINDINGS AND DIRECTIONS FOR FUTURE RESEARCH

There are differences in perception of what constitutes “success” and “progress” in the field of addiction treatment. Treatment and prevention are inextricable parts of the recovery process for drugs that are commonly used in developing communities (Hall et al., 2006), and the study has identified several factors that should be considered in addressing and providing treatment to sugars addicted persons. The scourge of addiction is not only perpetuated by ineffective treatment methods and a lack of understanding of the addictive process, but also by a lack of treatment options to those that are unable to afford rehabilitation costs (USAID, 2016). The research findings have important clinical implications for craving management, withdrawal management, relapse prevention and more effective treatment planning for sugars addicted persons.

The research study points to the importance of using EMDR therapy in sugars addiction treatment, however EMDR therapy can only be administered by an EMDR therapy practitioner who has been trained by an accredited EMDR therapy trainer in the first and second level of EMDR therapy. The abovementioned training and registration criteria have resulted in few trained EMDR therapy practitioners in developing countries. Furthermore, the implementation of EMDR therapy is time consuming with each therapeutic session ranging from 1 to 2 hours, making it difficult to administer or cater for it in community treatment settings similar to the rehabilitation centres that were used in the current study, as they are highly populated, charge a minimal fee for treatment and are generally under resourced both financially and in terms of qualified professionals. Given the abovementioned limitations in administering EMDR therapy, a useful contribution of the study will be to use the information and insights that emerged from this study to develop and assist with programmatic interventions that are suitable for the research population. Distinguishing features amongst the sample population such as poor insight into recovery processes, hopelessness, helplessness, anger, powerlessness, unclear thinking, external locus of control, low self - efficacy, low self - confidence, varying motivation, lack of support and poor emotional regulation skills should be used to develop recovery programmes that specifically address these issues. Therefore, the researcher is of the opinion that the findings of this study and its impact on all major dimensions of a recovering

person's life should be used to provide guidelines for craving management and optimal recovery strategies for sugars addicted persons as outlined below.

8.2.1 Treatment Interventions

A suitable treatment programme for sugars addicted persons should aim at introducing a treatment plan that comprises of interactive and participatory interventions that replace dysfunctional thoughts, feelings and behaviours with adaptive ones. The treatment programme should include individualised and group activities that borrow from a range of therapeutic approaches such as cognitive therapy, solution focused brief therapy, family therapy, behavioural and exposure therapies. It is crucial for treatment professionals to conduct a thorough initial assessment to determine at which stage a person is with regards to the process of change. Thereafter, various client centred participatory methods such as brainstorming, role play, educational games and reward systems that encourage desirable behaviour should be used to create awareness and the maintenance of skills that are needed at different stages of treatment and recovery. Below is a broad list of strategies and techniques that have emanated from the findings of the study that will be useful in treating sugars addicted persons:

Responsibility

- Recovering persons should be encouraged to acknowledge and accept the devastation that the addiction has caused in their lives and that of significant others and to introduce strategies that lead to self - acceptance, as well as to take responsibility for the consequence of their previous drug usage.

Cognitive Development and Functional Thinking Skills

- Recovery programmes should aim at improving the insight of participants through consciousness raising by assisting in developing an awareness of intrapersonal triggers and the psycho physiologic aspects of the craving experience.
- Recovering persons should be taught the impulse - control skill of “stop, look, listen, think and plan” before reacting. They should be assisted in developing insight into the dangers of acting impulsively e.g. not having time to consider consequences or plan effectively. The interventions should help to uncover dysfunctional thoughts

and situations that lead to impulsivity and sugars usage, and to replace each of these thoughts with a more accurate, positive, self - enhancing and adaptive thought.

- Treatment providers should use various scenarios to assist recovering persons in identifying a sense of feeling powerless over sugars encourages usage. Recovering persons should be encouraged to identify the way in which negative thinking and behaviours can result in negative consequences and that the reframing of negative thoughts can lead to positive consequences, which in turn assists with developing an internal locus of control. They should be assisted in developing a list of positive, self - enhancing statements that needs to be used daily to build a positive and accurate self - image that replaces disparaging self - talk. They should also be encouraged to reinforce positive statements regarding their life and their future, which could help in developing an internal locus of control.
- Treatment interventions should help recovering persons become aware of the influence of the peer group on their sugars' usage. Their intent to break ties with a peer group should be reinforced by helping patients identify and list negative peers, and to write a plan that outlines ways to decrease social contact with old friends that are unsupportive of recovery.

Coping and Stress Management Skills

- A treatment professional should help participants develop a written plan to deal with high risk situations (e.g. negative emotions, social pressure, interpersonal conflict and testing personal control). It is also crucial that alternative constructive strategies that consist of a repertoire of skills be developed that could improve an individual's coping skills i.e., breathing and relaxation exercise, talking to someone about the challenges that are being experienced, calling a sponsor and physical exercises when experiencing a craving.
- Recovering persons should be taught self - nurturing strategies so that they understand and take care of their own needs.
- Programmes must include and encourage the use of relaxation techniques, where recovering persons learn to incorporate relaxation techniques such as progressive muscle relaxation, quiet time and mindfulness in their daily lives. The relaxation techniques are mechanisms that can help to reduce anxiety and stress and improve

their ability to cope with negative emotions. They should be encouraged to use these techniques twice a day for a period of 10 minutes.

- The need for self - help tools in this population are crucial, as they have poor support systems. Therefore, introducing and empowering recovering persons to use effective EMDR therapy self - help tools such as the safe place exercise and light stream technique are imperative and a much - needed future resource in maintaining sobriety.

Emotional Management and Development

- Treatment professionals should teach patients about the relationship between emotions and sugars usage, and the way in which drugs are used to cope with negative and positive emotions. Recovering persons should also be taught ways in which to identify and label emotions that have a negative impact on their sobriety and to utilise techniques that allow them to use negative and positive emotions as a guide in recovery.
- Recovering persons should learn to cope with the guilt and shame associated with sugars usage, as well as to learn letting go techniques to help reduce or let go of the shame and guilt associated with previous drug usage.
- Recovering persons should be made aware of the way in which angry thoughts and feelings lead to an increased risk of sugars usage, and they should be taught proactive anger management strategies to deal with angry reactions viz; impulse control strategies, sharing feelings, exercise and healthy self - talk.

Self - Awareness and Development Skills

- Recovering persons should be exposed to strategies that can improve their levels of self - efficacy by allowing them to engage in situations that encourage mastery.
- Programmes should focus on teaching recovering persons the importance of building their sense of self - worth and self - esteem, which should include practical strategies that can help them to rebuild a positive self - image and improve their self - esteem.
- Recovery programmes should highlight the relationship between self - esteem and self - confidence and participants should be encouraged to engage in activities that can help develop their self - confidence.

- Recovering persons need to be encouraged to affirm the self and to reward themselves for positive changes and for abiding to a recovery plan.

Interpersonal and Communication Skills

- Healthy communication skills are important in recovery, where recovering persons should be encouraged to verbally express themselves, specifically with being honest and sharing feelings. They should also be taught healthy communication skills that can assist with conflict resolution. Group therapy sessions should focus on social skills development and techniques that reinforce positive social interaction and healthy communication skills.
- Modelling, role playing, and behavioural rehearsal should be used to teach the patient refusal skills that are needed in high risk situations that evoke cravings.

Social and Environmental Support and Enrichment

- Living - environment deficiencies need to be addressed, where patients should be assisted in identifying problems within their living environment and its impact on cue induced cravings and relapse. Interventions should include identifying positive support systems in recovery and developing a personal plan that has the elements that are needed to cope in their environments e.g., activities that enable personal growth, refusal skills and assertiveness skills.
- Family therapy can assist in educating family members about addiction, sensitizing them to living environment deficiencies and equipping them with supportive strategies that assist recovering family members. Additionally, caregivers and significant others should be educated on important aspects of recovery that can help create a feeling of acceptance and safety, as feeling safe encourages and motivates recovery.
- Positive lifestyle changes comprising of regular exercise, healthy diet and pro social activities should be encouraged and incorporated at an early stage of recovery. Recovering persons should be encouraged to identify and engage in pleasurable leisure activities (e.g., hobbies, religious affiliations, sporting activities, games and positive social activities) that will increase their enjoyment of life and assist in avoiding unhealthy and negative socialisation experiences that encourage drug usage.

Below is a summarized view of the life skills (Table 33), which the researcher has identified as lacking in this population and should be included in recovery programmes:

Table 29 Essential life skills to be developed

Inter - personal Skills	<ul style="list-style-type: none"> • Listening skills • Giving & receiving feedback • Non-verbal communication skills • Assertion & Refusal skills • Conflict management • Relationship skill
Self - Awareness Skills	<ul style="list-style-type: none"> • Identifying personal strengths and weaknesses • Identifying positive thinking patterns • Self - image building skills • Self - confidence building skills • Skills for identifying needed values, influences on values and linking values to behaviours
Decision - Making Skills	<ul style="list-style-type: none"> • Problem solving skills • Skills that assess personal risk and consequences • Skills that assist with information gathering and generating alternatives
Coping/Stress Management Skills	<ul style="list-style-type: none"> • Coping with peer pressure • Self - control skills • Help seeking skills • Goal setting • Dealing with negative and positive emotions • Dealing with difficult situations

8.2.2 Reprogramming Exercise

The reprogramming exercise has been developed based on the findings and observation of this study, which can be administered to reduce the disturbances and anxiety associated with cravings. It comprises of elements of the addiction memory as seen in EMDR therapy, specifically the episodic memory of a distressing craving experience and relaxation training. The reprogramming exercise is rooted in associative memory concepts and operant

conditioning processes. Participants will choose the most disturbing craving symptoms from the SCI scale, which will be used in the reprogramming exercise that follows:

“Close your eyes and focus on all the sounds that you can hear on the outside of the room, now on the inside and now on what is happening inside yourself. Now clear your head of any thoughts and take a few deep breaths, breathing slowly and allowing your body to relax more and more and just feel yourself sinking into your seat. Now as you feel more and more relaxed, I want you to focus on your symptoms of craving for sugars. Focus on the backaches,headaches, yawning..... (based on the most disturbing symptom presentation of the SCI).

Now take these unbearable cravings and feelings and pair it with an image/picture of sugars. So, from now on whenever you think of sugars or whenever you take sugars, these extremely uncomfortable/unbearable feelings will appear. They will be so uncomfortable/unbearable, that you will not be able to tolerate them or think about sugars. Your mind has now been programmed/ conditioned. The thinking or taking of sugars will make you feel extremely uncomfortable and sick.

Now, that you have stopped thinking about sugars, or say no to using sugars, you will start to realise that these uncomfortable/unbearable symptoms will disappear. You have now been conditioned to feel extremely sick and miserable when you think or take sugars. As you move away from the thoughts of sugars, you will start to feel better, calmer, lighter and more focused on your recovery, more alive, more alert and more satisfied with yourself that you can say no to sugars and that you don't need sugars to cope or feel good.

This new feeling of being able to say no to sugars makes you feel good and makes you realise that your need for sugars has completely disappeared. All you need to do now is to focus on your recovery because thinking and taking sugars will make you feel extremely miserable and take you away from your family, health, happiness and yourself. From now on, you have entered a new phase in your life without any problems, which is going to be full of peace, joy, calm and prosperity because you have a responsibility to yourself to make sure that you recover. I now want you to have a few minutes of silence, to allow these suggestions to play/echo in your mind so that they become deeply rooted in your mind and grow stronger and more powerful with every moment that passes by. Now just continue to relax, taking in these suggestions and visualising/seeing yourself as completely recovered”.

The reprogramming exercise has been developed based on the findings and observation of this study, which can be administered to reduce the disturbances and anxiety associated with cravings. It comprises of elements of the addiction memory as seen in EMDR therapy, specifically the episodic memory of a distressing craving experience and relaxation training. The reprogramming exercise is rooted in associative memory concepts and operant conditioning processes. Participants will choose the most disturbing craving symptoms from the SCI scale, which will be used in the reprogramming exercise that follows:

8.2.3 Implications for Future Research

Apart from the treatment plans that emanated from significant findings of the study, there are several implications for future research as discussed below:

- Investigations and research should be conducted on the use of daily self-directed interventions and self-management tools such as relaxation therapy that can help reduce the anxiety associated with a craving or challenges experienced post treatment. Research should also be conducted to investigate the effects of specific self - administered EMDR therapy strategies that can assist recovering sugars addicts in coping with recovery e. g the butterfly hug and safe place exercises.
- Future studies should explore the possibility of using different data collection methods e.g., staff ratings of perceived changes, peer feedback and focus group discussions to get a more accurate view of the therapeutic effects of the modalities used in the study, as well as a broader perspective of the recovery process.
- Research should be conducted on treatment outcomes of participants that were coerced into treatment in comparison to voluntary admissions, to determine whether the treatment modalities can result in positive treatment effects despite the level of motivation. Therefore, research should be conducted to determine the extent to which readiness for treatment is related to EMDR therapy outcomes.

- In trying to determine the usefulness of the modality for the overall population, the effects of EMDR therapy on a sample of sugars addicted persons presenting with comorbid mental health conditions needs to be researched. This will help to determine similarities and differences in treatment outcomes between sugars users with comorbid mental health conditions, and those that do not present with comorbid mental health conditions.
- Sugars addicted persons seek therapy only when they feel they have lost control of their lives, which coincides with them losing family, belongings, employment etc. The recovery process may be less challenging if persons addicted to sugars receive treatment at an early stage of addiction. Research should be conducted to determine whether the response to EMDR therapy in recovering sugars addicts at an early stage of addiction differs from persons who come into treatment due to loss of control of their lives. Furthermore, research should determine whether the psychological constructs that have been identified in this study, which impacted on the recovery process will differ between those that seek treatment when they lose control of their lives in comparison to those that reach an addictive stage, but still have control of certain aspects of their lives.

8.3 RECOMMENDATIONS

Drugs have a negative impact on developing societies, undermining the moral fibre, demolishing family values and the eventual fate of the affected communities. This study will not only provide recommendations relating to improving the design and findings of the research study, but also provide recommendations that are related to programmatic and community interventions for sugars addicted communities.

8.3.1 Improving the Design of the Study and Treatment

- 1) The positive experiences related to using EMDR therapy and relaxation training in addicted patients should be replicated in more rigorous studies with larger and varied samples that allow for generalisability.

- 2) The Sugars Craving Inventory, a 25 item self-report instrument which was developed to measure different aspects of a sugars craving and to provide an overall rating of participants experiences needs to be refined, as participants responses demonstrated that some items were more important than others in defining their craving experience.
- 3) In trying to determine the effective use of EMDR therapy in withstanding and reducing cravings, craving specific EMDR therapy protocols that include current or earlier episodic memories of the craving experience should be developed and implemented at different stages of recovery viz, early treatment, middle treatment and advanced treatment stages. This will help to determine which protocol work best and under what conditions.
- 4) The future template which forms part of the EMDR therapy protocol should be included in craving and addiction specific protocols, to help empower recovering persons to cope with future dangers.
- 5) The study should be replicated using a combined sample of males and females to determine whether the craving experiences and treatment needs differ between the two groups, and whether broad based EMDR therapy protocols or specific gender differentiated protocols will be better suited for both groups.
- 6) A treatment setting is a neutral environment that provides very little opportunity to experience cue reactivity, therefore it is important to determine the impact of EMDR therapy and relaxation training on cue reactivity post discharge. Longitudinal studies need to be conducted to determine whether the gains that were achieved in managing cravings with EMDR therapy or relaxation training are maintained long term, or when a person is discharged from the treatment setting and reintegrated into their living environment.
- 7) Research should also look at the prevalence of addiction professionals that have been trained in the treatment modalities used in the study viz; EMDR therapy and relaxation training. These findings will provide useful information on the paucity of trained personnel in relation to these treatment modalities, the need for modified interventions and future training needs.

8.3.2 Community and Programmatic Recommendations

The findings of the research are consistent with media reports (USAID, 2016), stating that the sugars scourge is a community problem. Bold steps should be taken towards unpacking

the challenges that sugars usage poses to affected communities and a gigantic leap should be taken by various role players within the community to help alleviate the scourge of sugars addiction.

- 1) Programmes that need to be implemented must encompass a “bottom up approach” that promotes an alliance and active participation within the affected communities, and the language, content and tools used should be culture and context sensitive.
- 2) The need to promote balanced development in the sugars using population is imperative given their early onset of sugars usage. Creating educational opportunities and motivating learners to continue studying is a strong predictor of preventing drug use, as educational interventions and cognitive enhancement strategies will help the youth to determine and think rationally about the consequences of sugars usage.
- 3) Awareness campaigns should begin in primary school, given the magnitude and severity of sugars addiction in affected communities and should include education, confrontation, and self - confidence development. Consciousness raising should be considered a crucial aspect in awareness and treatment, whereby individuals are provided with information that increases their awareness about the intrapersonal and interpersonal factors, the impulsive addictive personality and genetic influences that may place certain individuals at a high risk for sugars usage.
- 4) Training of educators need to be factored into proactive awareness programmes to equip them in identifying potential abusers or those at high risk, so that referrals for support and prevention can be implemented on a more proactive basis.
- 5) Role players within the community should identify and encourage affected communities to engage in meaningful recreational activities, given that drugs are used recreationally within the affected communities.
- 6) The creation of job opportunities and providing gainful employment in recovery are supportive and motivational factors that will help to create a sense of purpose and assist in maintaining sobriety.
- 7) Family involvement is important in the implementation of community-based strategies. Family should be regarded as a pro social institution that can enhance the protective factors in affected communities, and awareness campaigns should focus on encouraging, empowering and educating the family on their ability to impact on drug free lifestyles and the prevention of sugars usage.

The abovementioned recommendations demonstrate that there is a clear need for multicomponent programmes and community - wide responses that promotes partnerships in fighting the sugars scourge in affected communities. This study has demonstrated that the interplay between individual, social and environmental factors impacts on the choice to use a drug and recovery and emphasizes the need for multicomponent programmes.

8.4 LIMITATIONS

The research study was able to address the aims and objectives of the study and provided evidence for the effectiveness of EMDR therapy in managing cue reactivity. However, there were some limitations to the study viz,

- The first limitation of the study is that the small sample size impacted on generalising the research findings. Due to the in - depth nature of the study, a small sample of 70 participants, comprising of 35 experimental group and 35 control group participants were used. In choosing the sample size, consideration was given to the high rate of recidivism and non - compliance in the research population, lack of resources and the inclusion and exclusion criteria. The length of time that was spent on the intake session, stabilisation techniques and the actual EMDR therapy session also played a role in choosing a small sample size.
- A second limitation of the study was that the researcher carried out the assessment processes in the research and was also the clinician that conducted EMDR therapy with the experimental group participants and relaxation training with control group participants. This was not just due to the lack of resources but also due to the researcher wanting to have a thorough and in depth understanding of participants' experiences. However, self - reporting instruments were put into place to minimise researcher bias, and instruments constructed for the purpose of the study were piloted prior to being implemented in the study.

- Craving and withdrawal symptoms are different but related factors that impact on the recovery process for heroin addiction. The study was conducted at a very early stage of treatment in which participants were still experiencing sugars withdrawals that may have affected participant's ability to differentiate between craving and withdrawal symptoms, due to the similarities in symptom presentation. The decision to implement the therapeutic processes at an early stage of inpatient treatment was based on the researcher's observation that participants present with severe craving symptoms in early recovery and that it would be useful to determine the impact of the therapeutic processes on their craving presentation at an early point in recovery. The researcher remained mindful of this overlap and was careful in distinguishing between withdrawals and craving symptoms, and in further clarifying the symptom presentation with participants.
- A key limitation of the study was the difficulty in assessing the way in which time effects impacted in reducing participant's cravings and overall functioning. The physiological effects of sugars and the withdrawal symptoms decreased with the passing of time as documented in the research literature on heroin (Amato et al., 2013), which allowed for recovering persons to cope better without the use of sugars. Therefore, the reduction of craving symptoms may in part be due to the reduction of withdrawal symptoms and the detoxification process.
- The follow up measurement was done a month after completion of the two sessions of EMDR therapy. It would have been beneficial to have more than one follow up session, and a follow up session post discharge, to ascertain whether gains were maintained when participants returned to their living environments. However, due to resource constraints, regular follow ups were difficult to carry out.
- EMDR therapy and relaxation therapy were the only type of psychological therapy that the participants received in their treatment setting, therefore the therapies were well received by participants. However, in the absence of any

other treatment modality, the perceived effects and perceptions of EMDR therapy may have been magnified.

Despite the above - mentioned limitations, the findings of the study suggest that EMDR therapy and relaxation therapy are effective and safe interventions to reduce the craving experience and thus to treat sugars addiction. The results of the current study combined with other studies, suggests that further research should be conducted to improve our knowledge relating to the efficacy of EMDR therapy and relaxation training in clinical treatments, and in alleviating cravings in sugars addicted persons in the early stages of recovery.

8.5 CONCLUSION

This study provides strong support for EMDR therapy and relaxation training due to the significant positive effects in reducing craving symptoms and enhancing addiction treatment. However, item analysis of the “Sugars craving inventory” and researcher observations suggested the superiority and effectiveness of EMDR therapy compared to relaxation training in treating the sample population. Future research should be conducted with improvements in the design of the study by using larger and varied samples, as well as a longitudinal design to confirm and further validate the efficacy of EMDR therapy in treating cravings, as well as the effect of EMDR therapy on broad constructs related to sugars addiction. It has also become evident from the findings of the study that the successful treatment of sugars addiction requires an approach that addresses the neurobiological changes to learning and memory systems that occur as part of the addictive process, therefore intervention and treatment should operate from a more comprehensive conceptualisation of sugars addiction that is focussed on particular mechanisms of addiction that are operative within the affected communities.

The study has also shed light on useful information relating to precipitating, perpetuating and maintaining factors of sugars addiction, providing a broad view of constructs related to sugars addiction which has implications for treatment interventions. Sugars addiction which is characterised by loss of control over drug seeking is closely linked to episodic memories that are linked to saliency, reward, motivation, memory, conditioning and inhibitory control that leads to profound disturbances in an individual’s behaviour and their immediate environment. Given the paucity of research on sugars addiction, it is hoped that the results of the current

study provide a better understanding on treating sugars addiction and initiates further research in the field, as well as to improve the state of knowledge on the efficacy of EMDR therapy and relaxation training in understanding and treating sugars addiction.

REFERENCES

- Abdollahi, Z., Taghizadeh, F., Hamzehgardeshi, Z., & Bahramzad, O. (2014). Relationship between addiction relapse and self-efficacy rates in injection drug users referred to Maintenance Therapy Centre of Sari, 1391. *Global journal of health science*, 6(3), 138.
- Abel, N. J., & O'Brien, J. M. (2010). EMDR treatment of comorbid PTSD and alcohol dependence: A case example. *Journal of EMDR Practice and Research*, 4(2), 50-59.
- Abel, N. J., & O'Brien, J. M. (2014). Treating addictions with EMDR therapy and the stages of change. In F. Shapiro, *Eye Movement desensitisation and reprocessing: Basic principles, protocols and procedures* (3rd ed., p.407). Guilford Press.
- Afifi, T.O., MacMillan, H., Boyle, M., Taillieu, T., Cheung, K., & Sareen, J. (2014). Child abuse and mental disorders in Canada. *Canadian Medical Association Journal*., 186(9), 324-328. PubMed database. (CMAIJ 131792).
- Agrawal, A., Verweij, K. J. H., Gillespie, N. A., Heath, A. C., Lessov-Schlaggar, C. N., Martin, N. G., Nelson, E.C., Slutske, W.S., Whitfield, J. B., & Lynskey, M. T. (2012). The genetics of addiction - a translational perspective. *Translational psychiatry*, 2(7), e140.
- Ahmed, S. H., Walker, J. R., & Koob, G. F. (2000). Persistent increase in the motivation to take heroin in rats with a history of drug escalation. *Neuropsychopharmacology*, 22(4), 413.
- Albers, J. (2010). The interplay of resourcefulness and resilience in recovery: A six session approach treating addictive behaviour, an extended EMDR protocol. In *1st EMDR Asia Conference, Bali, Indonesia*.
- Alim, T., Kumari, S., Adams, L., Saint-Cyr, D.A., Tulin, S., Carpenter-Song, E., Hipolito, M., Peterson, L., & Lawson, W.B. (2017). Craving and Depression in Opiate Dependent Mentally Ill African Americans receiving Buprenorphine/Naloxone and group CBT. *Clinical Psychiatry*, 3 (2), 11. <https://doi.org/10.21767/2471-9854.100042>.

Alonso, Y. (2004). The biopsychosocial model in medical research: the evolution of the health concept over the last two decades. *Patient Education and Counselling*, 53 (2), 239-244. [https://doi.org/10.1016/S0738-3991\(03\)00146-0](https://doi.org/10.1016/S0738-3991(03)00146-0).

Amano, T., & Toichi, M. (2016). The role of alternating bilateral stimulation in establishing positive cognition in EMDR therapy: A multi-channel near-infrared spectroscopy study. *PloS one*, 11(10), e0162735.

Amato, L., Minozzi, S., Ferroni, E., Ali, R., & Ferri, M. (2013). Methadone at tapered doses for the management of opioid withdrawal. *Cochrane Database System Review*, 28, 2: CD003409. <https://doi.org/10.1002/14651858.CD003409>. pub 4.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed). Author.

Andrade, J., Kavanagh, D., & Baddeley, A. (1997). Eye-movements and visual imagery: A working memory approach to the treatment of post-traumatic stress disorder. *British journal of clinical psychology*, 36(2), 209-223.

Baddeley, A. D. (1986). Working Memory. In F. Shapiro, *Eye Movement desensitisation and reprocessing: Basic principles, protocols and procedures* (3rd ed., p.371). Guilford Press.

Bae, H., & Kim, D. (2012). Desensitisation of triggers and urge reprocessing for an adolescent with an internet addiction disorder. *Journal of EMDR Practice and Research*, 6(2), 73-81.

Bae, H., & Kim, D. (2015). Desensitisation of triggers and urge reprocessing for pathological gambling: A case series. *Journal of Gambling studies*, 31, 333 -342.

Baker, T.B., Morse, E., & Sherman, J.E. (1987). The motivation to use drugs: a psychological analysis of urges. *Nebr Symp Motivation*, 34, 257-323. Referred from PMID: (3627296).

Bandura, A. (1997). *Self - efficacy: The exercise of control*. Freeman.

Barker, J.M., & Taylor, J.R. (2014). Habitual alcohol seeking: seeking modelling the transition from casual drinking to addiction. *Neuroscience. Biobehavioural. Rev*, *47*, 281-294.

Barnett, A. I., & Fry, C. L. (2015). The Clinical Impact of the Brain Disease Model of Alcohol and Drug Addiction: Exploring the Attitudes of Community – Based AOD Clinicians in Australia. *Neuroethics*, *8*, 271-282.

Beadman, M., Das, R.K., Freeman, T.P., West, R., Scragg, P., & Kamboj, S.K (2015). A comparison of emotion regulation strategies in response to craving cognitions: effects on smoking behaviour, craving and affect in dependent smokers. *Behavioural. Research Ther*, *69*, 29-39. <https://linkinghub.elsevier.com/retrieve/pii/S0005796715000522>.

Beebe, J. P. (1990). *The codependent counsellor: Guidelines for Self-assessment and change, Independence*, MO: Herald House/Independent Press.

Belin, D., Jonkman, S., Dickinson, A., Robbins, T.W., & Everitt, B.J. (2009). Parallel and interactive learning processes within the basal ganglia: relevance for the understanding of addiction. *Behav Brain Research*, *199*(1), 89-102. <https://doi.org/10.1016/j.bbr.2008.09.027>.

Belsky, D. W., Moffitt, T. E., Baker, T. B., Biddle, A. K., Evans, J. P., Harrington, H., Houts, R., Meier, M., Sugden, K., Williams, B., Poulton, R., & Caspi, A. (2013). Polygenic risk and the developmental progression to heavy, persistent smoking and nicotine dependence: evidence from a 4-decade longitudinal study. *JAMA psychiatry*, *70*(5), 534-542.

Benckiser, R. (2004). *Treating Opioid Dependence*. Reckitt Benckiser.

Bisson, J. I., Roberts, N. P., Andrew, M., Cooper, R., & Lewis, C. (2013). Psychological therapies for chronic post-traumatic stress disorder (PTSD) in adults. *Cochrane Database of Systematic Reviews*, (12).

Bivona, U., Riccio, A., Ciurli, P., Carlesimo, G. A., Delle Donne, V., Pizzonia, E., Caltagirone, C., Formisaro, R., & Costa, A. (2014). Low self-awareness of individuals with severe traumatic

brain injury can lead to reduced ability to take another person's perspective. *The Journal of Head Trauma Rehabilitation*, 29(2), 157-171.

Blodgett, J. C., Maisel, N. C., Fuh, I. L., Wilbourne, P. L., & Finney, J. W. (2014). How effective is continuing care for substance use disorders? A meta-analytic review. *Journal of Substance Abuse Treatment*, 46(2), 87-97.

Blum, K., Schoenthaler, S. J., Oscar-Berman, M., Giordano, J., Madigan, M. A., Braverman, E. R., & Han, D. (2014). Drug abuse relapse rates linked to level of education: Can we repair hypodopaminergic-induced cognitive decline with nutrient therapy? *The Physician and sportsmedicine*, 42(2), 130-145.

Blume, A. W., & Guttu, B. L. (2015). Categories of alcohol outcome expectancies and their relationships to alcohol related consequences. *Addictive behaviours reports*, 1, 64-67.

Boening, J. A. L. (2001). Neurobiology of an addiction memory. *Journal of neural transmission*, 108(6), 755-765.

Bond, A.J., & Witton, J. (2017). Perspectives on the Pharmacological Treatment of Heroin Addiction. *Clinical Medicine Insights: Psychiatry*, 8, 1-10.

Bossert, J. M., Marchant, N. J., Calu, D. J., & Shaham, Y. (2013). The reinstatement model of drug relapse: recent neurobiological findings, emerging research topics, and translational research. *Psychopharmacology*, 229(3), 453-476.

Bossini, L., Santarnecchi, E., Casolaro, I., Koukouna, D., Caterini, C., Cecchini, F., Fortini, V., Vatti, G., Marino, D., Fernandez, I., Rossi, A., & Fagiolini, A. (2017). Morphovolumetric changes after EMDR treatment in drug-naive PTSD patients. *Rivista di psichiatria*, 52(1), 24-31.

Bossini, L., Tavanti, M., Calossi, S., Polizzotto, N. R., Vatti, G., Marino, D., & Castrogiovanni, P. (2011). EMDR treatment for posttraumatic stress disorder, with focus on hippocampal volumes: a pilot study. *The Journal of neuropsychiatry and clinical neurosciences*, 23(2), E1-E2.

Boudewyns, P. A., & Hyer, L. A. (1996). Eye movement desensitization and reprocessing (EMDR) as treatment for post-traumatic stress disorder (PTSD). *Clinical Psychology & Psychotherapy: An International Journal of Theory and Practice*, 3(3), 185-195.

Boukezzi, S., El Khoury-Malhame, M., Auzias, G., Reynaud, E., Rousseau, P. F., Richard, E., Zendgian, X., Roques, J., Casteli, N., Correard, N., Guyon, V., Gellato, C., Samuelian, J. C., Cancel, A., Comte, M., Latinus, M., Guedj, E., & Khalfa, S. (2017). Grey matter density changes of structures involved in Posttraumatic Stress Disorder (PTSD) after recovery following Eye Movement Desensitization and Reprocessing (EMDR) therapy. *Psychiatry Research: Neuroimaging*, 266, 146-152.

Bowen, S., Witkiewitz, K., Clifasefi, S. L., Grow, J., Chawla, N., Hsu, S. H., Carroll, H. A., Harrop, E., Collins, S.E., Lustyk, M. K., & Larimer, M. E. (2014). Relative efficacy of mindfulness-based relapse prevention, standard relapse prevention, and treatment as usual for substance use disorders: a randomized clinical trial. *JAMA psychiatry*, 71(5), 547-556.

Braga, R. M., Fu, R. Z., Seemungal, B. M., Wise, R. J., & Leech, R. (2016). Eye movements during auditory attention predict individual differences in dorsal attention network activity. *Frontiers in human neuroscience*, 10, 164.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101. ISSN 1478-0881. <https://doi.org/10.1191/1478088706qpo63oa>.

Braun, V., & Clarke, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The psychologist*, 26(2), 120-123.

Briggs, S.R., & Cheek, J.M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality*, 54, 106-148.

Brown, S. H., Gilman, S. G., Goodman, E. G., Adler-Tapia, R., & Freng, S. (2015). Integrated trauma treatment in drug court: Combining EMDR therapy and seeking safety. *Journal of EMDR Practice and Research*, 9(3), 123-136.

Bunton, R; Baldwin, S; Flynn, D; & Whitelaw, S. (2000). The “stages of change model” in health promotion: Science and Ideology. *Critical Public Health, 10 (1)*, 55-70. <https://doi.org/10.1080/713658223>.

Cadet, J. L., Bisagno, V., & Milroy, C. M. (2014). Neuropathology of substance use disorders. *Acta neuropathologica, 127(1)*, 91-107.

Carnes, P. (1992). *Don't call it love: Recovery from sexual addiction (p. 11-12)*. Bantam.

Carney, R., Yung, A. R., Amminger, G. P., Bradshaw, T., Glozier, N., Hermens, D. F., Hickie, I. B., Killackey, E., McGorry, P., Pantelis, C., Wood, S.J., & Purcell, R. (2017). Substance use in youth at risk for psychosis. *Schizophrenia research, 181*, 23-29.

Caselli, G; & Spada, M. M. (2015). Desire thinking: What is it and what drives it ?. *Addictive Behaviours, 44*, 71-79. <https://doi.org/10.1016/j.addbeh.2014.07.021>.

Caselli, G., Nikcevic, A., Fiore, F., Mezzaluna, C., & Spada, M. M. (2012). Desire thinking across the continuum of nicotine dependence. *Addiction Research & Theory, 20(5)*, 382-388.

Colizzi, M., Carra, E., Fraietta, S., Lally, J., Quattrone, D., Bonaccorso, S., Mondelli, V., Ajnakina, O., Dazzan, P., Trotta, A., Sideli, L., Kolliakou, A., Gaughran, F., Khondoker, M., David, S. A., Murray, R. M., MacCabe, H., & Di Forti, M. (2016). Substance use, medication adherence and outcome one year following a first episode of psychosis. *Schizophrenia research, 170(2-3)*, 311-317.

Compton, W.M., Gfroerer, J., Conway, K.P., & Firger, M.S. (2014). Unemployment and Substance Outcomes in the United States 2002-2010. *Drug Alcohol Dependence, 0 (350-353)*, 1-14. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4127107>.

Conklin, C.A., & Tiffany, S.T. (2002). Applying extinction research and theory to cue exposure addiction treatments. *Addiction, 97*, 155-167. <https://doi.org/10-1046/j-1360-0443-2002.00014>.

Conklin, C.A., Vella, E.J., Joyce, C.J., Salkeld, R.P., Perkins, K.A., & Parzynski, C.S. (2015). Examining the relationship between cue-induced craving and actual smoking. *Clinical Psychopharmacology*, 23(2), 90-96. <https://doi.org/10.1037/90038826>.PMC article.

Corbetta, M., Patel, G., & Schulman, G.L. (2008). The reorienting system of the human brain: From environment to theory of mind. *Neuron*, 58, 306-324.

Corbit, L.H., Nie, H., & Janak, P.H. (2012). Habitual Alcohol seeking: time, course and the contributions of the subregions of the dorsal striatum. *Biol. Psychiatry*, 72, 389-395.

Cornil, A; Lopez-Fernandez, O; Devos, G; de Timary, P; Goudriaan, A. E; & Billieux, J. (2018). Exploring gambling craving through the elaborated intrusion theory of desire: a mixed methods approach. *International Gambling Studies*, 18(1), 1-21. <https://doi.org/10.1080/14459795.2017.1368686>.

Courtney, K.E., Ghahremani, D.G., & Ray, L.A. (2015). The effect of alcohol priming on neural markers of alcohol cue-reactivity. *Am. J. Drug Alcohol Abuse*, 41, 300-308.

Cox, W.M., Fadardi, J.S., Intrilligator, J.M., Klinger, E. (2014). Attentional Bias modification for addictive behaviours: clinical implications. *CNS Spectr*, 19(3), 215-224. <https://doi.org/10.1017/S1092852914000091>.

Dada, S., Burnhams, N. H., Erasmus, J., Parry, C., & Bhana, A. (2017). SACENDU. Monitoring Alcohol and Drug Abuse Treatment Admissions in South Africa. Cape Town, MRC.

Dada, S., Erasmus, J., Burnhams, N.N., Parry, C., Bhana, A., Timol, F., Fourie, D., Kitshoff, D., Nel, E. & Weimann, R. (2015). Monitoring Alcohol and Drug Abuse Trends in South Africa (July 1996- December 2015). *SACENDU Research Brief*, 19(1), 1-19.

Dada, S., Pluddeman, A., Williams, Y., Parry, C., Bhana, A. & Vawda, M. (2012). SACENDU. Monitoring Alcohol and Drug Abuse Treatment Admissions in South Africa. Cape Town, MRC.

DARA. Dangerous Emotions in Recovery: The Emotions that can cause damage in recovery. Retrieved from: <https://alcoholrehab.com/addiction-recovery/dangerous-emotions-in-recovery> on April 20th 2015.

Darke, S., Williamson, A., Ross, J., & Teeson, M. (2005). Attempted suicide among heroin users: 12-month outcomes from the Australian Treatment Outcomes Study. *Drug Alcohol Dependence*, 78(2), 177-186.

Department of Veteran Affairs & Department of Defence. (2017). *Va/DoD clinical practice guidelines for the management of post-traumatic stress disorder and acute stress disorder*. Washington, DC: Veterans Health Administration, Department of Veteran Affairs, Department of Defense.

DeVillis, R. F. (2003). *Scale development: Theory and application* (2nd ed). Sage.

DiClemente, C. C. (2003). *Addiction and Change: How addictions develop and addicted people recover*. Plenum Press.

DiClemente, C. C. (2018). *Addiction and Change: How addictions develop and addicted people recover*. Plenum Press.

DiClemente, C.C., Schulndt, D., & Gemmell, L. (2004). Readiness and Stages of Change in addiction treatment. *American Journal of Addiction*, 13 (2), 103-119.

Dodge, K., Krantz, B., & Kenny, P. J. (2010). How we can begin to measure recovery?. <https://www.substanceabusepolicy.com/contents/5/1/31>.

Drobes, D. J., & Thomas, S. E. (1999). Assessing craving for alcohol. *Alcohol Research & Health*, 23, 179-186.

Drummond, D. C., Litten, R.Z., Lowman, C., & Hunt, W. A. (2000). Craving Research: future Directions. *Addiction*, 95(2), 247-255.

Drummond, D.C. (2001). Theories of drug craving, ancient and modern. *Addiction*, 96, 33-46.

Dugosh, K., Abraham, A., Seymour, S., McLoyd, K., Chalk, M. & Festinger, D. (2016). A systematic review on the use of psychosocial interventions in conjunction with medications for the treatment of opioid addiction. *Journal of Addiction Medicine*, 10(2), 91-101.

Duncan, B.L., Miller, S.D., Wampold, B. E., & Hubble, M. A. (Eds.) (2009). *The heart and soul of change: Delivering what works in therapy*. 2nd ed. American Psychological Association.

Edward, G., & Gross, M. M. (1976). Alcohol dependence: a provisional description of a clinical syndrome. In G. Edwards. *Current issues in clinical psychology* (pp. 146-147). Plenum Press.

Edwards, S. G & Rawson, R. (2010). Evidence – Based practices in addiction treatment: Reviews and recommendations for public policy. *Health Policy*. 2010 October, 97 :93-104. Published online 2010 Jun 16. <https://doi.org/10.1016/j.healthpol.2010.05.013>.

Edwards, S. (2016). Neuroscience of drug craving for addiction medicine: From circuits to therapies. In Ekhtiari, H., & Paulus, M. (2016). *Neuroscience for Addiction Medicine: From Prevention to Rehabilitation-Constructs and Drugs* (Vol. 223) (pp. 115 – 141). Elsevier.

Edwards, S., & Koob, G. F. (2012). Experimental psychiatric illness and drug abuse models: from human to animal, an overview. *Behavioural Pharmacology*, 24, 356-362.

EI- Gluebally, N. (2012). The meanings of recovery from addiction: evolution and promises. *Journal of Addiction Medicine*, 6 (1), 1-9.

Ekhtiari, H., & Paulus, M. (2016). *Neuroscience for Addiction Medicine: From Prevention to Rehabilitation-Constructs and Drugs* (Vol. 223). Elsevier.

Ekhtiari, H., Nasseri, P., Yavari, F., Mokri, A. & Monterosso, J. (2016). Neuroscience of drug craving for addiction medicine from circuits to therapies. *Progressive Brain Research*, 223, 115-141.

Ekhtiari, H., Rezapour, T., Aupperle, R.I., & Paulus, M.P. (2017). Neuroscience-informed psychoeducation for addiction medicine: A neurocognitive perspective. *Progressive Brain Research*, 235, 239-264. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5771228>.

Ekhtiari, H., Victor, T.A., & Paulus, M.P. (2017). Aberrant decision-making and drug addiction. *Current Opinion in Behavioural Sciences*, 13, 25-33.

Else, J. W., & Kindt, M. (2017). Tackling maladaptive memories through reconsolidation: From neural to clinical science. *Neurobiology of learning and memory*, 142, 108-117.

Emmelkamp, P.M.G., & Vedel, E. (2006). *Evidence-Based treatment for Alcohol and Drug*. Routledge.

Engels, G.L. (1978). The biopsychosocial model and the education of health professionals. *Annals of New York Academy of Sciences*, 310, 169-181. <https://doi.org/10.1111/j.1749-6632.1978.tb22070>.

Epstein, D. H., Marrone, G. F., Heishman, S. J. (2010). Tobacco, cocaine and heroin: craving and use during daily life. *Addictive Behaviour*, 35, 318-324.

Ersche, K.D., Jones, P.S., Williams, G.B., Smith, D.G., Bullmore, E. T., & Robbins, T. W. (2013). Distinctive personality traits and neural correlates associated with stimulant drug use versus familial risk of stimulant dependence. *Biol. Psychiatry*, 74 (2), 137-144.

Etikan, I., Musa, S.A., & Alkassim, R.S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5 (1), 1-4.

Falkowski, C. (2000). *Dangerous Drugs.: An Easy to use Reference for Parents and Professionals*. Hazelden.

Felitti, V.J., & Anda, R.F. (2014). The lifelong effects of adverse childhood experiences. *Chadwick's child maltreatment: Sexual abuse and psychological maltreatment*, 2, 203-215.

Field, M; Munafo, M. R; & Franken, I. H. A. (2009). A meta – analytic investigation of the relationship between attentional bias and subjective craving in substance abuse. *Psychological Bulletin*, 135, 589 -607.

Fletcher, A.M. (2013). *Inside Rehab: The Surprising Truth about Addiction Treatment*. Penguin Books.

Foa, E. B., & Meadows, E. A. (1997). Psychosocial treatments for posttraumatic stress disorder: A critical review. *Annual Review of Psychology*, 48, 449-480.

Frederiksen, N. J. S., Bakke, S. L., & Dalum, P. (2012). “No alcohol, no party”: An explorative study of young Danish moderate drinkers. *Scandinavian Journal of Public Health*, 40(7), 585-590.

Freud, S. (1955). *Psychoanalysis and war neurosis* (Standard ed. Vol. 17).

Galaj, E., Manuszak, M., & Ranaldi, R. (2016). Environmental enrichment as a potential intervention for heroin seeking. *Drug and Alcohol Dependence*, 163, 195-201.

Galaj, E., Manuszak, M., Babic, S., Ananthan, S., & Ranaldi, R. (2015). The selective dopamine D3 receptor antagonist, SR 21502, reduces cue-induced reinstatement of heroin seeking and heroin conditioned place preference in rats. *Drug and alcohol dependence*, 156, 228-233.

Garg, R. (2016). Methodology for Research. *Indian Journal of Anaesthesia*, 24 (60), 640-645. <https://www.ijaweb.org/text.asp/2016/60/9/640/190619>.

Gaston, L., & Marmar, C. R. (1989). Quantitative and qualitative analysis for psychotherapy research: Integration through time – series design. *Psychotherapy*, 26, 169-176.

Gielen, N., Krumeich, A., Tekelenburg, M., Nederkoorn, C., & Havermans, R.C. (2016). How patients perceive the relationship between trauma, substance abuse, craving and relapse: A qualitative study. *Journal of Substance Use*, 21 (5), 466-470. <https://doi.org/10.3109/14659891.2015.1063717>.

Giovazolias, T., & Themeli, O. (2014). Social Learning Conceptualisation for Substance Abuse: Implications for Therapeutic Interventions. *The European Journal of Counselling Psychology*, 3(1), 69-88.

Gipson, C. D., Kupchik, Y. M., & Kalivas, P. W. (2013). Rapid, transient synaptic plasticity in addiction. *Neuropharmacology*, 76, 276-286.

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, 8 (4), 597-607.

Goodman, J., & Packard, M. G. (2016). Memory Systems and the Addicted Brain. *Frontiers in Psychiatry*, 7 (24), 1-9.

Gorski, T. T., & Miller, M. (1986). *Staying sober: A guide for relapse prevention*. Independence, MO: Independence Press.

Gossop, M., Trakada, K., Stewart, D., & Witton, J. (2005). Reductions in criminal convictions after addiction treatment: 5 year follow up. *Drug Alcohol Dependence*, 79, 295-302.

Grant, J. D., Scherrer, J. F., Lynskey, M. T., Agrawal, A., Duncan, A. E., Haber, J. R., Heath, A.C., & Bucholz, K.K. (2012). Association of alcohol, nicotine, cannabis, and drug use with

educational attainment: evidence from cotwin-control analyses. *Alcohol Clinic Exp Res*, 36, 1412-1420.

Greenwald, R. (2007). *EMDR within a phase model of trauma-informed treatment*. The Haworth Press.

Griffiths, M. D. (2013). Is “Loss of control” always a consequence of addiction. *Front Psychiatry*, 4, 36. <https://doi.org/10.3389/fpsgt.2013.00036>.

Guest, G., MacQueen, K. M., & Namey, E.E. (2013). *Applied Thematic Analysis. Collecting Qualitative Data: A field manual for Applied Research*. Sage Publications.

Haffejee, F. (2014). *Drugs of Addiction*. Durban, Islamic Medical Association. Author.

Hall, W; Doran, C; Degenhardt, L, & Shepard, D. (2006). Illicit Opiate Abuse. *Disease Control Priorities in developing countries*. Washington DC: World Bank. <https://www.ncbi.nlm.nih.gov>.

Hannah, R, & Roser, M. (2018). *Substance Use*. <https://ourworldindata.org/substance-use>.

Hanewinkel, R., & Sargent, J. D. (2007). Exposure to smoking in popular movies and youth smoking in Germany. *American Journal of Preventative Medicine*, 32 (6), 466 -473

Hanson, E.W, Creswell, J.W, Plano Clark, V.L, Petska, K. S, & Creswell, J.D. (2005). Mixed Methods Research Design in Counselling Psychology. *Faculty Publications, Department of Psychology*, 373, 224 – 235. <http://digitalcommons.unl.edu/psychfacpub/373>.

Hase, M. (2010). CravEx: An EMDR approach to treat substance abuse and addiction. *Eye movement desensitization and reprocessing (EMDR) scripted protocols: Special populations*, 467-488.

Hase, M., Schallmayer, S., & Sacks, M. (2008). EMDR reprocessing of the addiction memory: Pre-treatment, posttreatment and 1-month follow up. *Journal of EMDR Practice and Research*, 2(3), 170-179.

Haysom, S., Castrow, P., & Shaw, M. (2018). The Heroin Coast – A political economy along the Eastern African Seaboard. ENACT Enhancing Africa's response to transnational organised crime. <https://enactafrica.org/papers/the-heroin-coast-a-political-economy-along-the-eastern-african-coast>.

Heather, N; Best, D; Kawalek, A; Field, M; Lewis, M; Rotgers, F; Wiers, R. W; Heim, D. (2018). Challenges to the brain disease models of addiction – European launch of the addiction theory network. *Addiction Research and Theory*, 21(4), 249-255. <https://doi.org/10.1080/16066359.2017.1399659>.

Hemphill, S.A., Heerde, J.A., Scholes-Balog, K.E., Herrenkohl, T.I., Toumbourou, J.W., & Catalano, R.F. (2014). *Journal of School Health*, 84 (11), 706-715. <https://doi.org/10.1111/josh.12201>.

Heydari, A., Dashtgard, A., & Moghadam, Z.E. (2014). The effect of bandura's social cognitive theory implementation on addiction quitting of clients referred to addiction quitting clients. *Iranian Journal of Nursing and Midwifery Research*, 19 (1), 19 -23.

Hicks, B. M., Foster, K. T., Iacono, W. G., & McGue, M. (2013). Genetic and environmental influences on the familial transmission of externalising disorders in adoptive and twin off spring. *JAMA Psychiatry*, 70 (10), 1076-1083.

Hill-Bowen, L. D., Riedel, M., Poudel, R., Salo, T., Flannery, J. S., Camilleri, J. A., Eickenhoff, S. B., Laird, A. R., & Sutherland, M. T. (2020). The cue reactivity paradigm: An ensemble of networks driving attention and cognition when viewing drug related and natural reward stimuli. bioRxiv, 1-31. <https://www.biorxiv.org/content/10.1101/2020.02.26.966549v1>.

Hinton, E. A., Wheeler, M. G., & Gourley, S. L. (2014). Early -life cocaine interferes with BDNF mediated behavioural plasticity. *Learn. Mem*, 21, 253 -257.

Hoglund, P. (2014). Exploration of the patient - therapist relationship in psychotherapy. *The American Journal of Psychiatry*, 171(10), 1056-1066.

Holahan, C.J., Moos, R.H., Holahan, C.K., Cronkite, R.C., & Randall, P.K. (2003). Drinking to cope and alcohol use and abuse in unipolar depression. *Journal of Abnormal Psychology*, 112, 159-165.

Hou, Y., Zhao, L., Yao, Q., & Ding, L. (2016). Altered decision- making in abstinent heroin addicts. *Neuroscience*, 627, 148-154. <https://doi.org/10.1016/j.neulet.2016.06.002>.

Huhn, A. S., Sweeney, M. M., Brooner, R. K., Kidorf, M. S., Tompkins, D. A., Ayaz, H., & Dunn, K. E. (2019). Prefrontal cortex response to drug cues, craving, and current depressive symptoms are associated with treatment outcomes in methadone-maintained patients. *Neuropsychopharmacology*, 44(4), 826.

Huhn, A.S., Harris, J., Cleveland, H.H., Lydon, D.M., Stankoski, D., & Cleveland, M.J. (2016a). Ecological momentary assessment of affect and craving in patients in treatment for prescription opioid dependence. *Brain Research Bulletin*, 123, 94-101.

Hulka, L.M., Eisenegger, C., Preller, K. H., Vonmoos, M., Jenni, D., Bendrick, K., Baumgartner, M.R., Seifritz, E., & Quednow, B. B. (2014). Altered social and non-social decision-making in recreational and dependent cocaine users. *Psychological medicine*, 44(5), 1015-1028.

Hunt, A (2014). Expanding the Biopsychosocial Model: The Active Reinforcement Model of Addiction. *Graduate Student Journal of Psychology*, 15, 57-67.

Hurley, T. D., & Edenberg, H. J. (2012). Genes encoding enzymes involved in ethanol metabolism. *Alcohol research*, 34 (3), 339-334.

Huston, J.P., de Souza Silva, M.A., Topic, B., & Muller, C.P. (2013). What's conditioned in conditioned place preference? *Trends Pharmacol. Science*, 34, 162-166.

Hyman, S. E., Malenka, R. C., & Nestler, E. J. (2006). Neural mechanisms of addiction: the role of reward related learning and memory. *Neuroscience*, 29, 565-598.

Ibrahim, F., Kumar, N., & Samah, B. A. (2011). Self-efficacy and relapsed addiction tendency: An empirical study. *Social Science*, 6(4), 277-282.

Independent Newspaper. (2012, January 11). R1 million drug bust in Chatsworth. Retrieved from : www.iol.co.za/news/crime/courts/r1m-drug-bust-in-chatsworth-1211048

Indianspice. *Sugars- The Indian Purge, And How We Could Respond*. (2014, September). <https://www.indianspice.co.za/2014/09>

International Narcotics Control Board. (2015). Report of the International Control Board for 2015. <https://www.incb.org/incb/en/publications/annual-reports/annual-report>.

Irvin, J. E., Bowers, C. A., Dunn, M. E & Wang, M. C. (1999). Efficacy analytic review. *Journal of Consulting and Clinical Psychology*, 67: 563-570.

Isbell, H. (1955). Craving for Alcohol. *Quarterly Journal of Studies on Alcohol*, 16, 38-42.

Isenhardt, C.E. (1997). Pretreatment readiness for change in male alcoholic dependent subjects: predictors of one year follow-up status. *Journal of Studies in Alcohol*, 58(4), 351-357.

Janis, I.L. & Mann, L. (1977). *Decision making*. Macmillan Publishing Co.

Jasinka, A. J., Stein, E.A., Kaiser, J., Naumer, M. J., & Yalachkov, Y. (2014). Factors modulating neural reactivity to drug cues in addiction: a survey of human neuroimaging studies. *Neuroscience & Biobehavioral Reviews*, 38, 1-16.

Jellinek, E. M. (1960). *The disease concept of alcoholism*. Hillhouse Press.

Jester, J. M., Steinberg, D. B., Heitzeg, M.M. & Zucker, R. A. (2015). Coping expectancies, not enhancement expectancies, mediate trauma experience effects on problem Alcohol use: a prospective study from early childhood to adolescence. *Journal of Studies on Alcohol and Drugs*, 76 (5), 781-789.

Juli, G., & Juli, L. (2015). Genetic of Addiction: Common and Uncommon Factors. *Psychiatria Danubina*, 27 (1), 383-390.

Jung, W.H., Chang, K. J., & Kim, N. H. (2016). Disrupted topological organisation in the whole-brain functional network of trauma-exposed firefighters: A preliminary study. *Psychiatry Research*, 250, 15-23.

Kadam, M., Sinha, A., Nimkar, S., Matcheswalla, Y., & De Sousa, A. (2017). A comparative study of factors associated with relapse in Alcohol Dependence and Opioid Dependence. *Indian Journal of Psychological Medicine*, 39(3), 627-633.

Kadden, R.M., & Litt, M. D. (2011). The Role of Self – Efficacy in the Treatment of Substance Use Disorders. *Addiction Behaviour*, 36(12), 1120 -1126.

Kalant, H. (1973). Biological models of alcohol tolerance and physical dependence. In: M. M. Gross (ed). *Alcohol intoxication and withdrawal: experimental studies* (pp 3-13). Plenum Press.

Kaplan, G. B., Heinrichs, S. C., & Carey, R. J. (2011). Treatment of addiction and anxiety using extinction approaches: neural mechanisms and their treatment implications. *Pharmacol. Biochem. Behav.* 97 (3), 619-625. <https://doi.org/10.1016/j.pbb.2010.08.004>.

Karoly, H. C., Harlaar, N., & Hutchinson, K.E. (2013). Substance use disorders: a theory-driven approach to the integration of genetics and neuroimaging. *Annals of the New York Academy of Sciences*, 1282, 71-91.

Kaskutas, L. A., Borkman, T. J., Laudet, A., Ritter, L. A., Witbrodt, J., Subbaraman, M. S., Stunz, A., & Bond, J. (2014). Elements that Define Recovery: The Experiential Perspective. *Journal of Studies on Alcohol and Drugs*, 75, 999-1010.

Kavanagh, D.J., Sitharthan, G., Young, R.H, Sitharthan, T., Saunders, J. B., Shockley, N., & Giannopoulos, V. (2006). Addition of cue exposure to cognitive behaviour therapy for alcohol misuse: a randomised trial with dysphoric drinkers. *Addiction*, 101(8), 1106-1116.

Kavanagh, D.J., Statham, D.J., Feeney, G.F.X., Young, R.M.C.D., May, J., Andrade, J., & Connor, J. (2013). Measurement of alcohol craving. *Addictive Behaviours*, 38(2), 1572-1584.

Kazantzis, N. (2018). Introduction to the Special Issue on Processes of CBT. *Cognitive Therapy and Research*, 42 (2), 115-120.

Kazdin, A.E. (2008). Evidence - based treatment and practice: New opportunities to bridge clinical research and practice, enhance the knowledge base and improve patient care. *The American Psychologist*, 63(3), 146-159.

Kedzior, K.K., & Laeber, L.T. (2014). A positive association between anxiety disorders and cannabis use disorders in the general population- a meta-analysis of 31 studies. *BMC Psychiatry*, 14, 136. <https://doi.org/10.1186/1478-224x-14-136>.

Kelly, J. F., Fallah-Sohy, N., Cristello, J., & Bergman, B. (2017). Coping with the enduring unpredictability of opioid addiction: an investigation of a novel family-focused peer-support organisation. *Journal of Substance Abuse Treatment*, 77, 193-200.

Kendler, K.S., Jacobson, K.C., Prescott, C.A., & Neale, M.C. (2003). Specificity of genetic and environmental risk factors for use and abuse/dependence of cannabis, cocaine, hallucinogens, sedatives, stimulants and opiates in male twins. *American Journal of Psychiatry*, 160, 687-695.

Khazan, I. (2015). Mindfulness and Acceptance- Based Biofeedback. *Biofeedback*, 43(3), 104-110. <https://doi.org/10.5298/1081-5937-43.3.08>.

Klinger, E., Gregoire, K.C.J., & Barta, S. (2007). Physiological correlates of mental activity. Eye movements, alpha, heart rate during imagining, suppression, concentration, search and choice. *Psychophysiology*, 10(5), 471-477.

Knipe, J. (2015). EMDR toolbox: Theory and treatment of complex PTSD and dissociation. In Shapiro, F. (2018). *Eye Movement desensitisation and reprocessing: Basic principles, protocols and procedures (3rd ed)* (pp. 341-342). Guilford Press.

Knowlton, B. (2015). Basal ganglia: habit formation. *Encyclopaedia of Computational Neuroscience*, 28, 336-351.

Konova, A.B., Moeller, S. J., & Goldstein, R. Z. (2013). Common and distinct neural targets of treatment: changing brain function in substance addiction. *Biobehavioural. Rev*, 37, 2806-2817. <https://www.sciencedirect.com/science/article/pii/S0149763413002261>.

Koob, G.F; & Volkow, N.D. (2010). Neurocircuitry of addiction. *Neuropsychopharmacology*, 35, 217-238.

Koob, G. F. (2008). A role for brain stress systems in addiction. *Neuron*, 59, 11-34.

Koob, G. F., Buck, C. L., Cohen, A., Edwards, S., Park, P. E., Schlosburg, J. E., Schmeichel, B., Vendruscolo, L. F., Wade, C.L., Whitfield, T. W., & George, O. (2014). Addiction as a stress surfeit disorder. *Neuropharmacology*, 76, 370-382.

Kopetz, C. E., Lejuez, C. W., Wiers, R. W., & Kruglanski, A. W. (2013). Motivation and Self-Regulation in Addiction: A Call for Convergence. *Perspective psychological Science*, 8(1), 3-24. <https://doi.org/10.1177/1745691612457575>.

Korn, D., & Leeds, A. (2002). Preliminary evidence of efficacy for EMDR resource development and installation in the stabilisation phase of treatment of complex post-traumatic stress disorder. *Journal of Clinical Psychology*, *58*, 1465-1487.

Koya, E., Spijker, S., Voorn, P., Binnekade, R., Schmidt, E. D., Schoffemeer, A. N., De Vries, T. J., & Smit, A. B. (2006). Enhanced cortical and accumbal molecular reactivity associated with conditioned heroin, but not sucrose-seeking behaviour. *Journal of neurochemistry*, *98*(3), 905-915.

Kullack, C., & Laugharne, J. (2016). Standard EMDR protocol for alcohol and substance dependence comorbid with posttraumatic stress disorder: Four cases with 12-month follow-up. *Journal of EMDR Practice and Research*, *10* (1), 33-46.

Lane, R. D., Ryan, L., Nadel, L., & Greenberg, L. (2015). Memory reconsolidation, emotional arousal, and the process of change in psychotherapy: New insights from brain science. *Behavioural and Brain Sciences*, *38*. <https://doi.org/10.1017/50140525814000041>.

Lassiter, P. S; & Spivey, M.S. (2018). Historical Perspectives on the Moral Models. In P.S. Lassiter & J. R. Culbreth, *Theory and Practice of Addiction Counselling Inc.* Sage Publications.

Laugharne, J., Kullack, C., Lee, C.W., McGuire, T., Brockman, S., & Drummond, P. D. (2016). Amygdala volumetric change following psychotherapy for posttraumatic stress disorder. *Journal of Neuropsychiatry and Clinical Neurosciences*, *28* (4), 312-318.

Lauder, L., Howsare, J., & Byrne, M. (2013). The impact of Substance Use Disorders on Families and Children: From Theory to Practice. *Social Work Public Health*, *28*, 194-205.

Lee, C. W., & Cuipers, P. (2013). A meta-analysis of the contribution of eye movements in processing emotional memories. *Journal of Behaviour Therapy and Experimental Psychiatry*, *44*, 231-239.

Leshner, A. I. (1997). Addiction is a brain disease, and it matters. *Science*, 278, 45-47. <http://doi.10.1126/science.278.5335.45>

Lincoln, Y.S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Beverley Hills, CA: Sage.

Linehan, M.M. (1993). *Cognitive – behavioural treatment of borderline personality disorder*. Guilford Press.

Little, M., van den Hout, M. A., & Engelhard, M. (2016). Desensitising addiction: Using eye movements to reduce the intensity of substance-related mental imagery and craving. *Frontiers and Psychiatry*, 7, 114.

Lou, M., Wang, E., Shen, Y., & Wang, J. (2012). Cue elicited craving in heroin addicts at different abstinent time: an fMRI pilot study. *Substance Use Misuse*, 47 (6), 631-639.

Maarefvand, M., Ghiasvand, H. R., & Ekhtiari, H. (2013). Drug craving terminology among opiate dependents., a mixed method study. *Iranian journal of psychiatry*, 8(2), 97.

Machielsen, M.W. (2014). The effect of clozapine and risperidone on attentional bias in patients with schizophrenia and cannabis use disorder. *Journal of Psychopharmacology*, 28, 633-642.

Macklin, M., Metzger, L.J., Lasko, N. B., Berry, N. J., Orr, S. P., & Pitman, R.K. (2000). Five-year follow-up study of eye movement desensitisation and reprocessing therapy for combat-related posttraumatic stress disorder. *Comprehensive Psychiatry*, 41, 24-27

Magidson, J. F., Gorska, S. M., MacPherson, L., Hopko, D. R., Blanco, C., Lejuez, C. W., & Daughters, S. B. (2011). Examining the effect of the Life Enhancement Treatment for Substance Use on residential substance abuse treatment retention. *Addictive Behaviours*, 2011, 36, 615 -623. PubMed database. (21310539).

Marhe, R., Waters, A.J., van de Wetering, B.J., & Franken, I.H. (2013). Implicit and explicit drug-related cognitions during detoxification treatment are associated with drug relapse. *Journal of Consulting Clinical Psychology, 81*(1), 1-12.

Marich, J. (2009). EMDR in addiction continuing care: Case study of a cross-addicted female's treatment and recovery. *Journal of EMDR Practice and Research, 3*(2), 98-106.

Marich, J. (2010). EMDR in addiction continuing care: A phenomenological study of women in early recovery. *Psychology of Addictive Behaviours, 24* (3), 498-507.

Marich, J. (2011). *EMDR Made simple: 4 Approaches to Using EMDR with Every Client*. Premier Publishing & Media.

Markus, W., de Weert-van Oene, G.H., Would, M.L., Becker, E.S., & de Jong, C. A. J. (2016). Are addiction-related memories malleable by working memory competition? Transient effects on memory vividness and nicotine craving in a randomised lab experiment. *Journal of Behaviour Therapy and Experimental Psychiatry, 52*, 83-91.

Marlatt, G.A., & Gordon, J.R. (1985). *Relapse Prevention: Maintenance strategies in the treatment of addictive behaviours*. Guildford Press.

Martell, C. R., Dimidjian, S., & Hermann-Dunn, R. (2013). Behavioural activation: an alternative to cognitive behavioural therapy. *Mental Health Practice, 17*(2), 27-33.

Martin, G. W., & Rehm, J. (2012). The effectiveness of psychosocial modalities in the treatment of alcohol problems in adults: a review of the evidence. *The Canadian Journal of Psychiatry, 57*(6), 350-358.

Maxfield, L., & Hyer, L.A. (2002). The relationship between efficacy and methodology in studies investigating EMDR treatment of PTSD. *Journal of Clinical Psychology, 58*, 23-41.

May, J., Andrade, J., Kavanagh, D. J., Feeney, G. F., Gullo, M. J., Statham, D. J., Connolly, J.M., Cassimatis, M., Young, R.M., & Connor, J. P. (2014). The Craving Experience Questionnaire: A brief, theory-based measure of consummatory desire and craving. *Addiction, 109*(5), 728-735.

May, J., Andrade, J., Pannabokke, N., & Kavanagh, D. (2004). Images of desire: cognitive models of craving. *Memory, 12*(2), 447-461. PMID. (15493072).

May, J., Kavanagh, D.J., & Andrade, J. (2015). The Elaborated Intrusion Theory of Desire: A 10 -year retrospective and implications for addiction treatments. *Addictive Behaviours, 44*, 29-34.

Mazza, J. M. (2014). *Reliability and Validity of a Substance Craving Scale: Testing Invariance across Substances*. (Doctoral dissertation).

McHugh, R. K., Hearon, B. A., & Otto, M. W. (2010). Cognitive-Behavioural therapy for Substance Use Disorders. *Psychiatric Clinic North America, 33*(3), 511-525. <https://doi.org/10.1016/j.psc.2010.04.012>.

McHugo, G.J., Drake, R.E., Brunette, M.F., Xie, H., & Essock, S.M. (2006). Enhancing validity in co-occurring disorders treatment research. *Schizophrenia Bulletin, 32* (4), 655-665.

McCrary, B.S; & Epstein, E.E. (2013). *Addictions – A Comprehensive Guidebook (2nd ed)*. Oxford University Press.

McKay, J. R., & Weiss, R.V. (2001). A review of temporal effects and outcome predictors in substance abuse treatment studies with long term follow –ups: Preliminary results and methodological issues. *Evaluation Review, 25*, 113-161.

McKenna, C. R. (2007). *Trends in Substance Abuse Research*. Nova Science Publishers, Inc.

Melchior, M., Chollet, A., Elidemir, G., Galera, C., &, Younes, N. (2015). Unemployment and Substance Use in Young Adults: Does Educational Attainment Modify the Association. *European Addiction Research*, 21(3), 115-123.

Melemis, S. M. (2015). Relapse Prevention and the Five Rules of Recovery. *Yale Journal of Biology and Medicine*, 88, 325-332.

Mello, N. K. (1972). Behavioural studies of alcoholism. In B. Kissin & .H Beglieter (eds), *Biology of Alcoholism*. (pp.219-291). New York, NY: Plenum Press.

Merchant, Y., & Dorkings, P. D. (2005). *Narcotics- An in-depth study*. Mumbai, D.A.I.R.R.C.

Mericle, A., Casaletto, K., Knoblach, D., Brooks, A., & Carise, D. (2010). Barriers to implementing individualised substance abuse treatment: Qualitative findings from the CASPAR Replication studies. *Journal of Drug Issues*, 40 (4), 819-839.

Michell, J. (2003). The qualitative imperative. Positivism, naïve realism and the place of qualitative methods in psychology. *Theory and Psychology*, 13, 5-31.

Miller, D., & Guidry, L. (2001). *Addictions and trauma recovery: Healing the body, mind and spirit*. W. W. Norton & Company.

Moeller, S. J., & Paulus, M. P. (2017). Towards biomarkers of the addicted human: Using neuroimaging to predict relapse and sustained abstinence in substance use disorder. *Prog Neuropsychopharmacol Biol Psychiatry*, 3 (80), 143-154.

Mohammad Ahmadi, S. S., Ekhtiari, H., & Cadet, G. (2016). Drug-induced neurotoxicity in addiction medicine: from prevention to harm reduction. *Progressive Brain Research*, 223, 19-41.

Monk, R. L., & Heim, D. (2013). A critical systematic review of alcohol outcome expectancies. *Substance Use and Misuse*, 48 (7), 539-557.

Morisano, D., Babor, T.F., & Robaina, K.A. (2017). Co-occurrence of substance use disorders with other psychiatric disorders: Implications for treatment services. *Nordic Studies on Alcohol and Drugs*, 37 (1), 5-26.

Moskowitz, A. (2001). *Lost in the mirror: An inside look at borderline personality disorder*, (2nd ed). Latham, MD: Taylor Trade Publishing.

Muller, C. P. (2013). Episodic memories and the relevance for psychoactive drug use and addiction. *Frontiers*. <http://journal.frontiersin.org/article/10.3389/fnbeh.2013.00034>.

Murphy, A., Taylor, E., & Elliot, R. (2012). The detrimental effects of emotional process dysregulation on decision – making in substance dependence. *Frontiers in Integrative Neuroscience*, 6(101), 1-20. <https://doi.org/10.3389/fnint.2012.00101>.

National Institute on Drug Abuse. (2013). *Drug Misuse and Addiction*. National Institute on Drug Abuse. https://www.drugabuse.gov/sites/default/files/podat_1.

National Institute on Drug Abuse. (2015). National Institute on Drug Abuse. https://www.drugabuse.gov/sites/default/files/podat_1.

National Institute on Drug Abuse. (2018). *Trends and Statistics*. National Institute on Drug Abuse. https://www.drugabuse.gov/sites/default/files/podat_1.

National Institute on Drug Abuse. (2019). *Trends and Statistics*. National Institute on Drug Abuse. https://www.drugabuse.gov/sites/default/files/podat_1.

Nieuwenhuis, S., Elzinga, B. M., Ras, P. H., Berends, F., Duijs, P., &, Samara, Z. (2013). Bilateral saccadic eye movements and tactile stimulation, but not auditory stimulation, enhance memory retrieval. *Brain and Cognition*, 81, 52-56.

Nikmanesh, Z., Baluchi, M. H., &, Motlagh, A.A. P. (2017). The Role of Self Efficacy Beliefs and Social Support on Prediction of Addiction Relapse. *International Journal on High Risk Behaviour*, 6, 1. <https://doi.org/10.5812/ijhrba.212092>.

Noel, J. G., & Thomson, N. R. (2012). Children's alcohol cognitions prior to drinking onset: discrepant patterns for implicit and explicit measures. *Psychological Addictive Behaviours*, 26 (3), 451 -9.

Nosen, E., Nillni, Y.I., Berenz, E.C., Schumacher, J.A., Staciewicz, P.R., & Coffey, S.F. (2012). Cue-elicited Affect and Craving Advancement of the Conceptualisation of Craving in Co-Occurring Posttraumatic Stress Disorder and Alcohol Dependence. *Behaviour Modification*, 36(6),808-833. <https://doi.org/10.1177/0145445512446741>.

Nowill, J. (2010). A critical review of the controversy surrounding eye movement desensitisation and reprocessing. *The British Psychological Society*, 25 (1), 63-70.

Nurnberger, J.I., Wiegand, R., Bucholz, K., O'Connor, S., Meyer, E.T., & Reich, T. (2004). Family study of alcohol dependence: Co-aggregation of multiple disorders in relatives of alcohol-dependent probands. *Archives of General Psychiatry*, 61, 1246-1256.

O'Brien, J.M., & Abel, N.J. (2011). EMDR addictions and the stages of change: A road map for interventions. *Journal of EMDR Practice and Research*, 5 (3), 121 -128.

Organised Crime report. (2011). *Does Heroin abuse and Distribution contribute to other forms of criminal behaviour in Chatsworth?* Compiled by South African Police Service Organised Crime Unit, unpublished. 1-22.

Palinkas, L.A., Aarons, G. A., Horwitz, S., Chamberlain, P., Hurlbert, M., & Landsverk, J. (2011). Mixed Method Design in implementation Research. *Administration and Policy in Mental Health*, 38 (1), 44-53. <https://doi:10.1007/510488-010-0314-z>.

Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J.P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method

implementation research. *Adm Policy Ment Health*, 42(5), 533-544. <https://doi.org/10.1007/s10488-013-0528-y>.

Paulus, M.P., & Stewart, J.L. (2014). Interoception and drug addiction. *Neuropharmacology*, 76, 342-350.

Pavlov, I.P. (1927). *Conditioned Reflexes*. Liveright.

Pearson, L., Prendergast, M., & Podus, D. (2012). Contingency management for the treatment of substance use disorders. *Addiction*, 107(8), 1462-1470.

Pedersen, E. R., Miles, J. N., Osilla, K. C., Ewing, B. A., Hunter, S. B., & D'Amico, E. J. (2015). The effects of mental health symptoms and marijuana expectancies on marijuana use and consequences among at-risk adolescents. *Journal of drug issues*, 45(2), 151-165.

Perkins, B., & Rouanzoin, C. (2002). An examination of misinformation regarding eye movement desensitisation and reprocessing: Points of confusion. *Journal of Clinical Psychology*, 58, 77-97.

Pluddemann, A., Parry, C. D. H., Flisher, A. J., & Jordaan, E. (2008). Heroin users in Cape Town, South African Injecting Practices, HIV related risk behaviours and other health consequences. *Journal of Psychoactive drugs*, 40(3), 273-279.

Pluddemann, A., Parry, C., Bhana, A., Dada, S., & Fourie, D. (2009). South African Community Epidemiology Network on Drug Use: update: alcohol and drug abuse trends (January – June 2009). Phase 26. *SACENDU research brief*.

Popky, A. J. (2005). DeTUR, an urge reduction protocol for addictions and dysfunctional behaviours. In R. Shapiro (Ed), *EMDR solutions: Pathways to healing (pp 167-188)*. W. W. Norton & Company.

Powers, M. B., Vedel, E., & Emmelkamp, M. G. (2008). Behavioural Couples Therapy for alcohol and drug use disorders: A meta-analysis. *Clinical Psychology Review, 28*, 952-962. PubMed. (9779329).

Prochaska, J.O., & DiClemente, C. C. (1984). *The transtheoretical approach: Crossing the traditional boundaries of therapy*. FL: Krieger.

Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change: Applications to addictive behaviours. *American Psychologist, 47*, 1102-1114.

Prochaska, J; DiClemente, C.C; Velicer, W.F; & Ross, J. S. (1993). Standardized, individualized, interactive and personal self-help programs for smoking cessation. *Health Psychology, 12 (5)*, 6 -7.

Rafajee, R., Olyae, S., & Sargollzaree, A. (2013). The relationship between the type of crime and drugs in addicted prisoners in Zahedan central Prison. *International Journal of High-Risk Behaviour Addiction, 2(3)*, 139-140. <https://doi.org/10.58.12/ijhrba.13977>.

Ramphele, L. (2018, August 17). There are 10 million South Africans abusing substances. *CapeTalk*. <https://www.capetalk.co.za/articles/315840/there-are-10-million-south-africans-abusing-drugs>.

Raybuck, J.D., & Lattal, K. M. (2014). Differential effects of dorsal hippocampal inactivation on expression of recent and remote drug and fear memory. *Neuroscience. Lett, 569*, 1-5.

Read, J., Fosse, R., Moskowitz, A., & Perry, B. (2014). The traumagenic neurodevelopmental model of psychosis revisited. *Neuropsychiatry, 4(1)*, 65-79.

Reddy, S. P., James, S., & Sewpal, R. (2011). *Umthente Uhlaba Usamila – The South African Youth Risk Behaviour Survey*. Cape Town: South African Medical Research Council.

Redonnet, B., Chollet, A., Fombonne, A., Bowes, L., & Melchior, M. (2012). Tobacco, alcohol, cannabis, and other illegal drug use among young adults: the socioeconomic context. *Drug Alcohol Dependence*, *121* (3), 231-239.

Reimer, J., Wright, N., Somaini, L., Roncero, C., Maremmani, I., McKeganey, N., Littlewood, R., Krajci, P., Alho, H., & D'Agnone, O. (2016). The Impact of Misuse and Diversion of Opioid Substitution Treatment Medicines: Evidence Review and Expert Consensus. *European Addiction Research*, *22*, 99-106. <https://doi.org/10.1159/000438988>.

Reynolds, E. K., Macpherson, L., Tull, M. T., Baruch, D. E., & Lejuez, C. W. (2011). Integration of the brief behavioural activation treatment for depression into a college orientation program: Depression and alcohol outcomes. *Journal of Counselling Psychology*, *58*, 555-564. PubMed. (21787070).

Rezapour, T., Hatami, J., Farhoudian, A., Sofuoglu, M., Noorozi, A., Daneshmand, R., & Ekhtiari, H. (2015). Neuro cognitive rehabilitation for disease of addiction (NERCOREDA) program: from development to trial. *Basic Clinical neuroscience*, *6* (4), 291-298.

Robbinson, T. E., & Berridge, K. C. (1993). The basis of drug craving: an incentive-sensitisation theory of addiction. *Brain Research*, *18*, 247-291.

Roddy, J., & Greenwald, M. K. (2006). In McKenna, C. R. *Trends in Substance Abuse Research* (p.2). Nova Science Publishers, Inc.

Rogers, S., & Silver, S. M. (2002). Is EMDR an exposure therapy? A review of trauma protocols. *Journal of Clinical Psychology*, *58*, 43-59.

Rogojanski, J., Vettese, L.C., & Anthony, M. M. (2011). Coping with cigarette cravings: comparison of suppression versus mindfulness -based strategies. *Mindfulness*, *2* (1), 14-26.

Rojewski, A.M., Morean, M.E., Toll, B.A., McKee, S.A., Sarin, S.K., Green, B.G., Bartoshuk, L.M., & O'Malley, S.S. (2015). The Yale Craving Scale: Development and psychometric properties. *Drug Alcohol Dependence*, *154*, 158-166.

Rothbaum, B.O; Astin, M.C; & Marsteller, F. (2005). Prolonged exposure versus eye movement desensitisation (PTSD) rape victims. *Journal of Traumatic Stress, 18*, 607-616.

Rudd, R. A., Aleshire, N., Zibbell, J. E., & Gladden, R. M. (2016). Increase in drug and opioid overdose deaths – United States, 2000-2014. *MMWR 64*, 1378-1382.

SAMSHA (2014). National Survey on Drug Use and Health: summary of national findings. Substance Abuse and Mental Health Services. <https://www.datafiles.samsha.gov/study/national-survey-druguse-and-health-nsduh-2014-nid13618>.

Schimdt, A.F., Eulenbruch, T., Langer, C., & Banger, M. (2013). Interoceptive awareness, tension reduction expectancies and self-reported drinking behaviour. *Alcohol and Alcoholism, 48*(4), 472-477.

Schneider, F., Habel, U., Wagner, M., Franke, P., Salloum, J. B., Shah, N. J., Toni, I., Sulzbach., Honig, K., Maier, W., Gaebel, W., & Zilles, K. (2001). Subcortical correlates of craving in newly abstinent alcoholic patients. *American Journal of Psychiatry, 158*, 29-37.

Schubert, S.J., Lee, C.W., Araujo, G., Butler, S.R., Taylor, G., & Drummond, P.D. (2016). The effectiveness of eye movement desensitisation and reprocessing therapy to treat symptoms following trauma in Timor Leste. *Journal of Traumatic Stress, 29* (2), 141 148.

Schubert, S.J., Lee, C. W., & Drummond, P. D. (2011). The efficacy of psychophysiological correlates of dual-attention tasks in eye movement desensitisation and reprocessing. *Journal of Anxiety Disorders, 25*(1), 1-11.

Schwartz, R.P. (2016). When added to opioid agonist treatment, psychosocial interventions do not further reduce the use of illicit opioids. *Journal of Addiction Medicine, 10*, 283-285.

Scott, J., Scott, E. M., Hermens, D. F., Naismith, S. L., Guastella, A. J., White, D., Whitwell, B., Lagopoulos, J., & Hickie, I. B. (2014). Functional impairment in adolescents and young adults with emerging mood disorders. *The British Journal of Psychiatry*, 205(5), 362-368.

Seow, L. S. E., Ong, W. J., Hombali, A., AshaRani, P. V., & Subramanian, M. (2020). A scoping review on cue reactivity in Methamphetamine Use Disorder. *International Journal of Environmental Research and Public Health*, 17(6504), <https://doi.org/10.3390/ijerph17186504>.

Servan-Schreiber, J., Schooler, J., Dew, M.A., Carter, C., & Bartone, P. (2006). Eye movement desensitisation and reprocessing for posttraumatic stress disorder: A pilot blinded, randomized study of stimulation type. *Psychotherapy Psychosomatics*, 75, 290-297.

Shapiro, F. (1989). Efficacy of the eye movement desensitisation procedure in the treatment of traumatic memories. *Journal of Traumatic Stress Studies*, 2, 199-223.

Shapiro, F. (1991). Eye movement desensitisation and reprocessing procedure: From EMD to EMDR: a new treatment model for anxiety and related trauma. *The Behavior Therapist*, 14, 133-135.

Shapiro, F. (1994). EMDR: In the eye of a paradigm shift. *Behaviour Therapist*, 17, 53-157.

Shapiro, F. (2001). *Eye Movement desensitisation and reprocessing: Basic principles, protocols and procedures (2nd ed)*. Guilford Press.

Shapiro, F. (2002). *EMDR as an integrative psychotherapeutic approach*. American Psychological Association.

Shapiro, F. (2006). *EMDR: Part 1 training manual, revised*. Watsonville, CA: EMDR Institute.

Shapiro, F. (2014). The role of eye movement desensitisation and reprocessing therapy (EMDR) in medicine: Addressing the psychological and physical symptoms stemming from adverse life experiences. *The Permanente Journal*, 18, 71-77.

Shapiro, F. (2018). *Eye Movement desensitisation and reprocessing: Basic principles, protocols and procedures (3rd ed)*. Guilford Press.

Shapiro, F., & Forest, M. (1997). *EMDR*. Basic Books.

Shapiro, F., Vogelmann- – Sine, S., & Sine, L.F. (1994). Eye movement desensitisation and reprocessing: Treating trauma and substance abuse. *Journal of Psychoactive Drugs*, 26(4), 379-391.

Sikes, C., & Sikes, V. (2003). EMDR: Why the controversy? *Traumatology*, 9, 169-181.

Silins, E., Fergusson, D. M., Patton, G. C., Horwood, L. J., Olsson, C. A., Hutchinson, D. M., Degenhardt, L., Tait, R. J., Borschmann, R., Coffey, C., Toumbourou, J. W., Najman, J. M., & Mattick, R. P. (2015). Adolescent substance use and educational attainment: an integrative data analysis comparing cannabis and alcohol from three Australasian cohorts. *Drug and alcohol dependence*, 156, 90-96.

Sinha, R., Fox, H. C., Hong, K. A., Bergquist, K., Bhagwagar, Z., & Siedlarz, K. M. (2009). Enhanced negative emotion and alcohol craving, and altered physiological responses following stress and cue exposure in alcohol dependent individuals. *Neuropsychopharmacology*, 34(5), 1198.

Sinha, R. (2013). The clinical neurobiology of drug craving. *Current Opinions in Neurobiology*, 23 (4), 649-654. <https://doi: 10.1016/j.conb.2013.05.001>.

Sittambalam, C. D., Vij, R., & Ferguson, R. P. (2014). Buprenorphine Outpatient Outcomes Project: can Suboxone be a viable outpatient option for heroin addiction? *Journal of community hospital internal medicine perspectives*, 4(2), 22902.

Skinner, M. D., & Aubin, H. J. (2010). Craving's place in addiction theory: Contributions of the Major Model. *Neuroscience and Behavioural Review*, 34, 606-623.

Smeets, M. A., Dijks, M. W., Pervan, I., Engelhard, I. M., & Van den Hout, M. A. (2012). Time-course of eye movement-related decrease in vividness and emotionality of unpleasant autobiographical memories. *Memory*, 20(4), 346-357.

Solomon, R.L. (1977a). Addiction: An opponent -process theory of acquired motivation: The affective dynamics of addiction. In J. D. Maser & M. E. P. Seligman (Eds). *Psychopathology: Experimental Models* (pp. 66-103). Freeman.

Sorg, B. A. (2012). Reconsolidation of drug memories. *Neuroscience. Biobehavioural Rev*, 36, 1400 -1417.

Stickgold, R. (2002). Sleep-dependent memory processing and EMDR action. *Journal of EMDR Practice and Research*, 2, 289-299.

Stickgold, R. (2008). EMDR: A putative neurobiological mechanism of action. *Journal of Clinical Psychology*, 58, 61-75.

Stimson, G. V., & Oppenheimer, E. (1982). *Heroin Addiction: treatment and control in Britain*. London: Tavistan

Sussman, S., & Arnett, J.J., (2014). Emerging Adulthood: Developmental Period facilitative of the addiction. *Evaluation of the Health Professions*, 37, 2. <https://doi.org/10.1177/0163278714521812>.

Suzuki, A., Josselyn, S.A., Frankland, P.W., Masushige, S. V., Silva, A. J., & Kida, S. (2004). Memory reconsolidation and extinction have distinct temporal and biochemical signatures. *Journal of Neuroscience*, 24, 4787-4795.

Swift, R., Oslin, D.W, Alexander, M., & Forman, R. (2011). Adherence monitoring in naltrexone pharmacotherapy trials: a systematic review. *J. Studies on Alcohol and Drugs*, 72, 1012-1018.

Tashakkori, A., & Teddie, C. (2009). *Foundations of Mixed Methods Research. Quantitative and Qualitative Approaches in the Social and Behavioral Sciences*. USA: Sage Publications.

Taylor, J. R., & Torregrossa, M.M. (2015). Pharmacological disruptions of maladaptive memory. *Handbook of Experimental Psychology*, 228, 381-415. <http://doi:10.1007/978-3-319-16522-6-13>.

Thompson, B. M; Bevins, R. A; & Murray, J. E. (2019). Interoceptive Stimulus Effects of Drugs of Abuse. In M. Toregrossa, *Neural Mechanisms of Addiction* (pp. 89 – 101). Elsevier. <https://doi.org/10.1016/B978-0-12-812202-0.00007-5>.

Thompson, C.B., & Panacek, E.A. (2006). Research Study Designs: Experimental and Quasi-Experimental. *Airmedical Journal*, 25(6)(pp.242-246). <https://doi:10.1016/j.amj.2006.09/001>.

Tiffany, S. T. (1990). A cognitive model of drug urges and drug –use behaviour., role of automatic and non-automatic processes. *Psychological Review*, 97,147-168.

Tiffany, S. T. (1999). Cognitive Concepts of Craving. *Alcohol Research and Health*, 23 (3), 215-223.

Tiffany, S.T., & Wray, J.M. (2012). The clinical significance of drug craving. *Ann N Y Acad Science*, 1248,1-17.

Timko, C., Halvorson, M., Kong, C., & Moos, R.H. (2015). Social processes explaining the benefits of Al-Anon participation. *Psychology of Addictive Behaviours*, 29 (4), 856-863.

Tolsi, N. (2006, April 04). Durban hit by “sugars” rush. *Mail & Guardian*, pp. 2-3.

Torregrossa, M. M., Corlett, P. R., & Taylor, J. R. (2011). Aberrant Learning and Memory in addiction. *Neurobiological Learning Memory*, 96(4), 609-623. <https://doi.org/10.1016/j.nlm.2011.02.014>.

Torregrossa, M. M., Corlett, P. R., & Taylor, J. R. (2013). Double dissociation between the anterior cingulate cortex and nucleus accumbens core in encoding the context versus the content of pavlovian cocaine cue extinction. *Journal of Neuroscience*, 33, 8370-8377.

Torregrossa, M. M., & Taylor, J. R. (2016). Neuroscience of Learning and Memory for Addiction Medicine: From Habit Formation to Memory Reconsolidation. In H. Ekhtiari., & M. Paulus (2016). *Neuroscience for Addiction Medicine: From Prevention to Rehabilitation-Constructs and Drugs* (Vol. 223) (pp. 91-105). Elsevier.

Tsuang, M.T., Bar, J. L., Harley, R. M., & Lyons, J. M. (2001). The Harvard Twin Study of Substance Abuse: what we have learned. *Harvard Rev Psychiatry*, 57, 267-279.

Ulberg, R., Ness, E., Johnsen Dahl, H.S., Hoglend, P.A., Critchfield, K., Blayvas, P., & Amlo, S. (2016). Relational interventions in psychotherapy: development of a therapy process rating scale. *BMC Psychiatry*, 16(1), 3-10. <https://doi.org/10.1186/512888-016-1021-4>.

United Nations Office on Drugs & Crime. (2019). *World Drug Report 2019*. United Nation Publication, Vienna. <http://www.unodc.org/documents/wdr2019/World> Drug Report.

United Nations Office on Drugs and Crime. (2010). *World Drug Report*. United Nations Publication, Vienna. <http://www.unodc.org/documents/wdr2010/World>_ Drug Report.

USAID. (2016). An exploration of the socio-economic impacts of two drug markets in South Africa. United States Agency for International Development. <https://www.researchgate.net/publication/309242670>.

van der Kolk, B. (2003). Post-Traumatic stress disorder and the nature of trauma. In M. F. Solomon & D. Siegel (Eds.), *Healing trauma: Attachment, mind, body and brain* (pp 168-195). Norton & Company.

van der Kolk, B.A. (1994). The body keeps the score. Memory and the evolving psychobiology of post- traumatic stress. *Harvard Review of Psychiatry*, *1*, 253-265.

van der Kolk, B.A. (2014). *The body keeps the score: Brain, mind and body in the healing of trauma*. Viking.

van Lier, H.G; Pieterse, M.E; Schraagen, J.M.C; Postel, M, G; Vollenbroek - Hutten, M. M. R; de Haan, H. A; & Noordzij, M. L. (2018). Identifying viable theoretical frameworks with essential parameters for real-time and real world alcohol craving research: a systematic review of craving models. *Addiction Research & Theory*, *26:1*, 35-51. <https://doi.org/10.1080/16066359.2017.1309525>.

Vassoler, F. M., & Sadri – Vakili, G. (2014). Mechanisms of transgenerational inheritance of addictive – like behaviors. *Neuroscience*, *0*, 198-206.

Veilleux, J.C., Colvin, P.J., Anderson, J., York, C., & Heinz, A.J. (2010). A review of opioid dependence treatment: pharmacological and psychosocial interventions to treat opioid addiction. *Clinical Psychology Review*, *30(2)*, 155-166. <https://doi.org/10.1016/j.cpr.2009.10.006>.

Venegas, A., & Ray, L. A. (2019). Comparing alcohol cue-reactivity in treatment – seekers versus non - treatment seekers with alcohol use disorder. *The American Journal of Drug and Alcohol Abuse*, *8*, 95-156. <https://doi.org/10.1080/00952990.2019.1635138>.

Verdejo-Garcia, A., Lawrence, A. J., & Clark, L. (2008). Impulsivity as a vulnerability marker for substance – use disorders: review from findings from high -risk research, problem gamblers and genetic association studies. *Neuroscience. Behav. Rev*, *32 (4)*, 777-810.

Verstand, A., & Rosenberg, H. (2007). Effect of brief imagery interventions on craving in college student smokers. *Addiction Research Theory*, *15(2)*, 177-187.

Vitacare. *What is Sugars? Narcotic Drug Mix Containing Heroin*. (2012, August, 23). <http://www.vitacare.co.za>.

Vogelmann- Sine, S., Sine, L.F., Smyth, N. J., & Popky, A. J. (2005). *EMDR chemical dependency treatment manual*. New Hope, PA: EMDR Humanitarian Assistance programs.

Volkow, N.D., & Morales, M. (2015). The Brain on Drugs: From Reward to Addiction. *NIDA*, 162, 712-725. <https://doi.org/10.1162/j.cell.2015.07.046>

Volkow, N.D., Koob, G.F., & McLellan, A.T. (2016). Neurobiologic advances from the brain disease model of Addiction. *N Engl J Med*, 374 (4):363-371.

Volkow, N.D., Wang, G. J., Fowler, J.S., & Tomasi, D. (2012). Addiction Circuitry in the Human Brain. *Annual Review Pharmacological Toxicology*, 10(52), 321-336.

Walker, M.P., & Stickgold, R. (2010). Overnight alchemy: Sleep-dependent memory evolution. *Nature Reviews Neuroscience*, 11, 218-219.

Walley, A. Y., Xuan, Z., Hackman, H.H., Quinn, E., Doe-Simkins, M., & Sorensen, A., Ruiz, S., & Ozonoff, A. (2013). Opioid overdose rates and implementation of overdose education and nasal naloxone distribution in Massachusetts: Interrupted time series analysis. *British Medical Journal*, 346, 174.

Walter, M., Degen, B., Treugut, C., Albrich, J., Opiel, M., Schulz, A., Schachinger, H., Dursteler-Macfarland, K.M., & Wiesbeck, G.A. (2011). Affective reactivity in heroin-dependent patients with antisocial personality disorder. *Psychiatry Res*, 187, 210-213.

Wang, J. C., Kapoor, M., & Goate, A. M. (2012). The genetics of substance dependence. *Annual Rev. Genomics*, 13, 241-261.

Watchel, P.L. (2002). "EMDR and psychoanalysis. In F. Shapiro (Ed.), *EMDR as an Integrative Psychotherapy Approach*. American Psychological Association Press.

Wattis, E. (2001). Unpublished keynote address: The future of counselling. In R. Woolfe, W. Dryden & S. Strawbridge (Eds), *Handbook of counselling psychology* (2nd ed., p. 660). London: Sage.

Watts, B. V., Schnurr, P.P., Mayo, L., Young-Xu, Y., Weeks, W. B., & Friedman, M. J. (2013). Meta-analysis of the efficacy of treatments for posttraumatic disorder. *Journal of Clinical Psychiatry*, 74 (6), 541-550.

Weich, L. (2010). "Defeating the dragon". Can we afford not to treat patients with heroin dependence? *South African Journal of Psychiatry*, 16(3), 75-79.

West, R. (2005). *Theory of addiction*. Malden, M: Blackwell.

White, W., & Kurtz, E. (2006). *Recovery- Linking addiction treatment and communities of recovery: A primer for addiction counsellors and recovery coaches*. Pittsburgh, PA: The Addiction Technology Transfer Center Network.

Wikler (1948). Recent progress in research on the neurophysiologic basis of morphine addiction. *American Journal of Psychiatry*, 105(5), 329-338. [https:// doi:10.1176/ajp.105.329](https://doi.org/10.1176/ajp.105.5.329).

Wilson, D., Silver, S.M., Covi, W., & Foster, S. (1996). EMDR: Effectiveness and autonomic correlates. *Journal of Behaviour Therapy and Experimental Psychiatry*, 27, 219-229.

Witkiewitz, K., Bowen, S., Harrop, E.N., Douglas, H., Enkema, M., & Sedgwick, S. (2014). Mindfulness- Based Treatment to Prevent Addictive Behaviour Relapse: Theoretical Models and Hypothesised Mechanisms of Change. *Substance Use Misuse*, 49, 513-524.

Witkiewitz, K., Lustyk, M.K.B., & Bowen, S. (2013). Re-training the Addicted Brain: A Review of Hypothesised Neurobiological Mechanisms of Mindfulness Based Relapse Prevention. *Psychol Addict Behaviour*, 27(2), 351-361.

Wolffgram, J., Galli, G., Thimm, F., & Heyne, A. (2000). Animal models of addiction: models for therapeutic strategies. *Journal of Neural Transmission*, 107 (6), 649-668.

Wolpe, J. (1990). *The practice of behaviour therapy (4th ed)*. Pergamon Press.

World Drug Report. (2018). *The opioid crises, prescription drug abuse, expands, cocaine & opium hits record high*. <https://www.unodc.org/unodc/en/frontpage/2018/June/world-drug-report-2018-opioid> crisis - prescription-drug-abuse-expands-cocaine-and-opium

World Health Organisation. (2010). *Global Health Risks: Mortality and burden of disease attributable to selected major risks*. http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/index.html on December 14th 2010.

World Health Organisation. (2013). *Guidelines for the management of conditions that are specifically related to stress*. Author.

York, C., & Leeds, A. (2001). *Gate theory: An accelerated information processing model for developing functional state change*. In *EMDRIA Conference, Austin, TX*.

Young, M., Stuber, J., Ahern, J., & Galea, S. (2005). Interpersonal discrimination and the health of illicit drug users. *American journal of Drug and Alcohol Abuse*, 31, 371-391.

Zamboanga, B. L., Ham, L.S., van Tyne, K., & Pole, N. (2011). Alcohol expectations amongst adolescent non- drinkers. *Journal of adolescent health*, 49 (1), 105 -107.

Zapata, A., Minney, V.L., & Shippenberg, T.S. (2010). Shift from goal-directed to habitual cocaine seeking after prolonged experience in rats. *Journal of Neuroscience*, 30, 15457 -15463.

Zayfert, C., & Black Becker, C. (2007). *Cognitive behavioural therapy for PTSD: A case formulation approach*. Guilford Press.

Zikali, Z. (2018, September 29). South Africa is losing the war against Alcoholism and Drug abuse. IOL News. <https://www.iol.co.za/news/south-africa/eastern-cape/why-sa-is-losing-the-war-against-alcoholism-and-drug-abuse>.

Zweben, J., & Yeary, J. (2006). EMDR in the treatment of addiction. *Journal of Chemical Dependency Treatment*, 8(2), 115-127.

APPENDICES

APPENDIX A: INFORMED CONSENT

Dear Sir/Madam

I am conducting research into the effect of EMDR in the treatment of sugars addiction as part of my PhD studies in the Discipline of Psychology, School of Applied Human Sciences at the University of KwaZulu-Natal, Durban (My student number is: 6169951-9). Ethical clearance for the study was also obtained from the Ethics Committee of the University of KwaZulu-Natal (HSS/1300/012D).

The aim of this study is to determine whether EMDR will assist in regaining control over the craving thereby enhancing recovery. In terms of your participation in this study I would like to bring the following to your attention:

- Your participation is voluntary.
- Your participation will have no bearing on your current treatment.
- The information obtained from you would remain confidential and anonymous.
- You would have the right to refuse participation at any time.

Should you have any questions about the Ethical clearance of the study you may contact **Ms Phumelele Ximba; Tel: 031 260 3587; Email: ximbap@ukzn.ac.za** at the University of KwaZulu-Natal Ethics Committee.

Name and contact details of my supervisors:

Prof. Anna Meyer Weitz (031) 2607618 e-mail address – meyerweitza@ukzn.ac.za

Name and contact details of my supervisors:

Prof. Anna Meyer Weitz (031) 2607618 e-mail address – meyerweitza@ukzn.ac.za

Kindly complete the following to confirm that the above has been discussed and that you consent to being a participant in this research study.

Signature

Name

Date

I thank you for your involvement in this study.

Naseema Dawood

(Principal Researcher)

Date

APPENDIX B: PERMISSION TO CONDUCT THE STUDY AT THE REHABILITATION INSTITUTION

Dear Sir/Madam

I am conducting research into the effect of EMDR in the treatment of sugars addiction as part of my PhD studies in the Discipline of Psychology, School of Applied Human Sciences at the University of KwaZulu-Natal, Durban (My student number is: 6169951-9). Ethical clearance for the study was obtained from the Ethics Committee of the University of KwaZulu-Natal (HSS/1300/012D).

The aim of this study is to determine whether EMDR will assist in regaining control over the craving thereby enhancing recovery. I would like to obtain permission to conduct the study among clients in the institution. In terms of their participation in this study I would like to bring the following to your attention that:

- Participation is voluntary.
- Participation will have no bearing on their current treatment.
- The information obtained from the clients will remain confidential and anonymous.
- They will have the right to refuse participation at any time.
- Publication of the results will be for research purposes only and will be anonymous.

Should you have any questions about the Ethical clearance of the study you may contact **Ms Phumelele Ximba; Tel: 031 260 3587; Email: ximbap@ukzn.ac.za** at the University of KwaZulu-Natal Ethics Committee.

Name and contact details of my supervisors:

Prof. Anna Meyer Weitz (031) 2607618 e-mail address – meyerweitza@ukzn.ac.za

Thanking you in advance.

Naseema Dawood

(Principal Researcher)

Date

APPENDIX C: ETHICAL CLEARANCE FORM



7 December 2012

Mrs Naseema Dawood 9148580
School of Applied Human Sciences
Howard College Campus

Dear Mrs Dawood

Protocol reference number: HSS/1300/032D

Project title: EMDR in the treatment of sugars addiction: Regaining control over cue reactivity and cravings

EXPEDITED APPROVAL

I wish to inform you that your application has been granted Full Approval through an expedited review process.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



Professor Steven Collings (Chair)

/pm

cc Supervisor: Prof Anna Meyer Weitz & Prof Steve Collings
cc Academic Leader: Professor Johanna Hendrina Buitendijk
cc School Admin.: Mr Mondli W Ngubane/ Ms Doreen Hattingh

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Funding Centres: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

INSPIRING GREATNESS



APPENDIX D: INTAKE INTERVIEW

Name: _____

Age: _____

Address: _____

Tel No : _____

Ethnic Group: _____

(Circle the appropriate selection).

(A) Treatment details:

Present admission:

a) Date of admission: _____

b) Drug of choice: _____

c) Place of treatment: _____

d) Period of treatment: _____

(B) MARITAL STATUS

Single – Engaged – Married – Separated – Divorced – Widowed – Remarried –
Common-law

How long with current partner: _____

Does your partner use drugs? Y/N

(C) EDUCATIONAL HISTORY (circle appropriate selection)

Highest school standard/grade passed:

Std 8 – Std 9 – Std 10.

Post school education.

Type _____

Currently studying: Y/N

Course completed: Y/N

(D) EMPLOYMENT HISTORY

Are you employed: Y/N

How long: _____

Type of job _____

Occupation or types of work that you have done _____

Have you ever lost a job because of drugs: Y/N
Details: _____

SUBSTANCE USE HISTORY

Tell me about all the drugs you have ever taken? (Starting with your drug of choice) For each substance used, the following will be explored:

- Age at first use

- Years used

- Amount of use

- Route of administration

- Current pattern and drug used

- Period at last use

What are the symptoms associated with usage? (i.e. body pain, anger, paranoia, hallucinations, criminal activities etc).

When did you lose control over your addiction?

Was there anything happening in your life when your drug usage increased?

Have you ever overdosed on any drug? If yes, which drug and when?

What are the symptoms that you experience when craving for sugars?

What are the symptoms that you experience upon withdrawing from sugars?

When do you experience intense cravings for sugars?

Is there anything you see, hear, smell, taste or feel that brings on a craving?

What would you consider as your main triggers, which leads to your usage of sugars?

I would like to understand if there are particular thoughts and feelings that trigger your desire to use sugars. Which of the following trigger's your need to use a drug?

- I feel angry or frustrated, either with myself or if things are not going my way
 - Seeing sugars, makes me want to use sugars
 - Seeing other people using, makes me want to use sugars
 - I feel bored
 - I feel anxious or tense
 - I feel sad
 - I feel, I just would not be able to cope without sugars
 - I feel ill or in pain because I need to take the sugars
 - I am in a good mood and I feel like getting high
 - I just feel tempted out of the blue and go off to get the sugars
 - I feel angry or frustrated because of the problems I experience with my family / spouse / girlfriend
 - I am with others, having a good time and feel the need to get high together
 - I feel ill or pain (not due to withdrawal)
 - I feel others criticize me all the time
 - Are there any other thoughts or feelings I have not mentioned
-

Have you previously received treatment for sugars? If yes,

- When

- Why then

- Form of treatment

- Duration

- How long did you maintain sobriety post treatment?

- What triggered your relapse

Describe your pattern of drugging during the relapse – (amount used, times of starting)

Where there any other efforts of abstinence (staying sober)? If yes,

- Why?

- How long?

- What helped you to stay sober?

- What triggered relapse?

Are there any current problems that could affect your ability to stay away from sugars?

What are your fears about future dangers that may cause you to relapse?

Has anyone in your family or other blood relatives been problem users, alcohol/drug dependent at any time in their lives?

MENTAL STATUS

1. Appearance include posture, clothes

2. Behaviour and psychomotor actions including agitation and mannerisms

3. Attitudes towards the practitioner or care givers

4. Speech

5. State of consciousness

Alertness

Orientation

6. Affected state

Mood

7. Anxiety level

8. Thought processes including (productivity, relevance, coherence)

9. Preoccupation

10. Suicidal/ homicidal

11. Thought disturbance (delusions/dissociation)

12. Perceptual disturbance including hallucinations

13. Memory (immediate, recent, remote)

14. Daily routine (ability to follow a daily routine)

TRAUMA HISTORY

1. Have you ever experienced any kind of abuse?
- Emotional, physical, sexual abuse
 - Abandonment
 - Serious illnesses
 - Accidents
 - Losses
 - Violence
 - Humiliation
 - Trauma related to substance use

 - Other
-
2. Do you experience any of the following symptoms or intrusive memory related to the trauma?
- Distressing memories
 - Recurrent dreams related to trauma
 - Acting and feeling as if the trauma were recurring
 - Intense psychological distress at exposure to internal or external cues reminding you of trauma
 - Sense of loss or betrayal
 - Sense of helplessness
3. Do you experience any numbing or avoidance symptoms associated with the trauma that you have experienced?
- Goes through life avoiding experiencing the emotions evoked by intrusive experiences
 - Feels nothing and is out of touch with feelings
 - Avoids thoughts, feelings and conversations about it
 - Presents behaviour aimed at not feeling pain (compulsive spending, drug use etc)

CLIENTS TREATMENT GOALS

Current assessment of readiness for rehabilitation treatment

1. In denial about the negative consequences of sugars use and feels that he can control use without any formal help.
2. Acknowledges negative consequences of substance use, but commitment is poor.
3. Some commitment to treatment, but no demonstrated ability to abstain from the sugars as he still desires usage of sugars.
4. Demonstrates commitment to abstain from sugars, but not other drugs or alcohol.
5. Client acknowledges the detrimental effects of addiction and is committed to recover.

APPENDIX E: DESENSITISATION OF CRAVING PROTOCOL

(First Session – a day after admittance)

“When you think of sugars, what happens to you?” (Responses, reactions, images, feeling, thought, body sensations).

“Now that you focussing on your craving, what is happening to you?”

SUC’s “How strong is your craving for sugars right now on a scale of 0 to 10, where 0 is no craving and 10 is the most craving to want to use sugars?”

0 1 2 3 4 5 6 7 8 9 10
(no craving) (most craving)

Negative Cognition – “What are the words that best describe your negative thoughts/belief about you not being able to cope with your craving right now?”

Positive Cognition – “What would you like to believe about yourself that could help you to deal with your craving for sugars?”

Validity of Cognition – “When you look at what is happening to you, how true do the words _____ (PC) feel to you now on a scale of 1 to 7, where 1 feels completely false and 7 feels completely true?”

1 2 3 4 5 6 7

“What emotions are you feeling right now?”

Based on the client's response, the therapist would say to the client: Lets focus on that and the bilateral stimulation will be introduced once again. The participant will be asked to hold on to their response and the therapist will instruct them to:

“Go with that”

BLS will continue

Let's go back to focussing on your craving and rate the intensity of your craving for sugars, where 0 is no craving and 10 is the highest craving, how strong does your craving feel now?"

0 1 2 3 4 5 6 7 8 9 10

(No craving)

(Most craving)

Thereafter ask the? “If your craving has not gone down to a 0, what makes it a _____ and ask them to focus on that and begin with sets of stimulation

Continue with BLS

“Now take another look at your craving. Go back to focusing on your craving for sugars again and think of what represents your craving to want to use sugars, where 0 is no craving and 10 is the most intense craving, how strong does your craving feel now?"

0 1 2 3 4 5 6 7 8 9 10

(No craving)

(Most craving)

“Go with that”

BLS will continue until the client reaches a 0 or the client can let go.

It is ok if the client is not able to come down to a 0. They may have reached a preferred ecological resolution with a level of craving being more than 0.

If so, ask the participant to outline factors or conditions that prevent the SUC from going down to a 0:

INSTALLATION

“Now that your craving has gone or reduced, let us take a look at the positive thought that you have chosen about overcoming your craving. Is it still the right one or is there another positive statement that you would prefer to use now?”

“When you think of your craving for sugars, how true do the words _____ (PC) feel to you now on a scale of 1 to 7, where 1 is completely false and 7 is completely true.”

“Now think of what you experienced whilst craving for sugars and hold it together with the words _____ (PC).”

Do sets of BLS to strengthen the positive cognition and to see if more processing needs to be done.

BODY SCAN

“Close your eyes and think about your craving experience when we started and the PC (_____). Now bring your attention to the different parts of your body starting with your head and working downwards. Is there any place in your body that you find tension, tightness or unusual sensations?”

CLOSURE

Now that you have come to the end of your session “I want you to know that things related to your craving for sugars may or may not come up after this session. If they do come up, make a note of it so that we can deal with it in the next session. If you get any new memories, dreams, feelings or situations that upset you or that are positive, remember them or make a note of it so that we can work on it the next time we meet. If negative feelings or thoughts come up, don’t be worried or concerned, remember it is just stuff from the past and we can deal with them when I see you again. I would like you to use the safe place exercise to let go of the disturbance that comes up and to use it to help you to cope even if you are not experiencing any cravings or thoughts of using sugars. If you need to speak to me or see me before the two days, please ask the supervisor to allow you to give me a call”

SECOND SESSION (after two days)

REEVALUATION

Participant’s experience of their craving for sugars will be re-evaluated at the beginning of the second session. Therapist will first determine the participant’s level of craving on a scale of 0 to 10, where 0 is no craving and 10 is the highest level of craving experienced.

0 1 2 3 4 5 6 7 8 9 10

Thereafter processing will continue based on the participant’s response.

Body scan – “Close your eyes and keep in mind the cravings that you may experience in the future for sugars. Then bring your attention to different parts of the body, starting with your head and working downwards. Is there any place that you find any tension, tightness or unusual sensation?”

If any sensations are reported, do BLS. If it is a positive sensation, do BLS to strengthen the positive feelings. If the sensation is negative or distressing, reprocessing will be done until the discomfort subsides.

Ascertain VOC – “When you think of your craving for sugars, how true do the words _____, feel to you now on a scale of 1 to 7, where 1 feels completely false and 7 feels completely true?”

1 2 3 4 5 6 7

BLS will continue until reaching the VOC of 7 or there is ecological resolution

APPENDIX F: THE SUGARS CRAVING INVENTORY

INSTRUCTIONS: The following is a list of symptoms that people sometimes experience when they have a craving. Put a cross (x) in the space to the right that best describes how much that symptom or problem is bothering you.					
SYMPTOM LIST		0 – NOT AT ALL	1 - SOMEWHAT	2 - MODERATELY	3 – A LOT

CATEGORY 1: FEELINGS

1.	I feel worried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	I feel that things around me are confusing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	I feel scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	I feel tense	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CATEGORY II: THOUGHTS

5.	I am finding it difficult to concentrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	I think that I will not be able to cope without sugars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	I think that I am losing control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	I think that I am going crazy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	I think that I am going to die	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	I fear that something terrible is going to happen to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CATEGORY III: PHYSICAL SYMPTOMS

11.	My eyes are tearing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	I feel pain and tightness in my chest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	I feel electric shocks in my body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	I can feel butterflies or discomfort in my stomach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	My muscles feel tight and tense	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16.	I am sweating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	My body is shaking and trembling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	My legs feel weak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	I feel dizzy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	I have pains in my neck and back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	I feel cold chills throughout my body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	I feel tired and weak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	I feel nauseas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.	I have pains in my head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	I have a runny nose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THE SUGARS CRAVING INVENTORY

TOTAL SCORE	DEGREE OF CRAVING	YOUR SCORE
0-4	No craving	
5-10	Borderline craving	
11-20	Mild craving	
21-30	Moderate craving	
31-50	Severe craving	
51-75	Extreme craving	

APPENDIX G: INTERVIEW QUESTIONS

- Have you noticed any changes in yourself after receiving EMDR therapy? If so, what are these changes?

Thinking_____

Feeling_____

Physiological changes_____

Other _____

- Did you feel safe/ comfortable when EMDR therapy was administered?

- Was there any discomfort that you experienced as a result of the EMDR therapy experience?

- Where there any other disturbing issues that surfaced with EMDR therapy?

- Where there any underlying issues that may have surfaced during the process?

- Has your capability to withstand a craving improved as a result of EMDR therapy experience? If yes, explain.

- Do you think EMDR therapy makes recovery easier?

- Did EMDR therapy change your perspective about needing the drug?

- What are your thoughts about using EMDR therapy to reduce the craving?

APPENDIX H: NEGATIVE AND POSITIVE COGNITIONS (Addiction Specific Beliefs)

NEGATIVE COGNITIONS

I cannot cope without drugs

I cannot deal with the craving

I am weak

I am powerless/helpless without drugs

I must have drugs right now

I am nothing without my addiction

I have no identity without my addiction

My addiction is my security

I must use drugs to cope with my past

I am not capable of dealing with my feelings

I am not capable of dealing with my life

I cannot be social without drugs

I must use drugs to be in control

POSITIVE COGNITIONS

I can cope without drugs

I can deal with the craving

I am strong

I now have choices

I can handle it/I can say no or keep away from drugs

I am worthy/fine as I am

I am significant

I feel secure with myself

I can cope with my past

I am capable of dealing with my feelings

I am capable of dealing with my life

I am fine the way I am

I do not need drugs to be in control

APPENDIX I: SUBJECTIVE UNITS OF CRAVING SCALE (SUC)

10

9

8

7

6

5

4

3

2

1

0

SUC: Please evaluate the intensity of your craving for sugars on a scale of 0-10 where 0 is no craving or neutral and 10 is the most craving you can imagine, how strong your craving feels to you now.

APPENDIX J: RELAXATION EXERCISE

(Ego Strengthening by D. C. Hammond)

The Serenity Place D C Hammond

EGO-STRENGTHENING: ENHANCING ESTEEM, SELF-EFFICACY, AND CONFIDENCE

SUGGESTIONS

Now, as you continue to relax, more and more deeply, just allow yourself to float across time and space. And in a moment, your unconscious mind is going to suddenly take you, to a very special place, that's associated with tremendous feelings of peacefulness, and tranquility, and safety, and happiness. It may be a place you've been before, or some special place that you find yourself in for the first time. And you can just allow such a place to spontaneously come into your awareness now. And as you find yourself there, give yourself the opportunity, to experience all the refreshing feelings of calm, and contentment, and security, and happiness, associated with this wonderful place. And I'm not really sure whether you'd rather just sit and rest back, and look at everything around you, or if you'd rather walk around some, and explore this special place, that's here right now, just for you. And I don't know for sure, the things that will stand out most for you—whether it will be the sounds in this special place, or the beauty of it. Perhaps you'll especially enjoy the sensations and feelings as you touch things, and maybe even the smells will be unusually pleasant.

And I wonder if you've already begun to notice the fact, that as you just experience, and enjoy this special place, you soak up and absorb these tranquil feelings. And you can just allow these feelings of deep contentment, and peace, and calm, to flow, all through you, to all parts of you, allowing all of you to experience these soothing feelings. And as each moment passes in this special place, these wonderful, invigorating feelings increase, and become more a part of you. And you can savor this place, and your enjoyment of it can be heightened, with every moment that you spend here. And as you rest here, and recharge your batteries, this experience may remind you of other places and experiences, where you've felt happy, and contented, and filled with peaceful feelings. [Pause]

And in this place of serenity and security, things can come into perspective. [Pause] You

can be aware of actual feelings, with a correct sense of proportion, free from the distortions of a mood or set of circumstances. [Pause] As you rest in this place, things come into proper perspective. [Pause] And in this special place, independent of anything that I say, you can receive what you most need right now. Your unconscious mind knows what you most need. And I don't know exactly how you'll receive that. It may be that you gain a new perspective, or just find yourself feeling differently. [Pause] Or maybe, before awakening, you'll receive from your unconscious, a special gift, of an experience or a memory that gives you the understanding or the perspective or the feelings that you most need right now. [Pause] Or perhaps, you may hear, what you need. It may be that you hear a still voice, maybe a voice in your mind, or seeming to come from deep inside you, saying what you most need to hear, giving you the suggestions you most need to receive right now. [Pause]

And in a moment now, I'm going to stop talking. And you can remain in this special place of yours, for as long as you need. You can remain in this place of contentment, and happiness, and tranquility, for as long as you need, recharging your batteries, and soaking up these feelings, receiving what you need. And there's something that's going to be embedded and remain in your mind: you will know, that you can return to this special place of yours, whenever you need or want to. You will know, that whenever you need to rest, or replenish your strength and energy, that you can put yourself into a deep and peaceful hypnotic state, and return to this place.

And when you're ready to awaken, you can drift back across time and space, bringing these wonderful feelings, and this sense of perspective with you. And you'll awaken feeling well; refreshed, alert and clear-headed. And what you have experienced can remain with you, after you have awakened. Now, as I stop speaking, you can continue in this place, receiving what you need, for as long as you like.