Healing the Addiction Memory

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Abstract: This article discusses addiction and formation of the Addiction Memory. Addiction has been described as a brain disorder involving brain structures and neural circuits. Addiction impacts long term associative memory including multiple memory systems. Addiction has pathological associations with learning, memory, attention, reasoning, and impulse control. People with addictions suffer from high levels of early maladaptive schemas. The Addiction Memory (AM) plays a crucial role in relapse occurrence and maintaining the addictive behavior. Healing the addiction memory is imperative in treating addictions. Pharmacological and psychological methods are being used to treat addictions. Among the psychological interventions Cognitive Behavior Therapy, Eye movement desensitization and reprocessing (EMDR) and Schema-Focused Therapy (SFT) can be used to heal the addiction memory.

Key Words: Addiction Memory (AM), Maladaptive Schemas, Psychotherapy

Drug addiction has become an increased phenomenon in the modern civilization. Addiction habits have impacted individuals, families and the society. Addiction has been regarded as an individual disease as well as a social condition. Addictions cause structural changes in cultural, social, political, and economic system in society (Ajami et al., 2014). Addiction is almost universally held to be characterized by a loss of control over drug-seeking and consuming behavior (Levy, 2014).

Addiction is defined as compulsive drug use despite negative consequences (Hyman, 2005). Addiction is a multifactorial phenomenon (Shaghaghy et al., 2011). McLellan and colleagues (2000) conceptualize addiction as a brain disease. Leshner (1997) views addiction as a chronic, relapsing brain disorder that involves complex interactions between biological and environmental variables. According to Mate (2014) addictions are experience based and it has close links with pain, distress, negative emotions, loss of meaning and often connected with adverse early childhood experiences. Drug addiction leads to profound disturbances in an individual's behavior that affect his/her immediate environment, usually resulting in isolation, marginalization, or incarceration (Volkow et al., 2004).

Addictions and Brain Structures

There are numerous brain structures and neural circuits involved in the addiction process. Several studies using a whole brain analysis approach have demonstrated how sensorimotor brain networks contribute to addiction (Yalachkov et al., 2010). Drug addiction causes important derangements in many areas, including pathways affecting reward and cognition (Fowler et al., 2007). Tomkins & Sellers (2001) specify that multiple neurotransmitter systems may play a key role in the development and expression of drug dependence.

Studies indicate that The ventral striatum, a region implicated in reward, motivation, and craving, and the inferior frontal gyrus and orbitofrontal cortex, regions involved in inhibitory control and goal-directed behavior become affected in addictions (Konova et al., 2013). A central concept in drug abuse research is that increased dopamine (DA) in limbic brain regions is associated with the reinforcing effects of drugs (Di Chiara andImperato, 1988; Koob &Bloom,

1988; Volkow et al., 2004). Pharmacological and behavioral studies have indicated that modulation of locus coeruleus (LC) (which is the largest noradrenergic nucleus in brain, located bilaterally on the floor of the fourth ventricle in the anterior pons) neuronal firing rates contributes to physical aspects of opiate addiction, namely, physical dependence and withdrawal, in several mammalian species, including primates (Redmond and Krystal, 1984; Rasmussen et al.,1990;Nestler, 1992).

Memory and Addiction

Inter connection between human memory process and addiction has been speculated by numerous researchers in the past few decades. Theories of addiction have mainly been developed from neurobiologic evidence and data from studies of learning behavior and memory mechanisms (Cami & Farre, 2003). Wang and colleagues (2003) hypothesized that addiction can be resulted by the abnormal engagement of long term associative memory. Volkow et al. (2003) highlight that multiple memory systems have been proposed in drug addiction, including conditioned-incentive learning (mediated in part by the NAc and the amygdala), habit learning (mediated in part by the caudate and the putamen), and declarative memory (mediated in part by the hippocampus). According to Hyman (2005) addiction represents a pathological usurpation of the neural mechanisms of learning and memory that under normal circumstances serve to shape survival behaviors related to the pursuit of rewards and the cues that predict them.

The Process of Learning and Memory in Addiction

The process of learning and memory in addiction has been proposed to involve strengthening of specific brain circuits when a drug is paired with a context or environment (Klenowski et al., 2014). Addiction has pathological associations with learning, memory, attention, reasoning, and impulse control. Addiction related behaviors arise as a result of maladaptive learning process. Following learning pathways individuals with addictions become sensitive and strongly respond to drug cues (Robinson & Berridge, 2000). Drug use in the addicted individual is controlled by automatized action schemata (Tiffany, 1990).

Robbins and colleagues (2002) point out that pathological subversion of normal brain learning and memory processes in drug addiction. They further emphasize that drug related habits evolve through a cascade of complex associative processes with Pavlovian and instrumental components that may depend on the integration and coordination of output from several somewhat independent neural systems of learning and memory, each contributing to behavioral performance.

Tiffany (1990) concluded that drug urges and drug use result from distinct cognitive processes. Some experts believe that addiction related behaviors can be explained via the Feeling-State Theory. According to the Feeling-State Theory positive feelings and behavior are fixated in the body during an intense experience such as drug ingestion creating the feeling-state (Miller, 2005).

A considerable number of researchers point out that subcortical brain region plays a key role in formation of normal as well as drug related behavioral habits. Chronic drug exposure causes stable changes in the brain at the molecular and cellular levels (Nestler, 2001). Drug abusing habits can change the structure and function of the synaptic connections allowing synaptic plasticity for long periods even for a lifetime. Synaptic plasticity may play key roles in the addiction process (Winder et al., 2002). Kelley (2004) states that the process of drug addiction shares striking commonalities with neural plasticity associated with natural reward learning and memory.

Addictions and Maladaptive Schemas

Segal (1988) viewed schemas as the residue of past reactions and experience that often effect subsequent perception and appraisals. Bakhshi Bojed and Nikmanesh, (2013) pointed out that drug users suffer from some early maladaptive schemas which can be the potential for drugs abuse. A study done by Shaghaghy and colleagues (2011) indicated that people with addictions suffer from high levels of early maladaptive schemas and they had a more pessimistic attributional style. Maladaptive schemas and inefficient ways the patient learns to adapt with others often lead to chronic symptoms of anxiety, depression and substance abuse (Kirsch, 2009: Shaghaghy et al., 2011).

Memory and Craving

Craving is often depicted as the subjective experience; craving tends to be highly situationally specific, readily triggered by stimuli previously associated with drug use. Secondly, craving can persist well beyond the cessation of addicted substance (Tiffany & Conklin, 2000). Volkow and colleagues (2004) point out that drugs trigger a series of adaptations in neuronal circuits involved in saliency/reward, motivation/drive, memory/conditioning, and control/disinhibition, resulting in an enhanced (and long lasting) saliency value for the drug and its associated cues at the expense of decreased sensitivity for salient events of everyday life (including natural reinforces).

The Addiction Memory

The Addiction Memory (AM) plays a crucial role in relapse occurrence and maintaining the addictive behavior. The drug-associated cues are highly connected with Addiction Memory and it helps to maintain drug seeking craving. Boening (2001) views the personal Addiction Memory as an individual acquired software disturbance in relation to selectively integrating "feedback loops" and "comparator systems" of neuronal information processing. The Addiction Memory becomes part of the personality represented on the molecular level via the neuronal level and the neuropsychological level, especially in the episodic memory (Boening, 2001).

Working with the Addiction Memory

Böning (2009) discusses the difficulties in treating Addiction Memory since it is embedded above all in the episodic memory, from the molecular carrier level via the neuronal pattern level through to the psychological meaning level, and has thus meanwhile become a component of personality. Therefore healing the Addiction Memory is challenging and time consuming.

According to Leshner (1997) in addictions the most effective treatment approaches include biological, behavioral, and social-context components. Among the pharmaco-therapeutic methods Sittambalam, Vij, and Ferguson (2014) highlight Suboxone as an effective treatment method for heroin addiction and as a viable outpatient therapy option. In addition they recommend individualized treatment plans and counseling for maximum benefits.

Carroll & Onken (2005) argued that Cognitive behavior therapy, contingency management, couples and family therapy, and a variety of other types of behavioral treatment have been shown to be potent interventions for several forms of drug addiction. Kauer & Malenka (2007) suggest that reversing or preventing drug-induced synaptic modifications such as mesolimbic dopamine system is one of the key ways to treat addictions.

Gould (2010) stated that from a psychological and neurological perspective, addiction is a disorder of altered cognition. Restoration of altered cognition would be essential in working with the addiction memory. von der Goltz and colleagues (2009) conjectured that disruption of drug-related memories may help to prevent relapses. Growing evidence from preclinical and clinical studies concur that specific treatments such as extinction training and cue-exposure therapy are effective (von der Goltz & Kiefer, 2008).

Recent researches suggest that EMDR is a potent therapeutic method to treat addictions. Addiction memory could be considered as a form of an unprocessed memory. Unprocessed memories stored in networks that govern explicit and implicit memories. EMDR helps to process unprocessed memories stored in networks. EMDR involves the transmutation of dysfunctionally stored experiences into an adaptive resolution (Solomon et al., 2008).

EMDR reprocessing sessions promote an associative process that clearly reveals the intricate connections of memories that are triggered by current life experiences (Shapiro, 2014). EMDR may be used to ameliorate the effects of earlier memories that contribute to the dysfunction, potential relapse triggers, and physical cravings. In addition, EMDR is used to incorporate new coping skills and assist in learning more adaptive behaviors (Shapiro et al. 1994).

Wide arrays of experimental studies are supportive of a working memory explanation for the effects of eye movements in EMDR therapy (de Jongh et al., 2013). EMDR therapy is guided by the adaptive information processing (AIP) model (Shapiro, 2014). Levin, Lazrov & van der Kol,k (1999) found increased activation of the anterior cingulated gyrus and of the left frontal lobe after 3 sessions of EMDR treatment. Brain scans have clearly demonstrated pre-post changes after EMDR therapy, including increases in hippocampal volume, which have implications for memory storage (Shapiro, 2012).

As reviewed by Andrade and colleagues (1997) EMDR reduces the vividness of distressing images by disrupting the function of the visuospatial sketchpad (VSSP) of working memory. Cecero& Carroll (2000) considered drug cravings as a form of disturbing thoughts and they used EMDR to reduce cocaine cravings.

Young, Zangwill, and Behary, (2002) proposed combination of Schema-Focused Therapy (SFT) and Eye Movement Desensitization and Reprocessing (EMDR) would give effectual results processing dysfunctional memories. According to Young , Klosko & Weishaar (2003) Schema-Focused Therapy is an integrative form of psychotherapy combining cognitive, behavioral, psychodynamic object relations, and existential/humanistic approaches. Schema-Focused Therapy helps to modify individual's maladaptive thoughts about self and others and process the emotions connected with schemas, teach coping skills and break maladaptive behavioral patterns (Young et al., 2003).

Conclusion

Addiction is a chronic, relapsing brain disorder. Addiction related behaviors are complex and these behaviors are strongly connected with the memory system. Formation Addiction Memory helps to maintain the addictive behavior and drug seeking craving. It becomes a component of personality. Therefore working with addiction memory could be challenging. Reduction in maladaptive schema, restoration of drug related altered cognitions help to combat addictions. Pharmacological and Psychological interventions proved to be effective in working with addiction memory. Among the psychological interventions Cognitive Behavior Therapy (CBT) Eye movement desensitization and reprocessing (EMDR) and Schema-Focused Therapy (SFT) seem to be useful in treating addiction memory.

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