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Stimulating neuroplasticity: Mindfulness and mindsight / interpersonal neurobiology in the treatment of co-occurring disorders[1]

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Abstract

Alcoholism, behavioral disorders (compulsive eating or compulsive sexual activity), and Post Traumatic Stress Disorder (PTSD) are disorders that co-occur with high incidence. These co-occurring disorders are complex conditions which require coordinated and integrated treatment plans in which medication, psychotherapy, and 12 Step programs may be implemented concurrently to minimize the risks of relapse. A review of the literature suggests that mindfulness based therapies, or the novel therapeutic approach known as mindsight arising in the developing field of interpersonal neurobiology may serve as impactful components of integrated plans to treat these co-occurring disorders. All mindfulness-based approaches appear to stimulate neuroplasticity (i.e. development of more complex neural networks), resulting in less rigid, or less chaotic, more resilient behavior and affect regulation, thus reducing the probability of relapse. Several potential areas for future research are suggested.

I
Neurological and Physiological Observations for Three Identified Disorders

Sometimes you read something, and you mentally bookmark it. Later you realize that the reading shares characteristics with other seemingly unrelated topics you have read. These shared characteristics might not have been immediately obvious to you, but their relatedness calls you to explore further. So it is in this instance.

This review paper springs from my delving into several independent source works, all reporting observations of the following clusterings: alcoholism, behavioral addictions such as compulsive overeating or sexual addiction, and trauma co-occur with great frequency. Treatment of one addiction of several co-occurring addictions likely will be ineffective long term without an integrated treatment approach addressing all addictions. One clinical approach whose effectiveness is being studied with greater frequency, and which shows promise, as clinical resources to treat these co-occurring addictions, are mindfulness based therapies.

First, we may start with the observations from the existing clinical literature that there is a dance that does goes on between trauma, alcoholism and behavioral disorders, such as compulsive sexual behavior and compulsive overeating. This correlation has been frequently reported and analyzed, such as the research and clinical work that comes from author and sexual addiction therapist Patrick Carnes. Carnes, who in *The Betrayal Bond: Breaking Free of Exploitive Relationships*, noted his own process discovering the ubiquity of co-occurring disorders:

"From 1985 to 1990, I directed a team of researchers who followed the recovery of over one thousand sex addicts. This group had a number of significant characteristics, beyond their sex addiction, that made them important to study. First, they had multiple addictions: alcoholism and drug addiction (42 percent); eating disorders, including anorexia (38 percent); and other forms of addictive compulsion, including work, spending and gambling. Further, they had histories of trauma and abuse: sexual abuse (81 percent), physical abuse (72 percent) and emotional abuse (97 percent) " (Carnes, 1997, p. 96). These observations by Carnes at a minimum call for expanding the scope of intake and assessment protocols to ensure proper identification of co-occurring addictions which may then be enfolded within an integrated plan of treatment.

Second, another discrete area of research and clinical work reporting observable clusterings of multiple addictions, may be found in research on trauma and Post Traumatic Stress Disorder (PTSD). There is a cycle of grasping for control and loss of control. Tian Dayton, portraying the research efforts of Bessel Van der Kolk on the long term impacts of traumatic events (Van der Kolk, 1996), has aptly described the cyclical connection between trauma and addiction.

"The research shows that trauma victims attempt to control their internal state of hyperarousal, social withdrawal, emotion pain and anger through the use of substances that quiet their inner struggle and restore a sense of control over their tumultuous inner world. The substance of choice becomes a reliable source of mood management that temporarily masquerades as a restoration of the trauma victim's equilibrium. However, this method of mood

management actually has the effect of denying the trauma victim access to their own internal worlds. The emotional states and signals that would allow them to comprehend and come to terms with their internal struggle are numbed by this method of self-medication. While trauma victims gain the temporary relief they are seeking, they do so at the expense of self-knowledge and the potential for self-mastery" (Dayton, 2000, p. 30).

Dayton describes what becomes a vicious cycle of emotional and psychological pain followed by self-medication, followed by the reemergence of unresolved pain:

"If the trauma issues that lie beneath the desire to self-medicate are not resolved, an addict may lay down one addiction only to pick up another. The addictive process takes over and births a life of its own, rending the trauma victim more and more helpless with each sinister turn of the wheel of addiction. " (Dayton, 2000, pp. 29-30).

Thus, the treatment of only one of several addictions or trauma may and often does result in a deadly spiral into another addiction. The alcoholic with a history of trauma may exhibit a lack of control in other areas of her life, such as compulsive overeating, or compulsive sex activity, or gambling. Again, these observations emphasize the necessity for broad inquiries in intake and assessment, and integrated plans of treatment that encompass all identified additions, and disorders such as PTSD.

Third, along with the observed greater frequency of co-occurring multiple addictions, and the vicious cyclical interdependent nature of their occurrence, there is a new rapidly developing area of research and clinical work on multiple addictions, which is exploring the neurological and physiological correlates of these disorders. For example, Van der Kolk reports how the differentiated structures of the brain may facilitate or inhibit our ability to regulate our emotions, and trauma exacerbates this process.

"A traumatized person does not have access to the left hemisphere of the brain which translates experience into language, therefore, they can't make meaning out of what is happening to them or put it into any context. The right hemisphere evaluates the emotional significance of incoming information and regulates hormonal responses. Traumatized people have been known to have trouble tolerating intense emotions without feeling overwhelmed and thus continue to rely on dissociation [Comment]. This interferes with their ability to utilize emotion as guides for action. Such individuals go from stimulus to response without being able to figure out what upsets them. They overreact, shut down, or freeze." (Van der Kolk, 1996, quoted in Dayton, 2000, p. 31). Being unable to determine what upsets them, the addict may turn impulsively to alcohol, food, or sex to sooth and numb the overwhelming emotions experienced as the result of a traumatic event. But the benefits are short lived, and lead to a progressive spiral, resulting in further lack of control, and negative consequences to the addict.

Fourth, the final cluster of research arises from the collective clinical experiences of a diverse group of practitioners, but all of whom share a common interest in mindfulness based therapies and/or "mindsight", and the developing critical importance of the concept and reality of *neuroplasticity.* Psychiatrist Daniel Siegel describes *neuroplasticity* as the capacity in each of us to create new neural connections and growing new neurons in response to experience (Siegel, 2010). Originally thought to occur only in our youth, we have learned that neuroplasticity may occur throughout our lifespan.

As conceptualized in the developing field of interpersonal neurobiology, the brain is viewed primarily as a social organ, and in the prefrontal cortex the brain seems to create what Siegel refers to as a "me-map" that gives us insight into ourselves, a "you-map" which gives us insight into others, and a "we-map" providing representations of our relationships. The middle portion of the prefrontal cortex coordinates many essential skills, such as regulating the body, attuning to others, balancing emotion, being flexible in our responses, soothing fears, and creating empathy, insight and intuition (Siegel, 2010). Thus, we appear to be hardwired at birth to be connected to one another, but this connection may be lost through alcoholism, traumatic events, food and sex addictions. In addictions, we become trapped, impulsively showing only our ingrained behaviors, our compulsions, and our rigid or chaotic reactive emotional loops.

For example, Siegel's concept of "mindsight" is a kind of focused attention that allows us to look at the internal workings of our own minds without being swept away by our impulses, our compulsions, our addictions. By focusing our attention on our internal world, we are using a surgical scalpel of sorts so that we may resculpt existing neural pathways, stimulating growth of new pathways and neural networks in areas of the brain that are vital to mental health. Through mindsight, Siegel believes that individuals will be better able to balance their emotions, achieving an equanimity that permits us to cope with various stressors in our lives; that achieving internal balance and cohesiveness between brain and body will make us more resilient, enjoying greater health; and that our relationships with others, and ourselves will be improved. This is the hope and promise of developing the skill of mindsight.

The hope and promise of mindsight is premised on one of the most important discoveries in the past 25 years, that how we focus our attention shapes the structure of the brain. For neurons and neural networks, ***what fires together wires together.*** The reflective skills of mindsight activate the neural circuits that create behavioral resilience and well-being that underlie empathy and compassion. Such behavioral resilience permits us to avoid overly rigid emotional responses, and overwhelmingly chaotic emotion responses.

Mindsight is but one conceptualization of the more general class of mindfulness based therapies, which are proving themselves to be most useful in the treatment of a variety of medical conditions, addictions, and psychiatric disorders. This paper shall review the research and clinical work that illustrates the application of mindsight and mindfulness based therapies in the treatment of alcoholism, compulsive overeating, compulsive sexual behavior, and PTSD.

II
The Basics: Alcoholism, Behavioral Disorders, and PTSD

Alcoholism

Definitions

Alcoholism is a primary chronic disease with genetic, psychosocial, and environmental factors influencing its development and manifestation. The disease is often progressive and fatal. Alcoholism is characterized by impaired control over drinking, preoccupation with alcohol, use of alcohol despite significant adverse consequences, and distortions in thinking, such as rigid resistance and denial that one has the disease (Morse, Flavin et al, 1992).

The classification scheme in the DSM-IV-TR manual of the American Psychiatric Association ("DSM-IV-TR") defines Alcohol Dependence (303.90) and Alcohol Abuse (305.00) as Alcohol Use Disorders under the general classification of Substance Use Disorders. Alcohol Dependence criteria would be exhibited by a maladaptive pattern of alcohol use, leading to clinically significant impairment or distress, as manifested by 3 or more of the following criteria at any time in the same 12 months period: tolerance, withdrawal, alcohol taken in larger amounts or over a longer period than intended, a persistent desire or unsuccessful efforts to cut down or control use, great deal of time expended to obtain alcohol, important life activities are given up or reduced because of alcohol use, and use continues despite recurring physical or psychological problem which is exacerbated by alcohol use. Alcohol Abuse criteria would be exhibited by a similar Substance Use Disorders. Alcohol Abuse criteria would be exhibited by a maladaptive pattern of alcohol use, leading to clinically significant impairment or distress, as manifested by 1 or more of the following criteria at any time in the same 12 months period: recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school or home; recurrent alcohol use in situations in which it is physically hazardous; recurrent alcohol related legal problems; and continued alcohol use despite persistent or recurring social or interpersonal problems caused or exacerbated by effects of alcohol use; and also the symptoms have never met the criteria for Alcohol Dependence (DSM-IV-TR, pp. 197-199, 213-214).

Neurology of Alcoholism

The use of alcohol alters the neurochemistry of the prefrontal neocortex that controls reasoning and judgment, and what is referred to often as the reptilian brain, the limbic system, which rules mood and the regulation of emotion. Unlike other psychoactive drugs, alcohol interacts with receptors, neurotransmitters, cell membranes, intracellular signaling enzymes, and including genes (Inaba & Cohen, 2007). Long-term alcohol abuse has more significant profound detrimental effects on neurochemistry and cellular function than most other psychoactive drugs. Alcohol limits the brain's ability to use glucose and oxygen thus killing brain cells in addition to inhibiting message transmission. Chronic high dose use causes direct damage to nerve cells (Inaba & Cohen, 2007).

Neurotransmitter and neural pathway research.

Alcohol affects the neurochemistry both in the higher functioning centers of the neocortex that control reasoning and judgment, and, in the limbic system of the brain that is

associated with the regulation of emotion and mood (Inaba & Cohen, 2007). Unlike most other psychoactive drugs, which affect only a few specific types of neurotransmitters or receptors, the effects of alcohol are ubiquitous. Alcohol has reported impact on receptors, neurotransmitters, cell membranes, intracellular signaling enzymes, and genes (Inaba & Cohen, 2007). For example, alcohol causes the mood neurotransmitter, serotonin, to be released initially elevating mood, but then serotonin is depleted with excess use, resulting in depression. Alcohol also induces the release of dopamines and norepinephrines increasing pleasure, as well as endorphins and anandamides, which enhance alcohol's reinforcing, effect (Columbo Serra, Vacca et al., 2005). Alcohol also results in glutamate release, and reduces excitatory neurotransmission at NMDA receptor sites (subtype of glutamate receptors) (Stahl, 2000). Finally, Alcohol causes GABA, which is the primary inhibitory neurotransmitter in the brain, to enhance neurotransmissions at the GABA-A neural receptor – resulting in the lowering of psychological inhibitions (See e.g. Blume & Zilberman, 2005).

Neural network degradation.

Chronic high dose use of alcohol causes direct damage to neural networks. Additionally, alcohol induced malnutrition may also indirectly injure brain cells and disrupt brain chemistry. Dementia, faulty memory, disorientation and poor problem solving ability are all associated with the chronic heavy use of alcohol.

One of the most serious consequences of heavy drinking may be the onset of *Wernicke's Encephalopathy* resulting directly from the brain damage, arising from alcoholism and a thiamine (Vitamin B1) deficiency. The symptoms range from delirium, imbalance, visual problems, and impaired capability of coordinating movement of the lower extremities. Alcoholics suffering from *Wernicke's Encephalopathy*, and exhibiting prolonged thiamine deficiency often develop *Korsakoff's Psychosis* whose symptoms include disorientation, memory failure, and repetition of false memories (Johnson & Ait-Daoud, 2005).

Frequent Co-Occurring Disorders

Most alcohol abusers use other drugs (Substance Abuse and Mental Health Services Association [SAMHSA] [*Results from the 2010 National Survey on Drug Use and Health: Summary of National Findings.]*, 2011).[2] Approximately 32% of alcohol abusers are also reported concurrent abusers of illicit drugs. Less prevalent in the literature is the study of the co-occurrence of alcoholism and the several behavioral disorders, such as compulsive eating disorders, sexual addictions, or gambling addictions.

Behavioral Disorders

Definitions

Binge Eating Disorder (BED). Repeated episodes of uncontrollable eating binges in the absence of inappropriate compensatory behavior (APA, 2000; Mitchell *et al.* 2008). Binger eaters eat more rapidly than usual when binging, eat when not physically hungry, eat until they

[2] http://www.samhsa.gov/data/NSDUH/2k10NSDUH/2k10Results.htm#1

are physically uncomfortable, and experience guilt, depression, embarrassment and significant distress due to their binge eating. BED remains a research diagnosis at the present time, and is categorized formally as a form of Eating Disorder Not Otherwise Specified (ED-NOS, APA, 2000). BED may be seen as a maladaptive attempt to regulate emotion through behavior, especially aversive aspects of experience.

Excluded Anorexia Nervosa/Bulimia. Anorexia Nervosa (AN) is a diagnosis whose hallmarks are extreme weight loss, an overriding fear of weight gain, undue influence of body weight/type on evaluation of self-worth, and absence of 3 or more consecutive menstrual cycles in women (APA, 2000) Bulimia Nervosa (BN) is characterized by recurring episodes of binge eating ***with*** recurring inappropriate behaviors to avoid weight gain, such as vomiting, fasting, excessive exercising, or the misuse of laxatives or other medications. (APA, 2000) The American Psychiatric Work Group on Eating Disorders discovered that AN occurs with the least frequency (0.5 – 3.7% Women), followed by BN (1.1 – 4.2% Women), and that BED is more common than AN and BN with reported rates as high as 5% of the population.

Sexual Addiction (SA). Patrick Carnes in his analysis of the many forms of sexual addiction has pointed to the parallels between these two behavioral disorders, SA and eating disorders, which may be exhibited by polar extremes of deprivation and avoidance – AN and sexual anorexia, or, excess and indulgence - BN and sexual bulimia (Carnes, 1997). Both sexual addiction and BED may be seen as ineffective attempts to self-regulate emotions, particularly aversive unpleasant emotional states.

Persons suffering from eating disorders typically display rigidity and persistent distorted perceptions about their eating patterns, perfectionism, and body appearance related thinking (Herman & Polivy, 1980). These perfectionists hold unrealistic unattainable eating, weight, and shape related goals, and are known to experience profound feelings of shame (Swan & Andrews, 2003). Overwhelming cyclical patterns of feelings of shame are also a hallmark of persons suffering from the numerous illustrated forms of sexual addiction (Carnes, 1997).

Neurology of Eating Disorders.

The analysis of the differential neurological characteristics associated with AN, BN, and BED is just beginning, The number of such studies are few, but increasing rapidly as Magnetic Resonance Imaging improves as a tool to study underlying neurological correlates of these behavioral disorders.

In one notable recent study, patients diagnosed with BED or BN were shown photos of food after an overnight fast during functional Magnetic Resonance Imaging (fMRI). The fMRI provided neural imaging of specific neural activation in discrete areas of the brain (Schienle *et al*, 2008). The BED patients displayed an enhanced reward sensitivity and showed stronger medial orbitofrontal cortex (OFC) responses while viewing food pictures than all other patients in the study. The bulimic patients displayed greater arousal, anterior cingulate cortex (ACC) activation, and insula activation than the other groups. This is the first study showing differential neural brain activity to visual food stimuli in patients with BED and patients with BN. A more recent limited exploratory study using fMRI technology has shown differential neural responses between women patients diagnosed with AN, and another group diagnosed as BN, exposed to visual food stimuli (Brooks *et al*. 2011). These studies overall suggest varying degrees of top-

down cognitive control possibly impinged by activations of reward/somatosensory regions of the brain.

Frequent Co-Occurring Disorders

Patrick Carnes in his seminal work on sexual addiction, *Contrary to Love – Helping the Sexual Addict,* notes that addictions do not always progress linearly, but are complex and interactional. Compulsive behaviors may disappear and reappear in another form (Carnes, 1989).

"…[T]he energy from one addiction can flow into another. The energy from de-escalating sex addiction can be transformed into compulsive working. Or the escalation of sexual compulsivity can be matched simultaneously by increases in compulsive eating or drinking. "

(Carnes, 1989, p. 66). Thus treatment of eating disorders must involve an assessment and possible treatment for all diagnosed concurring disorders.

PTSD

Definitions

Post-traumatic stress is not simply a single diagnosed disorder but rather consists of a spectrum of traumatic stress disorders: Acute Stress Reaction (ASR), Acute Stress Disorder, and PTSD. Acute Stress Disorder (ASD) and PTSD are defined in the DSM-IV-TR, ASR is not. An individual diagnosed with ASD must have experienced trauma(s), and will have experienced symptoms lasting more than two days, but less than one month after exposure to the trauma and exhibits re-experiencing, avoidance, increased arousal, and at least three out of five dissociative symptoms. An individual diagnosed with PTSD will significant symptoms continuing more than one month after initial exposure to a traumatic even that has caused the individual significant distress or impairment in social, occupational, or other important areas of functioning. Individuals with PTSD may exhibit persistent re- experiencing of the traumatic event(s), persistent avoidance of stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal, which did not occur before the trauma. PTSD can also have a delayed onset, which is described as a clinically significant presentation of symptoms at least 6 months after exposure to trauma. (DSM-IV-TR)

Neurology of PTSD

"PTSD may be associated with stable neurobiological alterations in both the central and autonomic nervous systems. Psychophysiological alterations associated with PTSD include hyper-arousal of the sympathetic nervous system, increased sensitivity and augmentation of the acoustic-startle eye blink reflex, and sleep abnormalities. Neuropharmacologic and neuroendocrine abnormalities have been detected in most brain mechanisms that have evolved in coping, adaptation, and preservation of the species. These include the noradrenergic, hypothalamic-pituitary-adrenocortical, serotonergic, glutamatergic, thyroid, endogenous opioid, and other systems. Structural brain imaging suggests reduced volume of the hippocampus and anterior cingulate. Functional brain imaging suggests excessive amygdala activity and reduced

activity of the prefrontal cortex." www.ptsd.va.gov/professonal/pages/ptsd-overview.asp. These reported findings at the NCPTSD website are reviewed and analyzed extensively in Friedman, Charney and Deutch's *Neurobiological and clinical consequences of stress: From normal adaptation to PTSD* (Friedman et al, 1995).

Frequent Co-Occurring Disorders

A 2009 Department of Veterans Affairs' Conference (VA) report on PTSD and Substance Abuse stated that approximately one third of veterans seeking treatment of substance abuse disorders also met the criteria for PTSD. Further, in a 2008 study by the VA, almost 22% of veterans diagnosed with PTSD also received a substance abuse diagnosis. The Conference reported further noted that the frequency of such co-occurring diagnoses continues to increase. Co-occurring diagnoses of substance abuse disorders and PTSD are also associated with more severe PTSD symptoms, and the rates of co-occurrence for men are significantly higher: men diagnosed with PTSD are five times more likely to have a substance abuse disorder when compared with the general population. *Report of (VA) Consensus Conference: Practice Recommendations for Treatment of Veterans with Comorbid Substance Abuse and PTSD.* (2009) National Center for PTSD. White River Junction, VT ("2009 VA Conference Report").

Interestingly, improvement in PTSD symptoms is related to overall improvement in substance abuse symptoms, but this relationship is not reciprocal – improvement in substance abuse symptoms does not necessarily relate to an improvement in PTSD symptoms. Thus, while substance abuse disorders and PTSD may be treated concurrently, it appears that primary therapeutic focus must be on resolution of PTSD issues, which may greatly improve results in substance abuse treatment (2009 VA Conference Report).

III
Diagnosis and Assessment of Co-Occurring Disorders

Mindfulness Psychometric Assessment

The Mindful Attention Awareness Scale (MAAS) is a widely used measure of mindfulness as a trait, that is, measuring the application of mindfulness in one's life generally. MAAS has been applied mainly to homogeneous populations of Caucasian adult, but the application of MAAS to other diverse populations remains to be examined fully. MAAS appears to hold up as a measure of mindfulness for a culturally distinct population – Chinese high school students (Black et al, 2011).

The Freiburg Mindfulness Inventory (FMI) is a 30 item written instrument intended to assess present moment observation and openness to negative experience in experienced meditators (Wallach et al., 2006). Higher FMI scores are correlated with increased private self-awareness and self-knowledge, decreased dissociation, less reported psychological distress.

The Toronto Mindfulness Scale (TMS) attempts to assess the attainment of a mindful state in an immediately prior occurring meditation session (Lau, 2006). TMS examines both a curiosity factor and a decentering factor. The curiosity factor looks at interest and curiosity about inner experiences (e.g. "I was curious to see what my mind was up to, moment to moment."), while the decentering factor examines identifying awareness of experiences without identifying with them or being carried away by them ("I experience myself as separate from my changing thoughts and feelings.).

The Five Factor Mindfulness Questionnaire (FFMQ) attempts to segregate five different facets of the mindfulness experience: (1) observing, (2) describing with words, (3) acting with awareness, (4) nonjudging of inner experiences, and (5) nonreactivity of inner experiences. The intention is to better understand the skills that facilitated, cultivated and refined through the practice of mindfulness meditation (Baer et al, 2007). Administering the FFMQ groups of longstanding meditators and non-meditators resulted in significant correlations between higher FFMQ scores and extent of meditation experience (4 of the 5 factors), as well as feelings of well-being, and negative correlations with reports of psychological distress.

Of the four assessment tools described above, it appears that the FFMQ would be best suited to analyze and sort among the several facets of mindfulness, and to determine which of these facets contribute most to self-reports of well-being, less fear of emotion, and resilient psychological functioning.

IV
Pharmacological Treatment of Three Identified Disorders

Treatment of Alcoholism

Current Identified Psychopharmaceutical Treatment Regimens

The Food and Drug Administration (FDA) has approved naltrexone and acamprosate for the treatment of alcohol dependencec(Bankole et al., 2008). The most promising pharmacological agents appear to be those that impact the functions of opioids, glutamate with or without GABA, and serotonin.

Naltrexone's primary pharmacological effect upon alcohol consumption is to block the mu-opioid neural receptor, as well as the release of beta-endorphins in the brain. Naltrexone therapy studied in humans has produced mixed results but in general this medication may reduce craving for alcohol and its consumption, particularly with individuals with high prevalence of alcoholism in their families. Use of acamprosate in the treatment of alcohol dependence has also produced mixed results (Bankole et al. 2008). European studies have show the drug to produce benefits to alcohol dependent individuals with increased levels of anxiety, physiological dependence, negative family history, late age onset, and female gender. These results have not been replicated in studies in the United States. Thus, acamprosate remains an FDA approved drug but its efficacy remains limited. Additionally the drug topiramate has been show to decrease alcohol consumption at low dosages (200 mg/day), but there are reported side effects, and anorexia is one such effect. An individual with co-occurring disorders of alcohol dependence and BED would not be the ideal candidate for topiramate therapy (Bankole et al., 2008).

Treatment of BED and/or SA

Current Identified Psychopharmaceutical Treatment Regimens. Sibutramine is a serotonin and norepinephrine reuptake inhibitor[3] has been shown in short and long term studies to be effective in promoting maintaining weight loss in obese patients who have BED, and reducing eating pathology(Wilfley *et al.* 2008). Similarly, topiramate, an anti-seizure medication used in the treatment of epilepsy also has been shown to be effective in the short term treatment of BED (Arbaizar & Gomez-Acebo, 2008).

Treatment of PTSD

Current Identified Psychopharmaceutical Treatment Regimens

The United States Department of Veterans Affairs' National Center for PTSD (NCPTSD) provides leading research and clinical work on PTSD and traumatic stress. NCPTSD has a wealth of information for the mental health professionals who deal with those suffering from traumatic stress and PTSD, including information regarding psychopharmacological agents used in treatment plans.

[3] A class of compounds typically used in the treatment of depression.

Whereas original clinical work in PTSD involved demonstrating in limited trials the efficacy of older agents like tricyclic anti-depressants in the treatment of PTSD, more recent research has focused on the selective serotonin reuptake inhibitors (Lindley, 2002). The serotonin reuptake inhibitors have less side affects, and are much better tolerated by clients. These drugs include Zoloft (50-200 mg daily), Prozac (20-60 mg daily), Paxil (20-60 mg daily), Celexa (20-60 mg daily). Additionally, the NCPTSD reports the use of mood stabilizing anticonvulsants, such as valproic acid or Depakote, carbamazepine or Tegretol, gabapentin or Neurontin. Other reported classes of drugs used in the treatment of PTSD include the hypnotics (Trizadone) or anxiolytics (Lindley, 2002). An excellent summary of medications is found at NCPTSD in the Clinician's Guide to Medications for PTSD (www.ptsd.va.gov/professional/pages/clinicians-guide-to-medications-for-ptsd.asp).

V
Mindfulness, Mindsight and Interpersonal Neurobiology in the Treatment of Three Identified Disorders

Definitions

Mindfulness

One of the premier clinical researchers in the field of mindfulness --John Kabat-Zinn, has spoken of mindfulness as the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment to moment (Kabat-Zinn, 2003). Others have given a more simply stated definition -- that Mindfulness is: (1) awareness, (2) of present experience, (3) with acceptance (Germer et al. 2005).

Mindfulness is at its core conceptually a practice, and it is essential to remember that Mindfulness is not merely a concept. Mindfulness is meditative practice, and at its heart is ancient Buddhist psychology, a non-striving orientation towards the world that has evolved as an effective therapeutic tool in western psychology and psychotherapy.

Mindfulness is reported as one of the most widely used, lasting and clinically examined disciplines in the world today. Approximately 10 million people in the United States meditate regularly, and are joined by hundreds of millions throughout the world (Deurr, 2004; Didonna, 2009).

In cognitive psychology there is a strong distinction drawn between bottom-up and top-down information processing (Eysenck & Keane, 2000). Mindfulness meditation is an example of bottom-up information processing. Mindfulness meditation focuses attention directly on the stream of sensory data bombarding each of our senses – visual information, smells, sounds, tastes, touch, and all that arises in our thoughts and images in our minds. The meditation practitioner is invited to abandon all conceptual pretensions, stories, narratives, and simple examine and experience directly the sensory flow itself, as it is, for what it is. Meditation allows us to see the subtleties of sensory experience – the sensory bottom underlying our cognitive conceptual top processing.

Awareness of this sensory experience with acceptance comes with repeated practice. The practice most often involves a formal daily meditation practice for the therapist practitioner, periodic retreats, and the application of mindfulness techniques throughout the day. The mindful therapist is typically deeply rooted in, and committed to meditative practice.

What mindfulness practice is not is: having a blank mind, becoming emotionless, withdrawing from life, seeking bliss, or escaping pain. Rather, mindfulness practice allows what is experienced through the senses to be viewed as it is every changing, constantly flowing. Mindfulness practice integrated in the therapeutic relationship, such as Daniel Siegel's mindsight, provide clients and therapist an invaluable tool, to become more aware of internal processes, negative emotions, and overwhelming impulses, to escape the compulsive addictive driving force of these sensations. Mindfulness practice or mindsight is an integrative force for

clients – a process leading from increasing awareness, to acceptance, and ultimately to greater interconnections with others. Mindfulness practice feeds the collective social being.

Mindsight/Interpersonal Neurobiology

Interpersonal neurobiology is the study of how we attach and grow and interconnect throughout life, and recognizes the fundamental notion that the brain is a social organ (Cozolino, 2006).

> "This complex, magical and sometimes scary phenomenon we call human relationships is all around us. How the connections occur, what impact they have on us, and how relationships change the architecture and functioning of the brain are the essential questions of interpersonal neurobiology." (Cozolino, 2006, p. 19).
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> …
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> "*The individual neuron or a single human brain does not exist in nature.* Without mutually stimulating interactions, people and neurons wither and die. In neurons this process is called *apoptosis*; in humans it is called depression, grief, suicide. From birth until death, each of us needs others who seek us out, show interest in discovering who we are, and help us feel safe."

(Cozolino, 2006, p. 11).

Psychiatrist Daniel Siegel is the novel thinker and principal creative force behind the concept and process we know as mindsight. (Siegel, 2010; See Appendix, pp. 259-263) Siegel's formulation postulates that there exists a triangle of well-being in our lives: (1) relationships, (2) mind and (3) brain. Relationships are the way energy and information is shared as we connect and communicate with each other. The brain refers to the physical mechanism through which this information and energy flows, and the mind is the process that regulates the flow of energy and information.

Mindsight refers to the process that permits us to monitor and modify the flow of information within the triangle of well-being. Siegel defines well-being as occurring when a system is *integrated.* Siegel focuses his attention on systems open to outside influences, capable of becoming chaotic, and comments that when such a systems are integrated they move in ways that are most flexible and adaptive. For Siegel, integrated systems are flexible, adaptive, coherent, energized, and stable.

The interconnection between the mind and brain is key to the process of integration:

> " The focus of our attention directs the flow of energy and information through particular neural circuits. In this way we can say that the mind uses the brain to create itself. Attention activates specific neural pathways and lays the foundation for changing the connections among those firing neurons by way of a

fundamental process called neural plasticity." (Siegel, 2010; See Appendix, pp. 259-263)

Furthermore, Siegel expands on the impact of the connections between mind and brain as follows:

> "The reflective practice of focusing internal attention on the mind itself with *openness, observation and objectivity* – the essentials of a strengthened *mindsight lens*—likely promotes the growth of these integrative middle prefrontal fibers [in the middle prefrontal cortex]. We use the acronym *SNAG* to denote how we *Stimulate Neuronal Activation and Growth*. This the foundation of neuroplasticity, of how experiences – including focus of our attention – transform brain structure. Mindsight SNAGs the brain toward integration, making it possible to intentionally promote linkage and differentiation within the various domains of integration." (Siegel, 2010; See Appendix, pp. 259-263)

But what is the end result? How does Mindsight effect a person's ability to weather life's emotional challenges - whether emotional frigidity or an overwhelming cascade of emotions? As Siegel notes – brain structure changes, and neural integration may occur in many dimensions including: (1) body regulation, (2) attuned communication, (3) emotional balance, (4) fear modulation, (5) response flexibility, (6) insight (7) empathy, (8) morality, and (9) intuition. These functions are predominantly associated with the middle prefrontal cortex, but in the context of interpersonal neurobiology these functions are what interconnect us all, they are the hallmarks of the social brain.

More importantly the practice of meditation and the process of Mindsight widens what Siegel describes as a person's *Window of Tolerance.* Windows of Tolerance are the bands of tolerable levels of arousal in which a person may attain and retain in an integrated system flow that is flexible, adaptive, coherent, energized and stable (FACES). Widened Windows of Tolerance create resilience in a person's life, and narrowed Windows create information flow outside tolerable boundaries resulting in either chaotic or rigid behavior. (Siegel, 2010; See Appendix, pp. 259-263)

Most importantly, integration occurs not only within the brain, but also in interpersonal relationships. For Siegel, it is "the attuned communications among people honored for their differences and then linked together to become the "we" that brings neuroplasticity to each member of the relationship. How this comes about is through specialized "mirror" neurons which are the antenna which pick up information about the intentions and feelings of each other – through our mirror neurons we couple our internal states and feelings with what we see in someone else. In the context of the therapeutic relationship, it is the resonance and dynamics between therapist and client, stemming from the increased firing of these specialized mirror neurons, which begins to permit attuned communication between the client and therapist. If client is attuned to the therapist, the client will feel he is truly *seen* by the therapist (Siegel, 2010, p. 226).

However, one must know oneself before one may truly know another.

> "This is the essence of mindsight: We must look inward to know our own internal world before we can map clearly the internal state, the mind, of the other. As we grow in our ability to know ourselves, we become receptive to knowing each other. And as a 'we' is woven into the neurons of our mirroring brains, even our sense of self is illuminated by the light of our connection. With internal awareness and empathy, self-empowerment and joining, differentiation and linkage, we create harmony within the resonating circuits of our social brains." (Siegel, 2010, p.226).

Alcoholism and Mindfulness

MBRP

In a 2009 randomized-controlled trial at the University of Washington, evaluating the feasibility an initial efficacy of an 8-week outpatient MBRP program, 168 adults with substance use disorders who had recently completed intensive inpatient or outpatient treatment were administered pre-intervention, post-intervention, and 2 and 4 months post-intervention assessments. This trial study demonstrated the feasibility of MBRP by consistent homework compliance, attendance, and participant satisfaction. Base levels of continuing substance use for the MBRP treatment group were significantly lower than those who received treatment as usual. MBRP was demonstrated to be an effective aftercare approach for individuals who have recently completed an intensive treatment for substance use disorders (Bowen, S. et al. , 2009).

The initial work of the pilot study described above has been formalized into a structured protocol with session-by-session agendas containing practices and worksheets integrating the principles of standard cognitive behavioral therapy (CBT) with mindfulness meditation practices (Bowen et al., 2011). A Clinician's Guide for facilitating MBRP therapists has been published.

Behavioral Disorders and Mindfulness

Current Research re Mindfulness Based Treatment of BED. Persons with BED show a marked deficiency in identifying emotions accurately, managing their emotions, and using them adaptively (Bydlowski *et al.,* 2005). If emotions are perceived as toxic, pathological, then individuals will tend to binge eat, use substances, or dissociate in an attempt to assert control, to shut down, or shut the emotions off (Leahy, 2002). When presented with unpleasant emotions, a binge eater has fewer adaptive emotional regulatory strategies, has more difficulty accepting and managing distress, and may use compulsive binge eating and compulsive behavior to produce a more positive emotional state (Overton *et al,* 2005).

In the recently published *Clinical Handbook of Mindfulness* (Didonna, (Ed.), 2009), Ruth Wolever and Jennifer Best discuss four mindfulness based therapeutic approaches, which have been assimilated within traditional cognitive-behavioral theory (Wolever & Best, 2009).

First, Dialectical Behavior Therapy (DBT) is designed to help patients cultivate core mindfulness abilities, as wells as emotional regulation, interpersonal effectiveness, and distress tolerance skills (Linehan, 1993). DBT is the most extensively studied mindfulness based approach to treating eating disorders. In a first single patient study, and several larger DBT

group studies, abstinence from binge eating was significantly greater following DBT therapy, and, DBT completers reported less weight, shape, and eating concerns, and a weaker urge to eat (Telch, Agras & Linehan, 2001).

Second, Acceptance and Commitment Therapy (ACT) holds as its core philosophy that maladaptive binge eating behaviors are purposely or habitually performed to reduce or control aversive experience, such as self-criticism, negative emotions, and painful body sensations (Hayes *et al. 1999).* Although ACT has been applied broadly in diverse clinical settings, case studies applying ACT to eating disorder populations remain to be published in the literature.

Third, Mindfulness Based Cognitive Therapy (MBCT) is a clinical extension of Mindfulness-Based Stress Reduction (MBSR). MBCT does not challenge the content of experience but rather challenges the individual to alter the context of experience by the practice of acceptance and letting go. Furthermore, MBCT relies on more traditional mindfulness strategies, and less on problem-solving or assertiveness skills (Baer et al., 2005).

Finally, Mindfulness-Based Eating Awareness Training (MB-EAT) was the first mindfulness-based approach designed for treatment of eating disorders (Kristeller & Hallett, 1999). In a 6-week study, MB-EAT resulted in self-reports of reduced binge eating binge, severity, anxiety and depression. Furthermore, improvements in binge eating were also correlated with improvements in mindfulness, eating control and signals of satiety (Kristeller & Hallett, 1999).

Current Research re Mindfulness Based Treatment of SA.

There is yet to develop a body of research that systematically and critically examines the use of mindfulness based therapies to treat sexual addiction. However, mindfulness has been demonstrated an effective therapy in several related areas, such as anxiety reduction and depression. Sexual addictions are mediated by anxiety reduction, and mindfulness meditation also has been shown to reduce anxiety (Kabat-Zinn et al., 1995). Sexual addictions also can be described as a way of coping with depression, burying painful feelings of shame and self-hatred, and mindfulness meditation also has been shown to have an anti-depressant impact (Carnes, 1991).

Further, as discussed previously there are parallels between the manifestations of eating disorders, and the range of sexual addictive behaviors. To the extent that mindfulness based therapies are effective in the treatment of binge eating disorder, we might expect a similar result with compulsive sexual behavior through mindfulness meditation techniques.

PTSD and Mindfulness

Current Research re Mindfulness Based Treatment of PTSD

Mowrer's two-factor theory is a widely accepted model that explains how PTSD first develops and is thereafter maintained. Mowrer asserts that PTSD is a function of both classical conditioning and instrumental learning (Mowrer, 1960). Fear is learned through classical

conditioning first, and then avoidance behaviors are learned through instrumental learning to avoid the negative conditioned cues.

Experiential avoidance occurs when an individual is unwilling or hesitant to experience unpleasant thoughts, feelings or emotions (Hayes et al., 1996). For those with a history of sexual abuse, these trauma survivors may avoid experiential distress by a variety of means, including substance abuse or intimacy avoidance (Polusny & Follette, 1995). Experiential avoidance is a strategy to avoid unpleasant thoughts and feelings associated with prior trauma. Experiential avoidance becomes relevant in treatment when the strategies adopted by the individual in whatever form interfere with the individual's well-being and ability to live life fully.

Current treatment schemes for trauma and PTSD have emphasized reducing trauma symptoms (Becker & Zayfert, 2001). Exposure therapy that is based on Mowrer's two-factor theory has been shown to be most effective in treatment of trauma. Exposure therapy presents the individual with unpleasant stimuli, activating the individual's fear structure. The therapist is a pilgrim with the individual on this emotional journey, providing guidance and insight, with the goal of permitting a change in the person's relationship to the unpleasant thoughts and feelings associated with the trauma memories. The process is one of emotional integration, with the individual creating more accurate narratives about the trauma. Exposure therapy may demonstrate to the individual that anxiety is not constant, and that experiencing anxiety need not lead to overwhelming loss of control (Foa & Meadows, 1997).

An individual's capacity to self-regulate emotions appears functionally related to mindfulness, and the use of mindfulness can be an effective strategy to manage distress (Brown & Ryan, 2003). "Mindfulness encourages acceptance rather than avoidance and can provide a tool in facilitating exposure to feared stimuli. We do not consider mindfulness to function as a form of control but rather to increase psychological awareness and flexibility when responding to emotional experiences." (Follette & Vijay, 2009, p. 310)

Follette and Vijay describe an integrative behavioral approach to treat trauma and posttraumatic distress which uses the experiential avoidance paradigm described above, but which appears less rigid and more inclusive theoretically. In their integrative approach the first stage of therapy has a primary goal of assisting an individual in creating or enhancing skills that will be useful in the difficult work facing the individual emotionally (Follette & Vijay, 2009). This may include learning to let go of the agenda of controlling internal experiences, and improving the accurate expression of emotions. In later stages of therapy, the focus shifts to developing a sense of self-acceptance in the individual, which may be difficult in trauma victims, but mindfulness can be effective in working towards the goal of self-acceptance. Further, the therapeutic relationship can be an agent for change, targeting clinically relevant behaviors such as difficulty in developing a sense of trust and safety in relationship to another person, and reinforcing appropriate behaviors in the client in the safety of a session. Through this a repertoire is built as the therapist and individual act in a resonant alliance, and the client learns to let go of old ideas and strategies of control and avoidance. Mindfulness remains at the heart of this work, bringing the individual in contact with the present moment, and beginning the work of moving their life in directions they value (Follete & Vijay, 2009).

VI
Conclusions

Recommendations for Future Research

There are several recommendations for future research based on the review of existing research in the literature.

First, in assessments for co-occurring disorders and in subsequent treatment, identification and treatment of distress resulting from traumatic events ought to be given a primary focus. Unless the client resolves trauma issues first, the efficacy of treatment for co-occurring behavioral disorders, or alcoholism will be impaired.

Second, an additional line of inquiry might evaluate the use of the four mindfulness-based treatments used in the treatment of BED, as applied directly to the treatment of sexual addictions.

Finally, another line of inquiry may explore and evaluate the efficacy of short-term mindfulness based interventions in outpatient, or community based settings.

The above research would expand the scope and ubiquity of mindfulness based therapies as a tool in the effective treatment of widely differing disorders.

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