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Empirical Identification of Axis I and Axis II Symptom Subtypes of Sex Addiction Using Latency Profile Analysis

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The University of Southern Mississippi

EMPIRICAL IDENTIFICATION OF AXIS I AND AXIS II SYMPTOM SUBTYPES
OF SEX ADDICTION USING LATENT PROFILE ANALYSIS

by

Maria Isabel Nino de Guzman

Abstract of a Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

August 2012

ABSTRACT

EMPIRICAL IDENTIFICATION OF AXIS I AND AXIS II SYMPTOMS SUBTYPES OF SEX ADDICTION USING LATENT PROFILE ANALYSIS

by Maria Isabel Nino de Guzman

August 2012

Sexual addiction is a disorder characterized by lack of control over sexual urges, pathological relationships and lack of intimacy, mood-altering experiences, and adverse consequences that tend to be disregarded by the person affected. Although not classified as a mental disorder in the Diagnostic Statistical Manual-IV-TR (DSM-IV-TR, APA, 2000) this distressful sexual manifestation is increasingly recognized as a clinical and public health problem. Previous studies suggest commonalities with addictive disorders and maladaptive personality traits. The purpose of the current study was to analyze personality configurations of individuals diagnosed as sex addicts and uncover specific subtypes or profiles associated to sexually addictive behaviors. The study used archival data from 222 individuals, mostly males, treated at a residential program for sex addiction. Latent Profile Analysis (LPA) was utilized to uncover latent classes by using scale scores from the Millon Clinical Multiaxial Inventory-III (MCMI-III) and the Personality Assessment Inventory (PAI). The statistical analyses identified four latent classes for Axis I and five classes for Axis II corresponding to homogeneous subgroups of participants, and determined class membership. Findings were followed up with multivariate and univariate analyses of variances and discriminant analysis to better understand qualitative and quantitative

differences among groups. Results revealed significant relationships between class membership and symptoms of Axis I and Axis II disorders measured by other screening tests: the Sexual Addiction Screening Test-Revised (SAST- R), the Eating Disorder Inventory (EDI), Post Traumatic Stress Inventory (PTSI), and the Brief Symptom Inventory (BSI), as well as severity of sexually addictive behaviors, and specific types of behavioral manifestations of sexual addiction as measured by the Sexual Dependency Inventory (SDI-R). No relations were found with legal consequences of addictive behavior. Some implications for treatment of sexual addiction were also addressed.

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DEDICATION

To Ricardo and Zulma for their love and for being the sources of strength and inspiration that I needed to walk this path.

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CHAPTER I

INTRODUCTION

Historical evidence of hypersexual behavior can be traced as far back as 2,500 years. Nymphomania, satyriasis, hysteria, Don Juanism, philanderism, sexual dependency, sexual compulsivity, and sexual addiction were some of the names given throughout the centuries to this type of behavior (Groneman, 1994; Orford, 1978). Clinical documentation of excessive and maladaptive sexual behavior was published in the 18th and 19th centuries by Benjamin Rush, Richard Kraft-Ebbing, and Havelock Ellis (Kafka, 2010). A few decades ago increasing evidence of uncontrollable sexual manifestations began to elicit scientific interest, particularly in the United States. At first, these were simply regarded as an extreme within the normal range of sexual expressions. However, Patrick Carnes (1983) identified individuals whose sexual behavior had the following commonalities with typical behavior of substance addictions: lack of control over sexual urges associated with those with pathological relationships, lack of intimacy, mood-altering experiences, and adverse consequences from sexual excesses. This condition was referred to as sex addiction.

Diagnostic Status

It is hard to estimate the current prevalence of sex addiction since people that may be affected become visible only when they seek treatment. Based on a seven-year study of nearly 1,000 patients, Carnes (1991) estimated that sexual addiction may affect between 3% and 6% of the population in the United States. Similar prevalence was reported by Schneider and Irons (2001). The number of

individuals reporting this condition has escalated in the last decade. For example, Leahy (2009) collected three-year data from over 26,000 college and university students and determined that 6% of this population endorsed probable presence of sexual addiction, and 1% reported severe symptoms of sexual addiction.

The National Center for Addiction and Substance Abuse (NCASA) released an estimation of around 17 million Americans suffering with disordered sexual behavior (Carnes, 1996; Coleman-Kennedy, & Pendley, 2002; and Cooper, Delmonico, & Burg, 2004). Carnes (1996) indicated that men report uncontrollable sexual behavior three to four more times than women. However, this trend seems to be changing and lately women report more difficulties with sexually uncontrolled behavior. A study of college students found that 22% of females versus 5% of male participants reported sexual concerns and needed to seek further evaluation and treatment by (Seegers, 2003). The NCASA has predicted a massive expansion of the problem through technology-based media (Cooper, Golden, & Kent-Ferraro, 2002; Cooper, Delmonico, Griffin-Shelley, & Mathy, 2004). More systematic epidemiological research is needed to determine more accurately the prevalence of this problem.

Impending hazards do not only originate in the potential spread of uncontrolled high-risk sexual practices. Public health concerns also arise from potentially adverse consequences of these sexual manifestations, such as non-wanted pregnancies, sexually transmitted diseases, or family disruptions (Longo-Disse, 2006; Bancroft, Janssen, Carnes, Goodrich, Strong, & Long, 2004).

Sexual addiction involves excesses in behaviors that are considered normal at lower frequencies and under certain circumstances such as compulsive masturbation or multiple sex partners. However, it can also entail less normative behaviors; for example sexual fantasies that can be offensive or non-humanizing relationships (i.e., objectifying), or more deviant behaviors such as self-harming behaviors, voyeurism and exhibitionism, and sexual violations, child pornography and rape (Bradford, 1997; Coleman, Miner, Ohlerking, & Raymond, 2001). Given the wide variety of sexual behaviors across individuals empirical research may help identify subtypes of sexual addiction, which may differ in terms of etiology, severity, and consequences of the behavior.

The diagnosis assigned to individuals with sexual addiction within the DSM-III-R nosology was either Sexual Disorder Non Otherwise Specified (1980) or Non-Paraphilic Sexual Addiction in the DSM-III-R (1987). The ICD-10 (World Health Organization, 1992) recognized Excessive Sexual Drive as a category within Psychosexual Dysfunction. No mention of the disorder is found in the DSM-IV (1994), but either Sexual Disorder Non Otherwise Specified or Impulse Control Disorder Not Otherwise Specified from the DSM-IV-TR (2000) is a diagnosis usually assigned to such individuals. The proposed label for sex addiction definition for the prospective DSM-V is Hypersexual Disorder, a category within Sexual Dysfunction. Furthermore, although the category addiction is not considered in the current DSM, the American Society of Addiction Medicine (ASAM) recognizes an addictive sexual disorder (ASAM, 2010).

Sexual addiction was included in past mental disorder classifications, deleted from the last mental health classification, and may be considered again in the prospective version of the DSM-V. Diagnostic classifications identify common pathognomonic signs for all addictions and some studies suggest commonalities with chemically dependent and non-substance related disorders. Empirical information is needed to determine whether this is an addictive, compulsive or inhibitory problem. Aside from classification and distinction from other clinical entities, theory needs to evolve from a better foundation of the disorder.

Significance of the Study

The proposed study aims to obtain clinical information about personality characteristics of individuals clinically identified as sex addicts. Specifically, the purpose is to find relatively homogeneous sub-types based on sex addicts' personality characteristics and psychopathology. Results are discussed in regards to extant theory, focusing on identified personality subtypes, as well as relationships between these and identified personality types and other external variables. Expanding knowledge may help determine the unique characteristics and needs of this clinical population as well as new pathways for treatment. Different theoretical contributions attempt to clarify the nature of the disorder. Some of the main approaches are the sexual addiction model, the sexually compulsivity model, and the impulse dyscontrol model.

CHAPTER II

REVIEW OF LITERATURE

Theoretical Models

Sexual Addiction Model

The American Society of Addiction Medicine (ASAM) conceptualizes addiction as a chronic disease that involves a dysfunctional brain reward processing with altered motivational hierarchies. ASAM states that addiction is not limited to alcohol or substances and involves an individual engaging in compulsive and/or impulsive behaviors for the purpose of reward and/or relief that can be obtained not just with chemicals but with sex, food, or other behaviors. An obsession with reward, cognitive preoccupation, and behavioral persistence occurs in a cyclical pattern of relapse and remission. This cycle tends to repeat despite negative consequences of the behavior. A person with addictive behaviors is unable to stay abstinent in a sustained manner, has limited insight of behavioral and interpersonal problems, and could be behaviorally and emotionally impaired. The disorder is progressive and can result in disability and oftentimes increases risk of premature death (American Society of Addiction Medicine, 2011).

Sex addiction is a clinical term used to describe forms of unrestricted sex with maladaptive consequences. The sexual addiction model developed by Patrick Carnes is a theoretical approach to conceptualize excessive and uncontrollable sexual behaviors. Carnes (1983) identified individuals who complained about a “pattern of out-of control sexual behavior” (p. 12). Such

behavioral pattern seemed to differ both quantitative and qualitatively from normal sexual behavior. Reportedly, severe difficulties with inhibiting sex created difficulties in major life areas. These individuals described cognitions, behaviors and motives that appeared to be driven by sexual urges and were reportedly unable to consider consequences of excesses that were potentially harmful to selves or others.

According to Carnes (1991), drastic mood changes occur in association with excessive sexual activity, similar to mood modifications that occur in response to external substances. The sequence starts with intense preoccupation with sexual fantasies, followed by arousal, excitement, and sexual acting out. After the act, the person's mood becomes negative again; depression, despair, hopelessness, shame, guilt and remorse are followed by a period of abstinence that purports recovery from the negative thoughts and affect. Then, new sexual urges are experienced as the cycle begins again (Bradford, 1997). Sex addicts will generally try to prolong the fantasy and excitement, thus reinforcing mechanisms that maintain the addictive cycle (Schneider, Sealy, Montgomery, & Irons, 2005).

Carnes (1991) suggested the following as markers of the disorder: persistent sexual behavior despite efforts to stop for at least six months; non-intimate relationships; sexual obsessions and fantasy as strategies for coping; mood alteration; functional impairment due to loss of time and neglect of daily activities and obligations; self-destructive or high-risk behaviors; adverse consequences, and increasing demands of sexual activity since the current level

becomes insufficient. Other characteristics such as obsessiveness, compulsivity, and withdrawal were added more recently (Carnes, 1991, 2001).

Sex addicts report recurrent failure to interrupt the behavior (i.e., powerlessness) and persistence of the behavior regardless of adverse consequences (i.e., unmanageability), both of which are considered necessary and sufficient to define an addiction in general. Other issues reported by sex addicts are preoccupation, compulsive and repetitive use of the behavior to escape from dysphoric mood, and use of lies to conceal it (Goodman, 2001). Sexually addictive processes involve urges for positive and/or negative reinforcement. The purpose of the behavior is release of tension and emotional pain while at the same time producing pleasure (Bancroft & Vukadinovic, 2004; Earle & Crow, 1990; Herring, 2004; Gordon, 2001; Orford, 1978; Leedes, 2001; Schneider & Irons, 1996, 2001).

Based on factor analysis, Carnes has studied behavioral reports of individuals identified as sex addicts and initially identified ten distinctive patterns: fantasy sex, seductive sex, anonymous sex, pain-exchange sex, intrusive sex, voyeuristic sex, exhibitionistic sex, trading sex, paying sex, and exploitative sex (Carnes, 1983, 1988; Carnes, & Delmonico, 1997). Most recently, Carnes detected new factorial configurations by analyzing separately frequency of the behaviors and emotional preoccupation associated to the behaviors (Green & Carnes, 2008). These factorial dimensions were predicted by specific MMPI-2 problem-scales (Arnau, Green, Blazec, Todd, & Carnes, 2011).

Carnes, Murray, and Charpentier (2005) identified addictive-like patterns among 1,604 patients who reported loss of control of sexual behavior and stress due to their excesses, and suggested a common neurological etiology for the entire addiction spectrum, in which the same brain reward pathways reinforce, shape, and facilitate salient and out-of-control behavior. Brain images of sex addicts suggested alterations in the brain similar to those found on individuals affected by drugs and alcohol dependence (Ullman, 2006). Martin and Petry (2005) indicated that brain response is the same for other non-substance-related disorders such as pathological gambling, overeating, and internet overuse, provided that these are not direct physiological effects of exogenous substances or manic episodes.

So, sexual addiction is one of the most widespread models to describe a pattern of out of control sexual behavior by using behavioral criteria that parallels substance-related addictive disorders. Besides the unmanageable consequences due to loss of control the model emphasizes mood alterations that occur during acting out moments, and underlying brain –related functioning processes and mechanisms.

Sexual Compulsivity Model

Coleman (1990) described hypersexual behavior that is characterized by compulsive sexual behavior as an attempt to relieve stress and emotional distress. Compulsions are behaviors subsequent to mental obsessions or intrusive thoughts, impulses, and images that are experienced as inappropriate and/or distressing, and that are the source of psychological discomfort or

distress. Obsessions are recurrent, intrusive, undesired thoughts that cause anxiety and worry. Compulsive acts, rigid patterns, and rituals are conceptualized as mechanisms that neutralize irrational mental fixations, fear, anxiety and painful affects. No pleasure is associated with these mechanisms but severe distress occurs if these are not acted (APA, 2000).

Hypersexual behavior is regarded as a compulsive syndrome associated with ideation that occurs despite efforts to control it, and repetitive acts associated with relief from anxiety. Compulsive disorders are regarded as compensatory mechanisms to modulate negative affect, regulate the sense of distress, self-soothe, and achieve emotional stability (Khantzian, 1985, 2005). Compulsive sexual behavior is characterized by “intense sexually arousing fantasies, urges, and behaviors that are intrusive, driven, and repetitive” (Coleman, Miner, Ohlerking, & Raymond, 2001, p. 326). These behaviors are motivated by anxiety reduction (Cripps, 2004).

Compulsive sexual behaviors mimic paraphilic behaviors. Paraphilias are disorders of sexual arousal and gratification associated with non-normative, repetitive, and extreme sexual behaviors involving individuals, objects or animals, which cause distress or serious problems in important areas of functioning (APA, 2000; Kafka, 2010). Paraphilic behaviors allude to sexually offensive acts (Coleman, 1990), whereas non-paraphilic sexual behavior comprises distressful but normative, compulsive sexual interactions with individuals experienced as objects, in response to problems or worries, causing shame and inability to stop

(Coleman, Miner, Ohlerking, & Raymond, 2001). Compulsive sexual behavior appears within the realm captured by the non-paraphilic type definition.

Compulsive masturbation may occur during anxiety states and be followed by an idiosyncratic sense of relief or anxiety respite (Bancroft & Vukadinovic, 2004). Individuals with compulsive behavior report that when they engage in high sexual risk acts they feel these as enjoyable (Kalichman & Cain, 2004). Sexual compulsivity reduces painful affective states with repetitive, meaningless sexual acts, in a rigid and ritualistic pattern (Bradford, 1997; Bancroft & Vukadinovic, 2004; Coleman, 1990). It is curious how compulsive sexuality may be the response to dysphoric states, which are normally associated with decreased libido (APA, 2000).

An increase of sexual arousal in the face of negative mood states, as it occurs for sex addicts when they are depressed or anxious, is atypical compared to individuals without sex addiction. Individuals with sexually compulsive behavior report that their sexual behavior is aimed to *fix* negative mood states. Sexual compulsions are purported to regulate negative emotions such as anxiety and fear, loneliness, and low self-esteem (Carnes, 1996; Earle, & Crow, 1990).

On a different note, some individuals with compulsive sexual behavior report the sexual act actually does not relieve dysphoric affects (Garos, 1997). Instead, a pattern of mood dysregulation (i.e., negative emotions) occurs immediately after sexual acting-out (Black, Kehrberg, Flumerfert, & Schlossee, 1997). These individuals seek relief of anxiety and pain (Quadland, 1985) and report constant preoccupation and anxiety while seeking love (Carnes 1996;

Cripps, 2004). Excessive apprehension combined with sexual desire and hypersexual behavior tends to disrupt social relationships, occupations and daily life (Kalichman & Cain, 2004). Sex-addicts report high scores of depression and endorse lifetime depressive symptoms (Weiss, 2004). In general, sex addicts do not develop a favorable response to SSRIs (Sealy, 1995). Furthermore, Perera (2005) reported that sexual compulsivity and sexual sensation seeking were significantly correlated with stimulant substance use.

In sum, sexual compulsivity appears as a well-known approach to disordered sexual behavior. This theoretical model addresses its irrational nature and the search of anxiety and dysphoria relief; however, it does not acknowledge the progression and escalation of the behavior, nor the paradox of increased sexual needs during states of fear and psychological distress, instead of having these diminished as it would be expected. Because of this paradoxical fact, the sexually compulsive model is controversial despite its popularity.

Sexual Disorder as an Impulse Dyscontrol Problem

The Kinsey Institute's "Dual Control Model" (Janssen & Bancroft, 2006) was used to explore different types of sexual dysfunction, including hypersexual behaviors. This model conveys inhibitory and excitatory brain processes involved in human sexual response based on biological predispositions and early learning experiences. Balance between such processes determines idiosyncratic sexual arousal and specific sexual behaviors. One of the assumptions of the model is that inhibitory processes help detect, avoid, or respond to anticipated threats to sexual response. Hypersexual response represents intensified

responsiveness or sensitivity of the sexual response system when inhibitory processes are weakened. According to Janssen and Bancroft (2006) this might explain hypersexual response of individuals with negative mood and increased sexual behavior in the presence of low inhibition.

Neurobiological regulatory processes are normally activated when sexual activity is dangerous or inappropriate, or interferes with individual functioning. The Behavioral Inhibition System (BIS) and Behavioral Activation System (BAS) are supposed to control behavior in response to internal or external cues and thus facilitate the expression of appetitive and aversive motives (Fowles, 2004). Activation of impulsive sensation-seeking traits (appetitive systems) or anxiety traits (aversive systems) depend on cues signaling positive or negative response-contingent outcomes (Bancroft & Vukadinovic, 2004). According to this model, excessive sexual desire represents unrestrained appetitive behavior in response to internal or external cues and the person is insensitive to negative response-contingent results (frustration or punishment).

Underactive BIS (low fear) in association with intensified or overactive BAS, (high sensation-seeking nature) explain the failure of self-control over sexuality. However, this dynamic does not account for failure over regulation of impulses, behavior monitoring, awareness of consequences, or conformity to norms (Bancroft & Vukadinovic, 2004; Kafka, 2010). Extreme sexual disinhibition somehow parallels disorders of impulse control (Barth & Kinder, 1987), “involving a failure to resist a drive to perform acts that are harmful for self or others” (APA, 1994, p. 609).

Hypersexual disorders are associated with impulse control problems, arousing fantasies and urges, and life interferences (Coleman, Miner, Ohlerking, & Raymond, 2001). Hypersexuality involves intense and frequent sexual behaviors and problems with self-control that resemble impulsivity-spectrum disorders (Bancroft & Vukadinovic, 2004; Hollander & Rosen, 2000; Kafka, 2010; McElroy, et al., 1999; Mick & Rosen, 2006). Problems with impulse control create intense preoccupation and disruptions in daily life (Kalichman & Cain, 2004) in the same way as hypersexuality does.

Excessive sexuality involves a failure in self- regulation of feelings, emotions, cognition, and behavior. Impaired inner regulatory system creates a need to compensate with external sources of behavioral regulation but at the same time increases the likelihood chances for an individual to engage in high-risk behaviors (Goodman, 2001). Sex addicts are sensation-seekers and tend to get involved in high-risk situations without distress (Bancroft, Graham, Janssen, & Sanders, 2009). These individuals may neglect daily-life activities and responsibilities, abandon primary needs, and their priorities are disturbed because of energy invested in acting-out and recovering from it (Kafka, 2001). Thus, people who score high on measures of sexual compulsivity are more prone to engage in unprotected sexual behaviors. For example, studies of HIV-positive individuals found that higher sexual compulsivity scores were associated with higher rates of unprotected sex with multiple partners (Goodman, 2009). High sensation-seeking, impulsivity, neuroticism, and low conscientiousness and agreeableness appear to influence processes leading to high-risk sex and

characterize impulsive and addictive disorders (Bancroft et al., 2004; Dodge, Cole, Reece, & Sandfort, 2004).

In brief, the impulse-dyscontrol model highlights the imbalance between behavioral inhibitory and behavioral activation processes involved in excessive sexual behavior. The model also helps understand the brain substrates of poor judgment, the lack of anticipation of consequences, and the risk-taking sexual behavior.

Relationship between Trauma and Sexually Addictive Disorders

Trauma appears as a determinant factor in the diathesis-stress model of sexual addiction and as a risk factor for sex addictions. Early investigations reveal a significant association between adverse childhood experiences and a propensity to mental disorders, sexual promiscuity, self-destructive, violent, and sexually offensive behavior (Whitfield, 1998; Van der Kolk, 2002). Physical, psychological and sexual abuse is ubiquitous throughout the life narratives of sex addicts (Adams, 1999; Carnes, 1983; Creeden, 2004; Robinson, 1999). Sexual abuse is especially prevalent among women presenting with sexually addictive behaviors (Langstrom & Hanson, 2006). In fact, sex addiction is sometimes regarded as a reenactment of traumatic experiences (Whitfield, 1998).

Trauma has eroding effects on an individual's ability to process experiences and anticipate consequences of his or her acts, as noted by Van der Kolk (2002). Traumatic experiences may cause a deficient neurochemical or neurofunctional response for basic attachment (Creeden, 2004), and ultimately affect the ability of a person to regulate and inhibit his or her sexual behavior.

Brain alterations compromising executive functions were observed in male sex addicts who suffered sexual abuse before age 15 (Ullman, 2006). Such individuals find unable to commit in a relationship with a single partner (Noll, Trickett, & Putnam, 2003; Schneider, Sealy, Montgomery & Irons, 2005).

Carnes (1983) found that a great number of sex addicts reported early abuse. Such individuals also described rigid, disengaged, and judgmental parents and recalled conditional love and disapproval in their interactions with parents. Surveying male and female sex addicts reflected that 97% individuals reported emotional abuse, 81% sexual abuse, and 72% indicated physical abuse. Rate of childhood sexual abuse was found to range from 39% to 63%, suggesting correlations between physical trauma and sexual addiction (Goodman, 2009). Carnes proposed a direct connection between sex addiction and abuse and suggested that childhood trauma is proportional to number and severity of addictions in adulthood and early abuse contributed to low self-esteem, shame, and guilt over sexuality. As noted by Carnes, for some individuals oversexualized activity may compensate for feelings of low self-worth by imposing power over an objectified human being. In support of this idea, sex addicts with histories of early trauma often report feelings of self-importance, power and ego-booster associated with the excessive sexual behavior (Cripps, 2004).

Briefly, the relationship between trauma and sexual addiction has been consistently reported by individuals suffering from this disordered sexual condition and the excessive sexual response has been hypothesized to be an

unhealthy attempt to cope with unresolved pain. The bidirectional nature of the relationship makes trauma a significant maintaining factor of sexually addictive behaviors, but the specificity of such interaction is yet to be described.

Comorbidity between Sexual Addiction and other Disorders

Hypersexuality has been associated with various Axis I and Axis II disorders, particularly substance abuse (Washton, 1996) and several personality disorders such as antisocial, borderline, histrionic, and narcissistic (Finlayson, Sealy, & Martin, 2001; Montaldi, 2002). Black, Kehrberg, Flumerfelt, and Schlosser (1997) found that about 45% self-reported sexually compulsive individuals presented with comorbid Axis I conditions (i.e., substance use, anxiety or mood disorders), and nearly 50% presented with Axis II personality disorders (i.e., histrionic, paranoid, obsessive compulsive and passive-aggressive). From 1604 patients diagnosed with sexual disorders, 69% men, 79% women, and 80% homosexual participants met criteria for other addictions (Carnes, Murray, & Charpentier, 2005). A study with 75 self-identified sex addicts revealed that chemical dependency affected 39% of them, whereas eating disorders were found in 32% of the study participants (Schneider & Schneider, 1991).

Sexual addicts commonly report incapability for intimacy in their relationships as well as feelings of loneliness and alienation. The lack of intimacy in relationships among these individuals has been interpreted as the result of an attachment disorder. Secure attachment in early infancy results in trusting and responsive interpersonal relations in adult life. Ambivalent or

insecure attachment characterizes relations reported by hypersexual individuals who substitute comfortable attachment in their relationships with dependency, detachment, or objectified sexual fantasies (Leedes, 1999).

Low self-esteem and emotional exhaustion, somatic symptoms, problems with intimacy and isolation, hopelessness and despair, high risk behavior, neglect of obligations and socially irresponsible behavior, and suicide, have been found correlated with sexual compulsivity (Carnes, 1991). Because of high rates of comorbidity with among people with sexual compulsivity, some speculate that this disorder is a manifestation of other mental health disorders, such as bipolar disorder or personality disorders (i.e., borderline). However, there is no remarkable evidence that some specific disorders are more associated with sexual compulsivity than others (Goodman, 2009; Muench & Parsons, 2004).

Hypersexual behaviors are oftentimes accompanied by social and personal dysfunction (Langstrom and Hanson, 2006; Kafka, 2010). Alcohol abuse and gambling addiction co- occurred with sexual addiction in a study with Norwegian inpatients (Roald, 2000). Sexual addictions and chemical dependency were found among health professionals (Irons & Schneider, 1996). Narcissistic or borderline features were also identified among sex addicts (Triebel, 2005). Some ways of ritualization have been considered as narcissistic forms of acting-out or reenacting dehumanized fantasies. These have also been regarded as defensive facades to cover feelings of emptiness, shame, and powerlessness in sex addicts (Schneider, Sealy, Montgomery, & Irons, 2005). Several mental health and personality disordered traits have been consistently

reported in association with sexually excessive behaviors, but no clarification has been made about these as factors that precede such conditions or result from them. Co-occurring disorders contribute to poorer prognoses and higher risk of relapse.

Assessment of Sexual Addiction

A few instruments have been developed to assess symptoms of sex addiction. The most frequently used instrument is the Sexual Addiction Screening Test- Revised (SAST-R, Carnes, Green, & Carnes, 2010). The SAST-R is a 45-item self-report test originally developed by Carnes (1989), which was designed to determine the likelihood a person meets criteria for sexual addiction. Little information exists about personality and psychopathology of sex addicts from standardized broad-band personality measures. Bradford (1997) conducted one of the few studies of personality profiles in sex addicts by using a personality inventory, the Minnesota Multiphasic Personality Inventory-2 (MMPI-2). Bradford defined three levels, from mild to severe, of sexual addiction. The first level included sexual behaviors that are within normal socially acceptable parameters, such as masturbation, fantasy and preoccupation, promiscuity and paid sex. Level two comprised sexual behaviors that violated social norms, such as indecent phone calls, exhibitionism and voyeurism, and other types of paraphilias. The third level considered sexual behaviors that profoundly violated cultural boundaries such as child molestation, incest and rape. Bradford examined personality traits with MMPI-2 scales 2 (Depression), 4 (Psychopathic Deviance), 7 (Psychasthenia), and 8 (Schizophrenia) on each level of sexual

behavior. Results indicated that all four scales were significantly elevated for the whole group; the MMPI-scale 4 (Psychopathic Deviance), which assesses problems with authority, family discord, and violations of cultural boundaries, was significantly elevated for 87% of participants in the sample. Participants with the most severe types of sexual addiction presented elevations on both scales 4 (Psychopathic Deviance) and 8 (Schizophrenia). Depression was more elevated among males.

Bradford's study results were restricted to a few clinical scales, and did not include information derived from most recently developed MMPI-II supplementary and content scales, which tap into more theoretically refined and homogeneous personality constructs, as well as higher-order constructs of personality and psychopathology (e.g., negative emotionality). In addition, the *severity* classification of sexual addiction created by the author of the study is not supported by any clinical theory, and it becomes unclear whether it reflects the degree of social unacceptability of the behavior, illegality, or harmful consequences to others.

Kalichman and Rompa (1994) evaluated sex addicts infected with HIV with the Sexual Compulsivity scale, the Obsessive-Compulsive scale and the Borderline Personality scale of the Schedule for Nonadaptive Personality (SNAP; Clark, Cavanaugh, & Gibbons, 1983), the State Trait Anxiety Inventory (STAI, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), and the Beck Depression Inventory (BDI; Beck & Steer, 1993). Results indicated that elevated scores for borderline and obsessive compulsive personality disorders, as well as

emotional distress indicators were associated with high levels of sexual compulsivity in men. Finally, Raviv (1993) evaluated sex addicts with the Symptom Checklist 90-R (SCL-90-R). This study revealed higher scores of anxiety, depression, obsessive-compulsiveness, and interpersonal sensitivity on individuals identified as sexual addicts than control group.

Clinical information about clinical personality traits of sex addicts is limited. The current study evaluated personality and psychopathology in individuals identified as sex addicts using two broadband inventories and other instruments to measure other specific psychological concerns.

Limitations of Studies with Sexually Addictive Populations

Evidence suggests sexual addiction is a severe mental health problem that manifests as an inability to abstain from sexual acting out despite negative consequences. It has some of the characteristics of an obsessive-compulsive spectrum disorder, such as significant impairment in behavior, mood, arousal, affect regulation, attachment, and executive functions (Ullman, 2006). It also comprises problems with behavioral inhibition and shares commonalities with substance-related disorders. Indeed, its clinical status is still under debate. Despite increased interest in sexual addiction in the last two decades, its nomenclature as a mental disorder is still controversial. The lack of a comprehensive paradigm and the limited empirical evidence has probably contributed thus far to the exclusion of the disorder from the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR, APA, 2000). Most recently it has been listed among disorders to be considered for inclusion in the DSM-V and

empirical evidence appears particularly relevant at this point. The current study purports to obtain empirical information that can increase knowledge of this disordered expression of sexuality.

Current Study Goals

Research is needed to obtain a comprehensive picture of personality traits and psychopathology associated with sexual addiction. Therefore, the goal of the current study was to obtain new empirical information about patterns of pathological personality traits and psychopathology associated with sex addiction using two well validated, broadband measures of personality and psychopathology: the Millon Clinical Multiphasic Inventory Revised (MCMI-III; Millon, 1997) and the Personality Assessment Inventory (PAI; Morey, 1991). Given the heterogeneous behavioral manifestations of the disorder, the primary purpose of the study was to determine if subgroups of sexual addicts exist as defined by common patterns of personality traits and psychopathology using latent profile analysis (LPA, Gibson, 1959; Muthen, 2006, 2008).

Once latent classes were identified, analyses were conducted to determine if subgroups systematically differed in terms of severity of addiction symptoms, specific types of sexually addictive behaviors, or severity or types of functional impairment associated with the sexual addiction membership.

Latent Profile Analysis

Latent profile analysis (LPA) is a mixture-modeling statistical technique introduced by Gibson (1959) to determine unobserved heterogeneity in a population of continuous variables. LPA is used to identify groups that are

similar in their responses to observed measured variables. Associations are the result of mean differences of continuous variables across the latent groups (Bauer & Curran, 2004). The number of classes in a population and the membership of individuals to specific classes are unknown beforehand but relationships among individuals can be estimated by using this technique. LPA is model-based, which means that a statistical model is postulated for the population from which the sample under study comes from (Vermunt & Magidson, 2002). The classes vary qualitatively or quantitatively and it is assumed that a latent variable models the heterogeneity (Nylund, Asparouhov, & Muthen, 2007; Lubke & Muthen, 2005). LPA provides a flexible model specification of a latent profile model; it makes it possible to compare different models and the combination of different outcomes and it enables informed decisions regarding the number of underlying groups (Marsh, Ludtke, Trautwein, & Morin, 2009).

Latent class analysis techniques are used to group people or objects based on what they share with one another, discovering “classifications within complex data sets” (Gore, 2000, p. 298). Members are arranged into homogeneous groups determined by similarities obtained by multivariate sources of information. Categories are based on scores across a set of individuals combined in a similar manner within groups (Schinka, Curtiss, and Mulloy, 1994; DiStefano & Kamphaus, 2006). Latent class analysis has been utilized to determine personality subtypes of people with various addictive behaviors, such

as alcohol abusers (Schinka, Curtiss, & Mulloy, 1994), gamblers (Lee, Smith, Graham, & Ben-Porath, 2007), and sexual offenders (Chantry & Craig, 1994).

Latent profile analysis (LPA) derives information about latent variables from observed variables; it explores relations among individuals by sorting them into groups in which individuals are similar to each other but differ from individuals in other groups (Marsh et al., 2009). The covariation of observed variables is explained by latent continuous variables. The latent profile model decomposes the covariances to highlight relationships among individuals.

Objects belonging to a class are assumed to be similar to the observed variables, coming from the same underlying probability distribution, and determined by a latent statistical model underlying the observed categories (Vermunt & Magidson, 2002; Marsh et al., 2009). Latent classes are considered to be homogeneous; all members within a class have the same probability distribution and correlations between variables across class are driven by the latent class on observed variables. In LPA the probability of membership to a latent profile is calculated from the model parameters and the observed scores; the parameters that determine the form of the groups are unknown and derived from the analysis (DiStefano & Kamphaus, 2006).

Exploration of different model solutions, goodness-of-fit indexes, and tests of statistical significance are ways to determine the optimal solution and the number of underlying classes. Fix indexes for LCA are the Bayesian Index Criterion (BIC) combined with the Akaike Information Criterion (AIC). Some researchers claim that the adjusted Bayesian Index Criterion (aBIC) is a superior

indicator of fitness. Others contend that the Lo Mendell-Rubin (LMR) is better to determine the number of classes in a model (Nylund, Asparouhov, and Muthen, 2007). The optimal solution may be determined based on existing theory or previous research. Models are nested and compared and the statistical significance of the difference in model fit is used to determine if a more complex model has a better statistical significance fit than a parsimonious model. In LPA, two models can be compared by using likelihood-based techniques such as bootstrapping methods, or information criterion indexes such as the Bayesian and Akaike's Information criterion (Marsh et al., 2009; Nylund et al., 2007).

LPA recognizes a level of error in the classification process that is partitioned and reflected in residual variances within class. Based on the model parameters, each case has a computed probability of belonging to each group, with values ranging from 0 to 1 per class, adding up to 1 across the set of classes. Group membership for a given individual is determined based upon for which group the member probability has the highest probability statistic (DiStefano & Kamphaus, 2006).

Correlates can be included to predict class membership, with endogenous variables serving as indicators of latent variables, and exogenous variables predicting membership of an object to a cluster (Vermunt & Magidson, 2002). The researcher considered for the current study external correlates such as legal consequences, sex addiction severity and type, and other disorder symptoms. Latent profile analysis is a statistical technique used to find commonalities among continuous manifest variables by identifying groups or classes that are supposed

to fit a latent mathematical model. To date, there do not appear to be any known studies utilizing LPA models on people with sexually addictive behaviors.

The current study purported to determine if latent classes of sexual addicts existed as defined by patterns of personality traits and psychopathology by using Latent Profile Analysis. In addition, the researcher aimed to find if subgroups systematically differed by specific types or forms of functional impairment associated with sexual addiction membership. In other words, the technique was used to identify groups similar in responses to observed measured variables and explore relations across individuals by sorting them into groups. Covariation of observed variables was explained by latent statistical model underlying observed variables. The study determined the extent to which correlations between variables across class were driven by latent class on observed variables.

CHAPTER III

METHODOLOGY

The study utilized archival data collected in an inpatient facility that specializes in the treatment of sexual addiction, the Pine Grove Behavioral Addiction Services. The Institutional Review Committee of the facility originally approved the data collection in October 2006. The facility provided authorization to use the archival data for the proposed study and the researcher obtained further approval from the Institutional Review Board of the University of Southern Mississippi. A copy of the IRB approval letter for the current study appears in the Appendix.

Participants

Archival data was collected from 222 inpatient participants who were in residential treatment for sexual addiction. Age of participants ranged from 18 to 72 years old ($M = 42.51$; $SD = 11.57$); most of them were male (95.5%) and married for the first time (60.8%); a majority was Caucasian (92.3%), and highly educated (66.7 % at least had bachelor's degree). Participants provided informed consent and were individually assessed with a battery of psychological tests within the first three days of admission at the facility as part of the routine evaluation process.

Instruments Used for Latent Profile Analyses

Personality Assessment Inventory (PAI; Morey, 1991). The PAI is a self-report test designed for the assessment of clinical symptoms and disorders, as well as for identifying personality features related to self-concept and interpersonal relationships. The test comprises 344 items, requires at least a

fourth-grade reading level, and takes approximately 50 minutes to complete by an average respondent. The PAI yields twenty two non-overlapping scales: four validity, eleven clinical, five treatment and two interpersonal scales. The validity scales reflect inconsistency, random or careless way of responding, or an exaggerated positive or negative self-presentation. The clinical scales portray somatic concerns or conversion symptoms, anxiety-related disorders, affective disorders (i.e., depressive or manic), paranoia and schizophrenia, personality disorders (i.e., borderline, dependent or antisocial), and alcohol or drug-related disorders. The treatment scales tap into characteristics related to aggression, suicidal ideation, stress, openness to treatment, and available support. Finally, the interpersonal scales assess the extent to which the person is capable of warmth or interested on controlling her relationships (Morey, 1991).

The test was developed following a construct-validation process using both quantitative and qualitative procedures. Ten of clinical and treatment scales contain subscales that were conceptually derived from the full scales. The validation and standardization processes were based on clinical and non-clinical samples considered as representative of the general population (1462 non-clinical community; 1051 college students, and 1265 clinical participants). For the original standardization study the author reported alphas of .81, .82, and .86 for the normative, college, and clinical samples, respectively, for the subscales (Morey, 1996). The temporal stability of the test has been determined by examining test-retest reliability over four weeks for all clinical scales, which was .86 (Morey, 1991), and .76 over 28 days (Boyle & Lennon, 1994). The

concurrent validity has been established with several clinical groups (Morey, 1991).

The scoring system utilizes linear *T* scores with a mean of 50 and a standard deviation of 10. A score at or above 60 (i.e., one standard deviation above the mean) is considered clinically significant, whereas a score at or above 70 (i.e., two standard deviations above the mean) is regarded as elevated (Morey, 1991). Elevated scores suggest a marked deviation from the normative sample group of reference and are more typical of clinical groups.

No information about the instrument exists on individuals identified as sex addicts. For the proposed study the following PAI scales were used: Somatic Complaints, Anxiety, Anxiety-Related Disorders, Depression, Mania, Paranoia, Borderline features, Antisocial features, Alcohol and Drug problems.

Millon Clinical Multiaxial Inventory-III (MCMI-III; Millon, 1997). The MCMI-III is a 175 item self-report scale for the assessment of symptoms of psychopathology and maladaptive personality traits. The test requires at least an eighth-grade reading level and takes approximately 30 minutes to be completed. The scores are based on the prevalence of disorders in the general population. Thus, scores with elevations between *BR* 75 and 84 are reported as clinically significant and indicative of a high probability of an Axis I or Axis II personality disorder. The higher the score, the more likely the person manifests aspects indicated in the relevant scale (Choca & Van Denburg, 1997; Groth-Marnat, 2009; Millon & Bloom, 2008).

The MCMI-III has 28 scales in total, which comprise eight moderately severe clinical personality patterns and three more severe personality pathologies; three severe personality pathology scales; seven moderately and three greatly severe clinical syndromes, and four modifying indexes scales. The clinical personality pattern scales are: Schizoid, Avoidant, Depressive, Dependent, Histrionic, Narcissistic, Antisocial, Sadistic, Compulsive, Negativistic and Masochistic. The personality pathology scales are: Schizotypal, Borderline and Paranoid. The moderately clinical syndrome scales are, as follows: Anxiety, Somatoform, Bipolar, Dysthymia, Alcohol Dependence, Drug Dependence and Post-Traumatic Stress Disorder. Finally, the severe clinical syndrome scales are, Thought Disorder, Major Depression and Delusional Disorder. The modifying/validity scales, which have not been considered for this study, are Disclosure, Desirability, and Debasement.

The MCMI-III measures behaviors and symptoms of Axis I and Axis II personality disorders. The test was originally structured according to a multi-axial format and includes scales representing clinical disorders and syndromes described by the Diagnostic Manual for Mental Disorders (DSM-IV-TR; APA, 2000). The validation process included theoretical substantive, internal-structural and external-criterion steps for all of the scales. The original validation sample of the test included patients from a variety of clinical settings and diverse clinical samples and good psychometric properties for the test are reported. Internal consistency for the scales ranged from .66 (i.e. Compulsive) to .90 (i.e. Debasement), and alphas exceeded .80 for most of the scales.

Test-retest reliability ranged from .82 for the Debasement scale to .96 for the Somatoform scale (Millon, 1997). The MCMI-III has demonstrated concurrent validity with other clinical tests in cases of addiction and personality disorders: the MMPI-2 (McMahon, Davidson, Gersh, & Flynn, 1991; Schoenberg, Dorr, Morgan, & Burke, 2004), the Basic Personality Inventory (BPI, Retzlaff, & Bromley, 1991), and the Personality Disorder Examination (PDE, Soldz, Budman, Demby, & Merry, 1993).

Instruments Used for External Validation Analyses

Sexual Dependency Inventory-R (SDI-R). The SDI-R is a measure of sexual addiction symptoms originally developed by Carnes (1989), based on data collected over seven years from 932 individuals diagnosed with sex addiction and their partners. The SDI was originally composed by 170 items representing different types of hypersexual behaviors, which reflected the frequency, extent, and consequences of these behaviors. The first factor analyses performed by Carnes yielded ten factors of sexual addition behaviors, namely fantasy sex, seductive sex, exhibitionistic, voyeuristic, intrusive sex, exploitive sex, paying for sex, pain exchange, anonymous sex, and trading sex (Carnes, 1991; Carnes & Delmonico, 1997).

Delmonico determined the internal consistency and test-retest reliability of the original SDI-R in a sample of sexual addicts, sexual offenders and non-sex addicts (Delmonico, Bubbenzer, & West, 1998). Cronbach's alpha ranged from $\alpha = .90$ (seductive) to $\alpha = .99$ (pain exchange) for Frequency subscales and from .91 (seductive) to .98 (trading) for Power subscales. Pearson correlations for

test-retest reliability ranged from .75 (fantasy) to .98 (trading) for Frequency subscales, and .67 (exploitative) to .93 (pain exchange) for Power subscales. Although the test was not good on identifying sex addicts separately from sex offenders, it demonstrated efficacy to distinguish clinical groups (sex addicts and sex offenders) from non-clinical groups; Delmonico's study also demonstrated adequate criterion-related validity between the SDI-R and the Sexual Addiction Screening Test (SAST).

Carnes, Delmonico, Griffin, and; Moriarity (2007) developed an online version of the SDI-R and refined the theory and psychometric properties of the test as well as the factorial structure using a more extensive sample (Green & Carnes, 2008). Preliminary results from an ongoing study suggested a new factor structure, providing evidence for higher order factors. The new factorial structure was derived from the intensity (power) and actuality (frequency) of the sexual behaviors (Green & Carnes, 2008). Some of the first order factors structure overlapped with paraphilic behaviors such as exhibitionism, voyeurism and pain-exchange (sadistic and masochistic sexual behaviors).

The SDI-R provides quantitative information about sexual behaviors, as well as qualitative information about the timeline associated with the development of the symptoms and periods of abstinence. It also provides dimensional data about readiness to change maladaptive sexual behaviors. This study focused on the ten scales identified by Carnes in the original study: fantasy sex, seductive sex, exhibitionistic, voyeuristic, intrusive sex, exploitive sex,

paying for sex, pain exchange, anonymous sex, and trading sex. %iles above 65 were considered significant.

Sexual Addiction Screening Test Revised (SAST-R). The SAST-R is a screening instrument originally developed by Patrick Carnes in 1988, modified in 2009 and normed for men and women, and for both homosexual and heterosexual I populations. The test comprises 45 items and taps features of sexually addictive behavior, and has the ability to discriminate between sex addicts and control populations with significant accuracy. The original version indicated good internal consistency and an ability to discriminate between male sex addicts and male control populations. The instrument is a good screener and identifies constructs core to the addictive process such as preoccupation, loss of control, affect disturbance, unmanageability, high risk behavior, and significant consequences. The original SAST consisted of 25 core items and efficiently and effectively discriminated between sex addicts and non-addicts. Using 6 points as a cutoff score, the test was able to correctly classify 96.5% as sexually addicted. Only 3.5% with scores 6 or higher were misclassified, and this level of specificity was relevant for the original screening purpose of the test (Carnes, 1989). Newer versions of the SAST have been further developed for heterosexual men, women, and homosexual men populations, with good psychometric properties (Carnes, Green, & Carnes, 2010). SAST-R differentiates outpatient, clergy, and college groups who are at-risk or actually present with the disorder (Green & Carnes, 2008).

The test measures four dimensions of sex addiction: preoccupation, loss of control, relational and affective disturbance. From the 25 core items, a cut-score of 6 suggests a high probability that an individual is a sex addict. The psychometric properties of SAST-R have been recently reported for 26,993 men, women, both heterosexual and homosexual yielding alpha coefficients from .50 to .85 for the different subscale scores (Carnes, Green, & Carnes, 2010). SAST-R scores were found with 94.4% sensitivity for identifying individuals with sex addictive behaviors. Total alpha for our sample was .86; for the dimension Preoccupation was .51; Loss of Control was .79; Relationship Disturbance was .54, and Affect Disturbance was .63.

Eating Disorder Inventory-3 (EDI-3). The EDI-3 (Garner, 2004) is a 91-item self-report measure developed to test clinically relevant symptoms of anorexia and bulimia nervosa and to determine eating disorder risk. The EDI-3 is a revision of the initial version of the test created by Garner, Olmstead, and Polivy in 1983 and comprises twelve clinical scales and three validity scales: drive for thinness, bulimia, body dissatisfaction, low self-esteem, personal alienation, interpersonal insecurity, interpersonal alienation, interoceptive deficits, emotional dysregulation, perfectionism, ascetism, maturity fears, inconsistency, infrequency, and negative impression. It yields six composites: eating disorder risk, ineffectiveness, interpersonal distrust, affective problems, overcontrol, and general psychological maladjustment.

The test has demonstrated good psychometric properties. Most of the psychometric information on the EDI-3 was based on the original version of the

EDI. The average item total correlation of subscales was .63 and scales that were included in the test met an alpha above .80 in order to be included. Cronbach's alphas for the anorexia nervosa group ranged from .83 (Interceptive Awareness) to .93 (Ineffectiveness), and reliability coefficients ranged from .72 (Maturity Fears) to .92 (Body Dissatisfaction). Content, criterion, convergent, and discriminant validity has also been reported. Items from the original version that had demonstrated relevance to construct domains were retained. In addition, convergent validity was determined by significant correlations between clinician's and patient's ratings on the dimensions the test purported to measure. Interrater correlations were significant at the $p < .001$ level and ranged from .43 (Maturity Fears) to .68 (Ineffectiveness). Convergent and discriminant validity were determined by comparing ratings of patients with eating disorders and non-clinical population in all subscales, similarities and differences between patients with anorexia nervosa and patients with different types of eating disorders, and correlations with other measures of eating disorders. In addition, factorial analyses were conducted to determine underlying relationships of items (Garner, 2004).

Brief Symptom Inventory (BSI). Derogatis developed the test in 1975 based on the Symptom Checklist-90-R (SCL-90-R). The BSI is a 53 self-report Likert scale that assesses psychological symptoms of psychiatric, medical, and non-clinical population. The scale has a distress rating scale ranging from 0 (*not at all*) to 4 (*extremely*). The test consists of nine subscales: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility,

Phobic Anxiety, Paranoid Ideation, and Psychoticism. It also includes three global indexes of distress, namely, General Severity Index, Positive Symptoms Distress Index, and Positive Symptom, which portray the current level of perceived distress and symptoms (Derogatis & Melisaratos, 1983). Normative groups were based on a 1002 psychiatric outpatient sample, 719 non-clinical, and 313 inpatient individuals. Reliability was determined with internal consistency; alpha coefficients ranged from .71 to .85 for the primary dimensions. Total score Cronbach's alpha for the present study (53 items) was .97.

Derogatis and Melisaratos (1983) determined test-retest reliability in a two-week period and ranged from .68 to .91 for the scales. Parallel form reliability with the SCL-90-R was tested and both tests were highly correlated. Convergent validity was established with the SCL-90-R, and excellent convergence with MMPI was demonstrated. Internal structure and construct validity was determined with factor analysis. Factor loadings of .35 were reported for nine factors that accounted for 40% of the variance. Finally, a few predictive validity and criterion validity studies were conducted with positive results.

Post-Traumatic Stress Index (PTSI). The self-assessment measure test was originally published by Carnes and Delmonico in 1997. The test was comprised of 144 items and explored different expressions of trauma. The instrument was developed from a previous study in which individuals identified with sex addiction who participated in a recovery program had reported significant abuse in early lives and reported benefit from processing traumatic

experiences that had been denied or repressed. The test allows identify different forms of trauma that are usually associated with sexual bonding that becomes addictive, namely: trauma reactions, trauma repetition, trauma bonds, trauma shame, trauma pleasure, trauma blocking, trauma splitting, and trauma abstinence. The researcher chose to include the total sum of responses as a general indication of trauma-related symptoms.

Procedure

Model derivation. The goal of this study was to determine if distinct subgroups of sex addicts could be identified by using measures of psychopathology and maladaptive personality traits, and if so, to decide the number and characteristics of subgroups. Latent profile analysis (LPA), a person-centered approach (Gibson, 1959), was used to identify distinct subtypes of sex addicts and determine which traits distinguish the resulting configurations. Individuals were classified based on their most likely latent class membership. Associations reflect discrete groups and are considered as the result of “differences in means of continuous measures over latent groups” (Bauer & Curran, 2004, p. 5). Once latent classes were uncovered, these groups were further validated by evaluating external correlates of group memberships. The *Mplus* (Muthen, 2008) statistical program was utilized to conduct the LPA, and IBM SPSS 19.0 was used for follow-up analyses.

In the model derivation phase, the study uncovered empirical latent profiles (subtypes) from 35 variables drawn out from two assessment instruments that measured clinical and severe Axis I syndromes, as well as pathological Axis

II personality disorders. Such measures were the Millon Clinical Multiaxial Inventory-III (MCMI-III) and the Personality Assessment Inventory (PAI).

The 10 MCMI-III scales used to indicate Axis I disorder symptoms were Anxiety, Somatoform, Bipolar disorder, Dysthymia, Alcohol dependence, Drug dependence, Post-traumatic stress disorder, Thought disorder, Major Depression, and Delusional disorder. Nine PAI scales were used as indicators of Axis I symptoms: Somatic complaints, Anxiety, Anxiety-related disorders, Depression, Mania, Paranoid, Schizophrenia, Alcohol dependence, and Drug dependence disorders.

The 14 MCMI-III scales selected as indicators of Axis II disorder symptomatology were Schizoid, Avoidant, Depressive, Dependent, Histrionic, Narcissistic, Antisocial, Sadistic, Compulsive, Negativistic, Masochistic, Schizotypal, Borderline, and Paranoid personality disorder. Two PAI scales, Borderline and Antisocial, were included for the Axis II dimension.

The MCMI-III utilizes a base rate scoring system, which considers prior probabilities of the disorders in the population where the scales originated. Base Rate (*BR*) Axis I scores from 70 to 75 suggested likelihood of symptoms of a syndrome; 75 to 84 indicated presence of an Axis I syndrome and *BR* 85 or higher suggested prominence of a syndrome. In regards of MCMI-III Axis II scales, *BR* elevations from 70 to 75 suggested likelihood of personality traits; 75 to 84 suggested clinically significant personality traits, and *BR* 85 or more indicated strong possibility of a personality disorder (Groth-Marnat, 2009; Millon & Bloom, 2008). On the other hand, PAI utilizes a scoring system expressed in

terms of percentiles. For both Axis I and Axis II, PAI T -scores from 60 to 64 T were elevated, whereas scores equal to or higher than 65 T were clinically significant and indicated a pronounced deviation from the mean, suggesting increased likelihood of a clinical syndrome or pathological symptoms (Morey, 1996).

Model Fit and Number of Classes

The researcher conducted two separate LPA's for the Axis I and Axis II indicator sets using the statistical program *Mplus* version 5.0 (Muthen, 2008). Determination of the number of latent classes for each indicator set was based on exploring a number of different solutions (between two and nine number of classes) and evaluating the fit of each solution to the data as well as the theoretical coherence and interpretability of the resulting classes. As recommended by Muthen, 2000 random sets of starting values and 500 iterations were predetermined in the *Mplus* in order to avoid the problem of local maxima (model stops before reaching maximum likelihood).

The three goodness- of-fit-indexes used for the proposed study were the Bayesian Information Criterion (BIC), the Akaike Information Criterion (AIC), and the Sample Size Adjusted BIC (SSA-BIC). In addition, the p value of Lo-Mendel-Rubin ($pLMR$) was an indicator of the statistical significance of the increase in model fit over the model with one fewer classes than that being evaluated. Lower values of AIC, BIC and SSA-BIC indicate a better fitting model. Finally, the number of groups within each model that contained less than 1% and 5% of the cases also helped determine the fit of the model. Groups with non-

representative number of cases (i.e., less than 1% of the sample) were not meaningful for interpretation and thus models with groups containing less than 1% of the sample were rejected.

Exploration of Class Composition

The researcher conducted a multivariate analysis of variance (MANOVA) to find indicator mean differences across the groups and determine the composition of the resulting latent classes was applied in order. This analysis intended to determine what indicator variables were defining the groups in terms of group indicator mean differences across latent classes. Statistically significant MANOVA results were further probed with two different follow-up analyses. The first follow-up analysis was a series of univariate ANOVA's. Significant main effects for group were followed by Tukey's Honestly Significant Difference post-hoc tests (HSD) when appropriate. The second follow-up analysis was a descriptive discriminant analysis, which yielded information about most important indicators at a multivariate level for discriminating among the latent classes.

Discriminant analysis is an appropriate technique for understanding differences among groups at a multivariate level using variables that have theoretical and empirical relevance (Kerlinger & Pedhazur, 1973). This technique helped identify variables that discriminate between two or more groups. In addition, such analysis provided an estimate of the accuracy of the indicator variables for predicting group membership, which is expected to be quite high given that these variables were the ones used in the LAP to derive the groups. In other words, the technique allowed determining how accurately an individual

has been predicted to belong to a group based on a number of selected variables (Marsh, Lubke, Trautwein, & Morin, 2009).

External Validation of Latent Classes

The utility of latent classes was further evaluated via examination of the relationships between class membership and external correlates such as a screening assessment of sexually addictive behavior, frequency and severity of specific types of sexually addictive behaviors, legal consequences of sexual behavior, symptoms of psychological distress, post-traumatic stress symptoms, and eating disorder symptoms endorsed by participants.

CHAPTER IV

ANALYSIS OF DATA

Latent Profile Analysis of Axis I and Axis II Diagnostic Indicators, a Person-Centered Approach

Latent Profile Analysis (LPA) was used to uncover homogeneous subgroups of individuals identified as sex addicts with distinguishable patterns of personality and psychopathology. Two separate LPA model solutions were conducted, one for Axis-I models (clinical and severe syndromes) and another for Axis-II models (pathological personality patterns) as indicators of symptoms. First, a series of models between two and nine latent classes were explored and fit indexes were examined in order to decide the number of latent classes with identifiable profiles. Next, the number of groups within each model that resulted in less than 1% and 5% of the sample was identified. Finally, groups were evaluated in terms of their theoretical sense.

Number of Groups and Model Fit

Latent profile Axis I. Goodness-of-fit indexes for Axis I models and proportion of cases represented are presented in Table 1. The values continued to decrease showing improved fit for the three information indexes (*AIC*, *BIC*, and *SSA-BIC*) as models with increased numbers of latent classes were evaluated. The nine-class model had the smallest *AIC*, *BIC*, and *SSA-BIC* values, but the only group with highly significant *pLMR* values was the model with two latent classes ($p = 0.0007$). No Axis I model resulted in groups with less than 1% of the

cases; one group from Class 4 and one group for Class 7 resulted in less than 5% of the cases.

Axis I *LMR* values were only significant for the Class 2 model ($p < .01$). Values for indexes *AIC*, *BIC*, and *SSA-BIC* were lower after Class 2 solution and smaller values indicated a better fitting model. Although p value provided by *LMR* for models after the Class 2 was not statistically significant, Class 4 had the next lowest $pLMR$ value after the Class 2; this showed improvement for k versus $k-1$ models. As noted in Table 4.1, p value provided by *LMR* values increased after the Class 4 model and showed a substantial increase when moving from 4 to 5 classes.

Overall information indexes and test of statistical significance were not consistently informative for determining the number of groups. The researcher also evaluated models in terms of their practical significance. It was noted that Axis I Class 4 model had a good proportion of participants in each class (Class 1 = 9%; Class 2 = 30%; Class 3 = 40%, and Class 4 = 20%). There was a fairly noteworthy drop in *SSA-BIC*. One model for Class 7, two models for Class 8, and two for Class 9 resulted in less than 5% of the cases. In addition, the table of means showed how practically and theoretically meaningful the models were for Axis I. Some scale means were distinctly elevated across the groups and low in others. A-priori predictions suggested that groups might represent a combination of level (high or low) and shape (negative emotionality, disinhibition and impulsive traits, and addictive features). Exploration of the distributions suggested that Class 4 model was consistent with expected groups. Differences

made sense in terms of clinical criteria and helped inform the decision to keep the Class 4 solution for Axis as the model that best fit data.

Table 1

Goodness of Fit for Axis I Models Based on Different Number of Groups (N = 222)

<i>N° Groups</i>		<i>Group Sizes</i>				
<i>(Class)</i>	<i>AIC</i>	<i>BIC</i>	<i>SSA-BIC</i>	<i>pLMR</i>	<i>LT1%</i>	<i>LT5%</i>
2	34271.72	34469.08	34285.27	.0007	0	0
3	33811.36	34076.77	33829.58	.5425	0	0
4	33555.39	33888.86	33578.28	.2035	0	0
5	33397.28	33798.80	33424.84	.3021	0	0
6	33267.00	33736.57	33299.23	.5790	0	0
7	33164.01	33701.63	33200.91	.7696	0	1
8	33061.51	33667.19	33103.10	.3868	0	2
9	32964.41	33638.15	33010.67	.7978	0	2

Note. Significant p value printed in boldface. AIC = Akaike's information criterion; BIC = Bayesian information criterion; pLMR= p Low Mendel Rubin; SSA-BIC = sample-size adjusted Bayesian Information Criteria; LT = Number of groups with less than 1% and 5% of cases.

Latent profile Axis II. Goodness of fit indexes for Axis II models are presented in Table 2. The fit for Axis II models revealed the same pattern of decrease across the number of models as these were evaluated except for Class 8 *BIC* relative to Class 7 model, which showed a mild increase relative to Class 7 model. *LMR* values were significant for Axis II two and three solutions ($p < .01$).

Given that statistical criteria were not consistent for number of model decision-making, practical and theoretical criteria were analyzed. Three models for Axis II Class 9 resulted in less than 5% of the cases. Profile exploration suggested groups with impulsive features and negative emotionality, as expected. Hence, Class 5 was chosen as the model that best fit data (Class 1 = 10%; Class 2 = 15%; Class 3 = 21%, Class 4 = 27%; and Class 5 = 27%).

Table 2

Goodness of Fit for Axis II Models Based on Different Number of Groups (N = 222)

<i>N° Groups</i> (Class)	<i>AIC</i>	<i>BIC</i>	<i>SSA-BIC</i>	<i>pLMR</i>	<i>Group Sizes</i>	
					<i>LT1%</i>	<i>LT5%</i>
2	29956.03	30122.76	29967.48	.0002	0	0
3	29598.24	29822.82	29613.66	.0179	0	0
4	29371.49	29653.91	29390.88	.6219	0	0
5	29190.41	29530.68	29213.77	.1375	0	0
6	29107.04	29505.15	29134.37	.3727	0	0
7	29029.54	29029.50	29060.84	.7061	0	0
8	28976.72	29490.52	29011.99	.7853	0	0
9	28924.24	29495.89	28963.49	.7358	0	3

Note. Significant p value printed in boldface. AIC = Akaike's information criterion; BIC = Bayesian information criterion; pLMR = Low Mendel Rubin; SSA-BIC = sample-size adjusted Bayesian Information Criteria; LT = Number of groups with less than 1% and 5% of cases.

Class Composition Analyses

Once decided the number of LPA classes per model, the composition of the latent classes was evaluated by exploring mean indicator differences across groups as well as presence of clinically elevated group means. MCMI-III *BR* Axis I scores from 75 to 84 were regarded elevated, and *BR* 85 or higher were significantly elevated. PAI *T*- scores from 60 to 64 were considered elevated, and scores equal to or higher than *T* 65 indicated pronounced elevation.

Axis I class composition. Figures 1a) and 1b) depict graphically Axis I values for MCMI-III and PAI scores. Class 2 and 3 had significantly elevated MCMI-III and PAI scores. Class 2 and 3 had significantly elevated MCMI-III and PAI mean values, whereas Class 1 and 4 showed a trend within normal values for most variables, particularly Class 1. Across a wide range of variables, Class 2 showed prominent elevations in five MCMI-III scales: Anxiety ($M = 89$) and Dysthymia ($M = 85$). Marked elevations were observed in four PAI scales, indicating clinically significant symptoms of Anxiety ($M = 71$), Anxiety-Related Disorders ($M = 71$), Depression ($M = 76$), and Schizophrenia ($M = 72$). Low mean scores were observed in MCMI-III Bipolar ($M = 62$), Delusional ($M = 42$), and PAI Mania ($M = 58$), Paranoia ($M = 62$), Alcohol ($M = 60$), and Drug scales ($M = 60$). Class 2 suggested significant and chronic negative emotionality, dysphoria, and pathological isolation. Latent Class 3 characterized by significant elevations in two MCMI-III scales, Anxiety ($M = 76$) and Dysthymic disorder ($M = 74$), and no PAI scale elevations. Class 3 was defined by clinically significant anxiety and chronic dysphoric emotions. Clinically non-significant mean elevations were noticeable in Class 4.

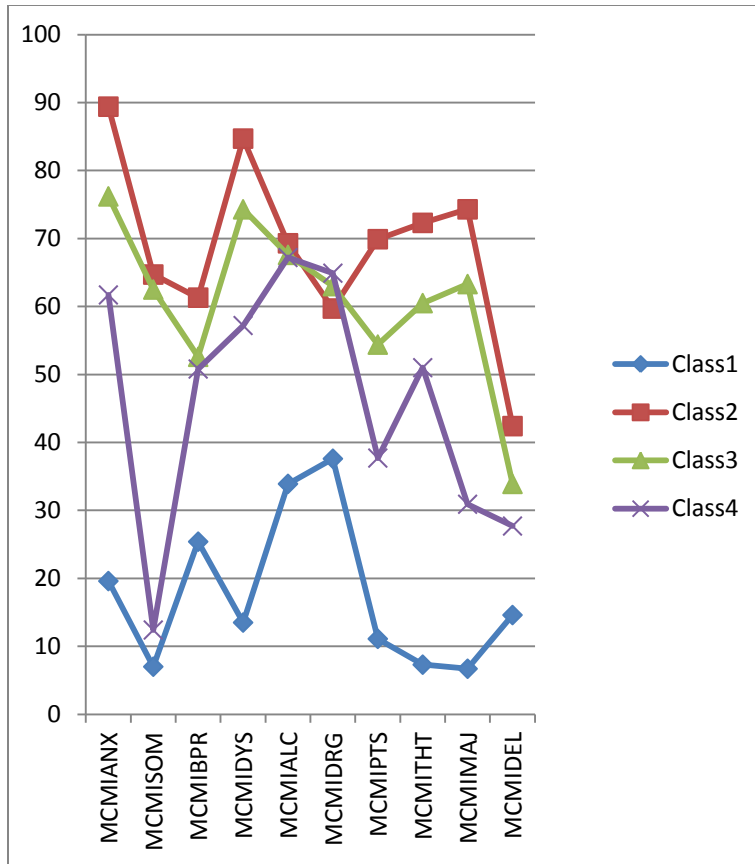


Figure 1a. Distribution of Four Latent Classes for Axis I MCMI-III BR Scores

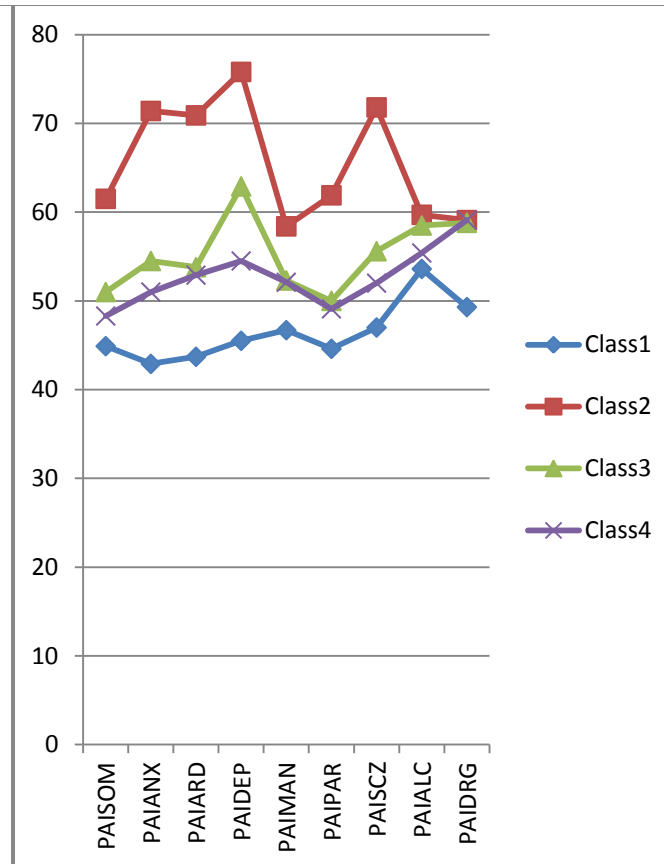


Figure 1b. Distribution of Four Latent Classes for Axis I PAI T Scores.

Axis II class composition. Mean scores for Axis II variables for the five latent classes (Class 1, 2, 3, 4, and 5) are displayed in Figure 2. This model included values within normal ranges for all the scales in Class 1, suggesting this is the group with less pathological symptoms. Class 2, Class 3, and Class 4 showed several mean scores within low levels, and a few moderate elevations. The group represented by Class 5 showed markedly significant elevations, some of which were within pathological ranges.

Class 2 had elevations in three MCMI-III scales representing pathological personality traits: Avoidant ($M = 77$), Depressive ($M = 77$), and Dependent ($M = 77$), and mild elevation in Masochistic ($M = 72$). Low mean elevations were observed on MCMI-III Histrionic ($M = 33$), Negativistic ($M = 37$), Sadistic ($M = 42$), and PAI Paranoia ($M = 37$). Scores in this latent class suggested high inhibition and constraint, as well as negative emotionality. Only one mean score is mildly elevated on Class 3, which was on MCMI-III Antisocial scale ($M = 73$). Low mean scores were observed on MCMI-III Schizoid ($M = 48$), Avoidant ($M = 33$), Compulsive ($M = 43$), Schizotypal ($M = 32$), and Paranoid ($M = 27$). Highly disinhibitory pattern is suggested on this profile. Class 4 showed elevations on MCMI-III Depressive ($M = 82$), Dependent ($M = 76$), Antisocial ($M = 79$), and Masochistic scales ($M = 74$), and elevations on PAI Borderline ($M = 71$) and Antisocial scales ($M = 69$). The lowest elevation is on MCMI-III Compulsive ($M = 34$). This latent class seems characterized by depression and dysphoria, self-defeating tendencies, emotional instability, and conflict between dismissal of rules and submissive or overcompliant tendencies.

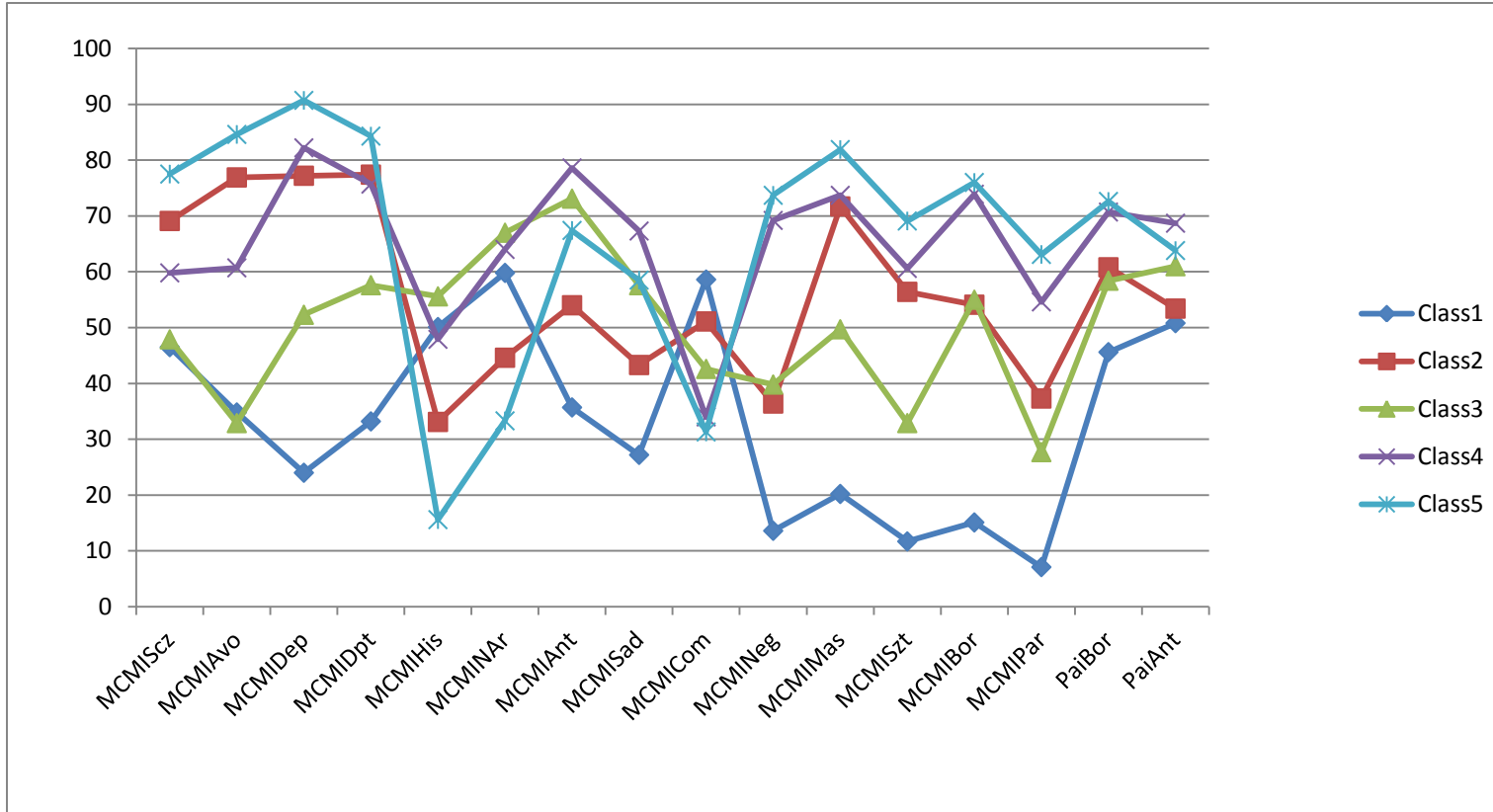


Figure 2. Distribution of the Five Latent Classes for Axis II MCMI-III BR Scores and PAI T Scores.

Finally, Class 5 is characterized by marked elevations on most scales, suggesting several areas of potential conflict. Mean scores are clinically elevated for MCMI scales Depressive ($M = 91$), Avoidant ($M = 85$), Dependent ($M = 84$), Masochistic ($M = 82$), Schizotypal ($M = 76$), Negativistic ($M = 74$), and Borderline ($M = 76$) as well as PAI scale Borderline features ($M = 73$). These elevations suggest this is the group with highest number and most severe maladaptive features. Mean scores suggest enduring pattern of thoughts, attitudes, behaviors and self-concepts related to depression with possible psychotic features, self-destructive tendencies, emotional instability, helplessness, pessimism and feelings of inadequacy. Profile also suggests limited social skills and proneness to be socially detached, as well as conflict between dependency and oppositional and argumentative tendencies.

Furthermore, multivariate analyses of variance (MANOVAs) were conducted to determine the simultaneous effect of group membership across Axis I and Axis II variables after controlling for Type I error rate. The group membership (independent variable, IV) was denominated *CPROB4* for Axis I variables and *CPROB5* for Axis II variables, and groups were named *CLASS*. A one way MANOVA on Axis I variables revealed a significant multivariate main effect for *CPROB4*, Wilks' $\lambda = .02$, $F(57, 567.35) = 27.1$, $p < .001$; partial eta squared = .73. MANOVA conducted on Axis- II variables revealed a significant multivariate main effect for *CPROB5*, Wilks' $\lambda = .02$, $F(64, 753.92) = 20.64$, $p < .001$; partial eta squared = .63. After using MANOVA to identify differences in the means of these variables across the latent classes, a one-way between subjects

analysis of variance (ANOVA) test was further conducted to follow up mean differences on these single variables. There was a significant effect of Group Membership (CPROB4) at the $p < .001$ level for most Axis I indicators, with the exception of PAI Alcohol Dependence [$F(3, 211) = 1.26, p = .291$] and Drug Dependence [$F(3, 211) = 1.70, p = .169$] as observed in Table 3. There was a significant effect of Group Membership (CPROB5) at the $p < .001$ level for all Axis II indicators.

Because the analysis yielded statistically significant results, a series of post-hoc tests was conducted to find how means were significantly different from one another. Tukey's Honestly Significant Difference (HSD) post-hoc test was selected to compare each of our conditions to every other condition. Tukey's HSD tests determined the minimum difference between means necessary for statistical significance.

Axis I ANOVA and post-hoc tests. Table 3 depicts post-hoc comparisons for Axis I variables using the Tukey's HSD test (along with the univariate ANOVA results). Univariate comparisons indicated that the higher mean score for MCMI-III Anxiety disorder was Class 2, and all four classes differed significantly from each other. Class 1 and Class 4 Mean scores for MCMI-III Somatoform disorder did not differ from each other but were significantly higher than Class 2 and 3.

Mean scores for Bipolar disorder Class 1 were significantly lower than Class 2, Class 3, and Class 4, which did not differ from each other. All groups differed significantly for MCMI-III Dysthymic disorder. As depicted in Table 3, Axis I scores for MCMI-III Class 2, 3, and 4 did not differ for Alcohol

dependence, and Class 1 was significantly lower from that subset. MCMI-III Drug dependence Class 1 mean was significantly lower than Class 2, 3, and 4, and these did not differ from each other. All classes differed from each other for MCMI-III Post-Traumatic Stress; Class 1 was significantly lower than the other classes whereas Class 4 was significantly higher. The same pattern was observed for Thought disorder and Major Depressive disorder. Mean values Class 2, 3, and Class for Delusional disorder did not differ from each other but were significantly higher than Class 1 and 2 values, which did not differ from each other.

As noticed in Table 3, Axis I Class 2 PAI Somatic Concern disorders was significantly higher than the other group mean values; Class 1 and Class 4 did not differ from each other, nor did Class 3 and Class 4. PAI Anxiety Class 2 was significantly higher than the rest of the groups; Class 1 was significantly lower, and Class 3 did not differ significantly from Class 4. The same pattern was identified for PAI Anxiety-Related disorders mean values. All groups differed for PAI Depressive disorders, being Class 2 significantly higher and Class 1 significantly lower when compared to the rest of the groups. PAI Mania disorders Class 2 appeared significantly higher than the other classes; Classes 1 and 3 did not differ from each other, nor did Class 3 and Class 4. The same pattern was observed for PAI Paranoid disorders and for PAI Schizotypal disorders, in which the only class that was significantly different was Class 2, whereas Class 1 and Class 3 were a subset with not significant differences from each other, and Class 3 and Class 4 were a different subset, as noticed in Table 3.

Table 3

Mean Differences for Axis I Four Latent Profile Mode

<i>Latent Class (CPROB4)</i>	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4</i>	<i>Total</i>		
<i>Test Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
MCMIANX	19.52 ¹	89.91²	76.01³	61.39 ⁰	71.78 (1.76)	96.10*	3, 215
MCMISOM	6.90 ¹	64.82 ²	62.46 ²	12.45 ¹	47.79 (26.13)	441.57*	3, 215
MCMIBPR	25.49 ¹	61.51 ²	52.40 ²	50.93 ²	52.22 (22.28)	17.07*	3, 215
MCMIDYS	13.14 ¹	84.91²	74.17 ³	57.18 ⁰	68.09 (24.91)	143.95*	3, 215
MCMIALC	33.67 ¹	69.52 ²	67.40 ²	67.18 ²	64.75 (19.86)	25.65*	3, 215
MCMIDRG	37.48 ¹	59.94 ²	62.87 ²	64.80 ²	59.95 (18.68)	13.95*	3, 215
MCM IPTS	11.24 ¹	70.20 ²	54.34 ³	37.32 ⁰	51.49 (24.38)	75.24*	3, 215
MCMITHT	6.90 ¹	72.42 ²	60.44 ³	51.05 ⁰	56.97 (23.05)	112.50*	3, 215
MCMIMAJ	6.43 ¹	74.38 ²	63.35 ³	30.89 ⁰	56.64 (26.55)	158.00*	3, 215
MCMIDEL	11.43 ¹	41.92 ²	34.16 ²	27.91 ¹²	33.32 (25.98)	7.34*	3, 215

Table 3 (continued).

<i>Latent Class (CPROB4)</i>	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4</i>	<i>Total</i>		
<i>Test Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
PAISOM	44.85 ¹	61.58 ³	51.08 ²	48.32 ¹²	53.96 (9.55)	42.20*	3,211
PAIANX	42.85 ¹	71.75²	54.34 ³	51.00 ³	52.77 (11.97)	131.67*	3,211
PAIARD	43.75 ¹	71.14²	53.82 ³	52.77 ³	57.82 (12.94)	69.63*	3,211
PAIDEP	45.40 ¹	75.89²	63.98³	54.45 ⁰	63.44 (13.35)	77.69*	3,211
PAIMAN	46.60 ¹	58.47 ²	52.31 ³	52.18 ¹³	53.59 (10.39)	9.42*	3,211
PAIPAR	44.55 ¹	61.86²	50.09 ³	49.11 ¹³	52.88 (10.67)	33.41*	3,211
PAISCZ	46.96 ¹	71.59²	55.92 ³	52.02 ¹³	58.95 (12.88)	57.60*	3,211
PAIALC	53.60	59.70	58.54	55.43	57.79 (15.31)	1.26	3,211
PAIDRG	49.30	59.53	58.51	59.05	58.07 (18.56)	1.70	3,211

Note. Values in bold: clinically significant. Means in the same row that do not share superscripts differ at $p < .001$. Scale abbreviations:

MCMIScz = Schizoid; MCMIAvo = Avoidant; MCMIDep = Depressive; MCMIDpt = Dependent; MCMIHis = Histrionic; MCMINar = Narcissistic;

MCMIAnt = Antisocial; MCMISad = Sadistic; MCMICom = Compulsive; MCMINeg = Negativistic; MCMIMas = Masochistic; MCMISzt = Schizotypal;

MCMIBor = Borderline ; MCMIPar = Paranoid; PAIBor = Borderline; PAIAnt = Antisocial. * $p < .001$.

Axis II ANOVA and post-hoc tests. Table 4 shows post-hoc comparisons using Tukey's HSD for Axis II MCMI-III mean scores (along with results of the univariate ANOVAS). The highest mean scores for Schizotypal personality disorder were Class 2 and Class 5; means did not differ between Class 1 and Class 3; groups 2 and 4 were also a homogeneous subset.

In regards of MCMI-III Avoidant disorder, no differences were found between Class 2 and Class 5 and these were the highest mean scores; Class 4 was significantly different to all other mean scores, and Class 3 and Class 5 were the lowest means and did not differ from each other. As noticed in Table 4.4, Axis II MCMI-III Depressive disorder mean scores for Class 4 and Class 5 were the highest; Class 3 and Class 4 did not differ from each other, and Class 1 was the lowest value.

MCMI-III Dependent Class 2, Class 4, and Class 5 were a homogeneous subset and values were significantly higher than Class 1 and Class 3, being Class 1 the lowest. For Histrionic personality disorder variables, Class 1 and Class 3 were the highest but did not differ from each other. Class 5 was significantly lower than the other groups.

Table 4

Mean Differences for Axis II Five Latent Profile Model

<i>Latent Class (CPROB5)</i>	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4</i>	<i>Class 5</i>	<i>Total</i>		
<i>Test Variable</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
MCMIScz	46.52 ¹	69.09 ²³	48.11 ¹	59.73 ²	78.02³	62.17 (21.02)	25.18*	4, 214
MCMIAvo	34.48 ¹	77.03²	32.96 ¹	61.30 ³	84.98²	61.26 (27.13)	73.93*	4, 214
MCMIDep	24.26 ¹	77.09³	51.96 ²	82.23³⁰	90.8⁰	71.39 (27.36)	80.26*	4, 214
MCMIDpt	32.96 ¹	77.12²	57.18 ³	76.57²	84.12²	70.05 (23.98)	41.34*	4, 214
MCMIHis	50.17 ¹³	33.12 ²	55.53 ¹	47.38 ³	15.12 ⁰	38.74 (19.75)	88.62*	4, 214
MCMINar	59.83 ³	43.88 ²	67.11 ³	63.82 ³	32.72 ¹	52.89 (19.32)	60.93*	4, 214
MCMIAnt	35.30 ¹	53.18 ²	73.42 ³⁰	78.30⁰	67.12 ³	65.97 (18.00)	52.31*	4, 214
MCMISad	27.09 ¹	42.21 ²	57.67 ³	67.17 ⁰	58.49 ³⁰	54.87 (17.85)	49.54*	4, 214
MCMICom	58.65 ¹	51.50 ²	42.62 ³	34.38 ⁰	31.05 ⁰	40.02 (14.21)	41.45*	4, 214
MCMINeg	13.83 ¹	36.65 ²	39.69 ²	69.98 ³	78.60 ³	53.20 (25.98)	91.88*	4, 214

Table 4 (continued).

<i>Latent Class (CPROB5)</i>	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4</i>	<i>Class 5</i>	<i>Total</i>		
<i>Test Variable</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
MCMIMas	19.91 ¹	71.29 ³	50.09 ²	73.70 ³⁰	82.14²⁰	65.02 (25.04)	74.08*	4, 214
MCMISzt	11.96 ¹	56.06 ⁰	32.13 ²	61.37 ³⁰	69.12 ⁰	51.37 (24.41)	78.11*	4, 214
MCMIBor	14.83 ¹	53.65 ²	55.20 ²	73.82 ³	75.81³	61.18 (22.32)	118.13*	4, 214
MCMIPar	7.17 ¹	36.79 ²	27.36 ²	55.05 ³	62.98 ³	43.56 (26.10)	52.05*	4, 214
PaiBor	45.61 ¹	60.50²	58.36 ²	70.56³	72.68³	64.37 (12.18)	55.46*	4, 210
PaiAnt	50.70 ¹	53.35 ¹	61.27²	69.30³	63.58²³	61.36 (10.84)	23.70*	4, 210

Note. Values in bold clinically significant. Means in same row that do not share superscripts differ at $p < .001$. MCMIANx = Anxiety; MCMISom = somatoform; MCMIBpr Bipolar; MCMIDys Dysthymia; MCMIAlc = Alcohol Dependence; MCMIDrg = Drug Dependence; MCMIPts = PTSD; MCMITht = Thought Disorder; MCMIMaj = Major Depression; MCMIDel = Delusional Disorder; PAISom = Somatic Complaints; PAIANx = Anxiety; PAIArd = Anxiety-related disorders; PAIDep = Depression; PAIMan = Mania; PAIPar = Paranoia; PAIScz = Schizophrenia; PAIAlc = Alcohol-related; PAIDrg = Drug-related.

* $p < .001$

Pairwise comparisons for MCMI-III Narcissistic disorder indicated that mean scores for Class 1, Class 4, and Class 3 were significantly higher than the two other groups. Class 3 and Class did not differ to each other but were significantly higher than the rest of the groups for MCMI-III Antisocial disorder.

In regards to MCMI-III Sadistic personality disorder, Class 4 appeared significantly higher than the rest of the groups, and Class 1 was the lowest; differences between Class 3 and Class 5 were not significant. Class 1 was significantly higher for Compulsive disorders and Class 4 and Class 5 were the lowest and did not differ from each other. Mean scores for MCMI-III Masochistic disorder Class 4 and Class 5 did not differ to each other but were the highest; Class 2 and Class 3 did not differ between each other, and Class 1 was the lowest score.

Finally, pairwise comparison of mean scores for Axis II MCMI-III Schizotypal indicated that Class 2 and Class 5 did not differ from each other but were significantly higher than the others; Class 2 and Class 4 did not differ, and Class 1 was the lowest mean score. The same pattern was observed for scales MCMI-III Borderline and Paranoid disorders, and PAI Borderline features and Antisocial features.

Discriminant Analyses

Once MANOVA results indicated that group-differences existed and ANOVA was used to identify where the specific differences resided, the MANOVA was also followed up with a descriptive discriminant analysis. The

purpose of this analysis was to see which indicators best predicted group membership.

Canonical discriminant functions were interpreted using the structure coefficients, which represent the correlation between the measured variable and the latent discriminant function score. Value of .30 or greater for a structure coefficient indicated a noteworthy contribution of a variable to the discriminant function, same as in factor loading interpretation. Largest loadings for each discriminate function indicated more important variables. Assumption of equal population covariance matrices to the dependent variables was tested using Box's M test, which indicated the group covariance matrices differed both for CPROB4 and for CPROB5.

Axis I discriminant analysis. Discriminant analysis produced three canonical discriminant functions for Axis I variables. The squared canonical correlation for the functions reflected the %age of variance in group membership accounted for by the predictors. Examination of the canonical correlations determined that the first function accounted for approximately 81.4% variability; the second for 10.5%, and the third for 8.1%. The three functions as a whole accounted for a statistically significant degree of variance. Wilk's Lambda values were: 1 through 3 = .02 (57), $p < .001$; 2 through 3 = .22 (36), $p < .001$; 3 = .50 (17), $p < .001$). The overall hit rate of the discriminant function for predicting class membership was 92.3%, indicating a high degree of accuracy. Structure coefficients were considered indicators of which variables made noteworthy contributions to the discriminant functions, and allowed identification of

conceptual dimensions underlying each function. As stated before, value used as threshold considered to be a noteworthy magnitude for interpretation for the structure coefficients was .30 or greater. Coefficients less than .30 were not considered interpretable because these accounted for less than 10% variability in the functions (Brown & Wicker, 2000).

Axis I structure matrix. Table 5 depicts the structure matrix for the discriminant analyses for Axis I variables, which shows the correlations of each variable with each discriminate function. Variables with structure coefficient values considered noteworthy (i.e., .30 or larger), were examined in order to identify the nature of the discrimination for each discriminant function. Structure coefficients for Axis I indicator variables depicted MCMI-III Somatoform, Major Depressive disorder, Anxiety and PTSD highly correlated with Function 1, suggesting the function is mostly defined by negative emotionality and trauma-related symptoms.

Variables that correlated the highest with Function 2 were MCMI-III Anxiety, Anxiety-Related disorders, Schizoid, Depressive, Paranoid, and Somatic-Complaint disorders. This suggests the function is defined by variables involving worry and tension; depression, mistrust and isolation, and somatic concerns. Correlations between discriminator variables and Function 3 suggested the most significantly correlated discriminator variables were MCMI-III Dysthymia, Thought Disorder, Alcohol, and Drug Dependence, suggesting chronic depression, poor judgment and sense of reality, and problems with alcohol and substances.

Table 5

Structure Matrix Coefficients for Axis I-Discriminator Variables

	Function 1	Function 2	Function 3
MCMISom	.77	-.45	-.23
MCMIMaj	.47	.06	.05
MCMIANx	.34	.29	.33
MCMIPts	.32	.28	.10
PAIALC	.04	.01	-.01
PAIANX	.34	.69	-.30
PAIARD	.23	.56	-.19
PAISCZ	.22	.44	-.25
PAIDEP	.36	.43	-.19
PAIPAR	.18	.38	-.18
PAISOM	.19	.37	-.22
PAIMAN	.09	.21	-.02
MCMIBpr	.13	.19	.17
MCMIDel	.10	.11	.04
MCMIDys	.43	.27	.46
MCMITht	.35	.34	.43

Table 5 (continued).

	Function 1	Function 2	Function 3
MCMIAIc	.14	.14	.41
MCMIDrg	.07	.05	.37
PAIDRG	.04	.04	.08

Note: values in bold indicate meaningful contribution to function. Abbreviations: MCMIAnx = Anxiety; MCMISom = Somatoform; MCMIBpr Bipolar; MCMIDys Dysthymia; MCMIAIc = Alcohol Dependence; MCMIDrg = Drug Dependence; MCMIPts = Post-Traumatic Stress Disorder; MCMITht = Thought Disorder; MCMIMaj = Major Depression; MCMIDel = Delusional Disorder; PAISom = Somatic Complaints; PAIAnx = Anxiety; PAIArd = Anxiety-related disorders; PAIDep = Depression; PAIMan = Mania; PAIPar = Paranoia; PAIScz = Schizophrenia; PAIAIc = Alcohol-related; PAIDrg = Drug-related.

Figure 3 depicts a plot of individual discriminant function scores with function 1 scores on the x-axis and function 2 scores on the y-axis, along with group centroids for the Axis I discriminant functions. Plotting of group means (centroids) provides a visual depiction of how well the discriminant functions distinguished between Axes I groups. As seen in Figure 4.3, Function 1 discriminated between groups 1 and 4 versus groups 3 and 2, and Function 2 discriminated between groups 1 and 3 versus 4 and 2.

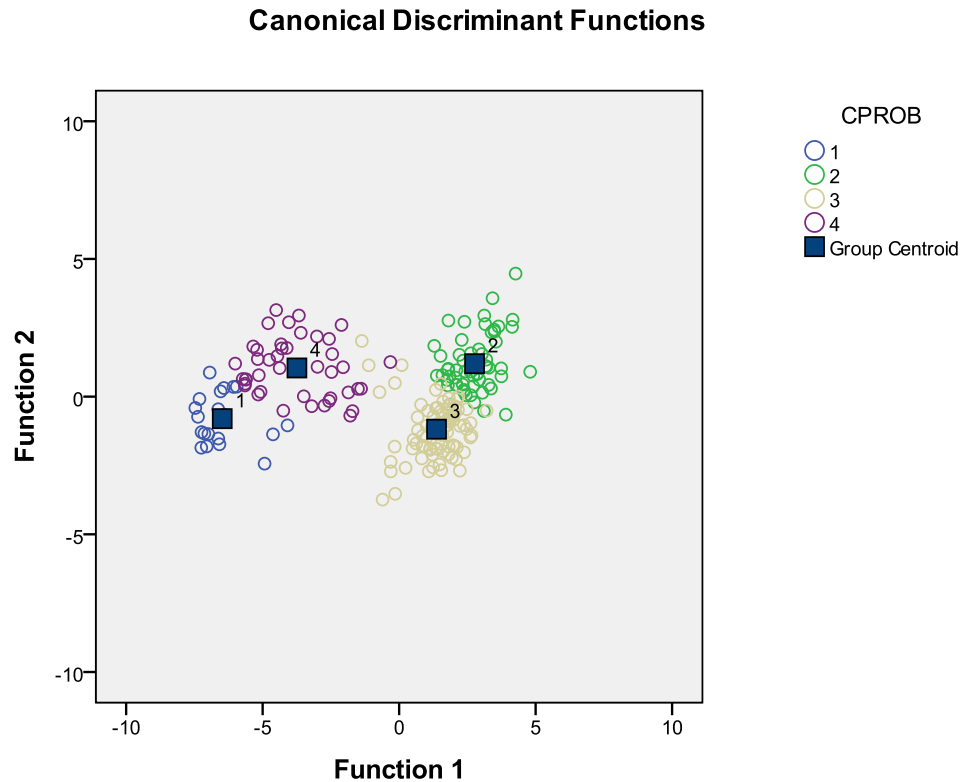


Figure 3. Discriminant Function Analysis Plot of Axis I Variables

External Validation of Axis I Latent Classes

The external validation phase included correlations with legal consequences of sexual behavior, frequency and severity of sexual behaviors measured by the Sexual Addiction Screening Test-R (SAST-R); unresolved traumatic experiences reported in the Post-Traumatic Stress Inventory (PTSI); eating disordered behaviors screened by the Eating Disorder Inventory (EDI); types of sexually addictive behaviors endorsed in the Sexual Dependency Inventory Revised (SDI-R), and general indicators of psychological distress as measured by the Brief Symptom Inventory (BSI).

Correlations between Group Membership (CPROB4) and legal consequences were explored for Axis I variables. Analysis of variances revealed no significant differences for any of the groups. ANOVA for Axis I and legal problems was non-significant ($F = .25$; $p = .86$).

Table 6 portrays results of one-way analysis of variance for Axis I group membership (CPROB4) and total scores from the Sexual Addiction Screening Test core items (SAST-R) as well as the four SAST-R main dimensions (i.e., preoccupation, loss of control, relationship disturbance, and affect disturbance). ANOVA indicates significant differences for the total sum and three of the four dimensions, with the exception of relationship disturbance.

In regards of SAST-R total sum, Classes 3 and 4 have significantly higher scores, whereas Class 1 is significantly lower than the rest of the groups. The dimension Preoccupation suggests Class 2 had the highest score, and the rest of the groups were comparable. Scores for dimension Loss of Control suggest Class 2 and Class 4 were higher than Class 1 and Class 3, and were not significantly different from each other. Finally, for dimension Affect disturbance, Class 1 appeared with the lowest score, whereas Classes 2, 3, and 4 were comparable.

Table 6

Analysis of Variance for Axis I CPROB4 and Correlates: Sex Addiction Screening Test Inventory and Core Dimensions

<i>Latent Class (CPROB4)</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Total</i>		
<i>Test Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
SUM_SAST	11.14¹	16.36³	14.22²	14.96²³	14.71 (3.91)	11.63*	3,213
SUM_PREO	1.19 ¹	2.92 ³	2.17 ²	2.27 ²	2.32 (1.12)	14.84*	3,216
SUM_LOSS	2.76 ¹	3.68 ²	3.23 ¹	3.64 ²	3.40 (1.10)	5.64*	3,216
SUM_RELATI	3.10 ¹	3.43 ¹	3.44 ¹	3.58 ¹	3.43 (0.87)	4.50	3,215
SUM_AFFEC	3.81 ¹	4.68 ²	4.27 ¹²	4.62 ²	4.42 (1.02)	5.53*	3,216

Note. *denotes a significant difference at the .01 level, values in bold: clinically significant values, means in the same row that do not share superscripts differ at $p < .001$. Abbreviations: SUM_SAST = sum of 20 core SAST scores; SUM_PREO = sum dimension preoccupation; SUM_LOSS = sum dimension loss of control; SUM_RELAT = sum dimension relationship disturbance; SUM_AFFEC = sum dimension affect disturbance. * $p < .001$

Table 7 shows results for the Eating Disorder Inventory (EDI), and the Post Traumatic Stress Inventory (PTSI). ANOVA suggests significant differences for the dimensions EDI global, Low Self-Esteem, Personal Alienation, Interpersonal Alienation, Interpersonal Deficits, Emotional Dysregulation, Perfectionism, and Ascetism at the $p < .01$ level. Significant differences were also identified for the PTSI. Given that ANOVA indicated that at least two groups differed from each other, it was followed with a Tukey's post-hoc to identify the pattern of differences.

Pairwise comparisons were conducted on each one of both tests (EDI and PTSI) to determine which Axis I groups were significantly different from each other. Tukey's HSD indicated that lowest mean scores for EDI Global score was for Class 1; Class 2 was the highest mean but no score was significantly different from the other two classes (Classes 3 and 4). The same pattern was observed for the other EDI dimensions: Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, Interpersonal Deficits, Emotional Dysregulation, Perfectionism, Ascetism, and Maturity Fears. The lowest mean scores for all the dimensions were for Class 1 and the highest for Class 2 but none was significantly different from the other groups.

Pairwise comparisons on PTSI indicated that mean score for Class 2 was the highest and differed significantly from all other groups. Mean scores for Class 3 and Class 4 did not differ significantly from each other, and Class 1 was significantly lower in comparison to the rest of the groups.

Table 7

Analysis of Variance for Axis I CPROB4 and Eating Disorder Subscales (EDI) and Posttraumatic Stress Inventory

<i>Latent Class (CPROB4)</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Total</i>		
<i>Test Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
EDI_Global	38.47 ¹	46.22 ²	41.63 ¹²	42.07 ¹²	42.85 (8.62)	6.01*	3,206
DThinness	44.53	43.85	44.25	43.77	44.05 (9.69)	0.49	3,206
Bulimia	32.16	34.45	32.48	32.79	33.12 (9.11)	0.68	3,206
BDissatisfac	30.74	31.46	29.98	29.33	30.37 (10.36)	0.43	3,207
LSelf_Esteem	40.32 ¹	47.38 ²	43.12 ¹²	43.58 ¹²	44.27 (9.24)	4.34*	3,207
PersAlienat	44.53 ¹	50.29 ²	46.35 ¹²	47.88 ¹²	47.71 (9.43)	3.03*	3,207
IInsecurity	45.00 ¹	50.63 ²	46.70 ¹²	49.09 ¹²	48.25 (9.56)	3.00*	3,207
IAlienation	38.68 ¹	44.45 ²	41.15 ¹²	41.56 ¹²	42.03 (8.66)	3.04*	3,207
IDeficits	44.00 ¹	49.32 ²	47.62 ¹²	45.35 ¹²	47.36 (8.69)	2.92*	3,207

Table 7 (continued).

<i>Latent Class</i>							
<i>(CPROB4)</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Total</i>		
<i>Test Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
EDysregulat	45.32	48.33	45.79	46.95	46.92 (8.99)	1.69	3,207
Perfect	41.21 ¹	45.25 ¹	42.32 ¹	40.77 ¹	42.81 (7.98)	3.43*	3,207
Ascetism	43.11	16.69	46.31	47.77	45.82 (8.25)	1.27	3,206
MatFears	38.42 ¹	46.17 ²	41.93 ¹²	42.63 ¹²	43.06 (9.45)	4.52*	3,206
PTSI_total	17.89 ¹	69.67 ³	41.89 ²	31.53 ²	46.16 (27.42)	41.03*	3, 180

Note. *denotes a significant difference at the .01 level, values in bold: clinically significant values, means in the same row that do not share superscripts differ at $p < .001$. Abbreviations: DThinness = Drive for Thinness; Bulimia; BDissatisfac = Body Dissatisfaction; LSelf_Esteem= Low Self-Esteem; PersAlienat= Personal Alienation; Insecurity = Interpersonal Insecurity; IAlienation = Interpersonal Alienation; IDeficits = Interpersonal Deficits; EDysregulat = Emotional Dysregulation; Perfect = Perfectionism; Ascetism; MatFears = Maturity Fears; EDI total = sum of total EDI scores; PTSD total = sum of PTSD total scores. * $p < .001$.

Table 8 depicts mean differences for Axis I group membership on SDI-R scale scores. Significant group differences were found for Fantasy frequency and power ($F = 13.48$ and $F = 10.34$), Seductive frequency ($F = 4.21$), Pain power ($F = 3.09$), Intrusive frequency and power ($F = 4.01$ and $F = 3.66$), Voyeuristic frequency and power ($F = 4.16$ and $F = 5.76$), Exhibitionistic frequency and power ($F = 4.18$ and $F = 3.56$), Trade frequency and power ($F = 2.97$ and $F = 2.67$), Anonymous frequency and power ($F = 8.82$ and $F = 3.20$), and Exploitative frequency ($F = 3.13$). Pairwise comparisons were conducted on Axis I group membership and SDI-R scale scores as post-hoc follow up for significant ANOVA. Fantasy Sex frequency mean score for Class 2 was significantly higher than the other groups, whereas Class 3 and Class 4 did not differ to each other, and Class 1 was significantly lower than the other groups. In regards to Fantasy Sex power, Class 1 was significantly lower than the rest of the groups, whereas Class 3 did not differ from Class 4, and Class 2 was the highest of all the groups. In terms of Seductive Sex frequency, one subset was formed by Classes 1, 3, and 4, which differed from the subset formed by Classes 2, 3, and 4. Pairwise comparisons for Pain Sex frequency indicated two different subsets; one formed by Classes 1, 3, 4, which differed significantly from the second subset composed by Classes 2, 3, and 4. Mean scores for Intrusive Sex frequency did not differ when Classes 1, 3, and 4 were compared to each other, but these differed significantly from the subset formed by Classes 2, 3, and 4. Intrusive Sex power had significantly low mean scores for Class 1, Class 3, and Class 4 versus a subset composed by Class 2, Class 3, and Class 4.

Table 8

Analysis of Variance for Axis I and SDI-R Subscale Correlates

SDI-R Type	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Total</i>	<i>F</i>
fantasy_frequency	51.64 ¹	69.68 ³	60.76 ¹²	62.08 ²	63.10	13.41*
fantasy_power	51.57 ¹	68.63 ³	60.57 ²	60.62 ²	62.43	10.34*
seductive_frequency	51.85 ¹	66.07 ²	56.56 ¹²	61.61 ¹²	60.09	4.21*
seductive_power	56.56	69.38	65.86	67.22	66.46	1.53
pain_frequency	46.31 ¹	60.90 ²	54.33 ¹²	57.91 ¹²	56.39	3.09*
pain_power	48.11	63.54	57.11	58.12	58.61	2.17
intrusive_frequency	49.81 ¹	64.64 ²	56.38 ¹²	59.82 ¹²	59.08	4.01*
intrusive_power	52.45 ¹	69.25 ²	58.52 ¹²	59.46 ¹²	61.63	3.66*
voyeuristic_frequency	63.60 ¹	77.21 ²	70.19 ¹²	71.65 ¹²	72.15	4.16*
voyeuristic_power	63.07 ¹	78.79 ²	68.71 ¹²	68.55 ¹²	71.45 ¹²	5.76*

Table 8 (continued).

SDI-R Type	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Total</i>	<i>F</i>
exhibitionistic_frequency	55.89 ¹	66.89¹	56.62 ¹	63.61 ¹	61.06	4.08*
exhibitionistic_power	54.77 ¹	70.06¹	57.81 ¹	61.62 ¹	62.15	3.56*
trade_frequency	50.61 ¹	64.40 ¹	55.55 ¹	62.81 ¹	59.23	2.97*
trade_frequency	50.61 ¹	64.40 ¹	55.55 ¹	62.81 ¹	59.23	2.97*
trade_power	50.89 ¹	75.88²	63.34 ¹²	65.19¹²	66.60	2.67*
anonymous_frequency	51.57 ¹	60.98 ¹	53.92 ¹	56.54 ¹	56.44	2.82*
anonymous_power	53.04 ¹	64.02 ¹	55.78 ¹	57.16 ¹	58.43	3.20*
pay_frequency	70.37	77.62	80.01	79.77	78.41	.36
pay_power	71.39	84.46	77.45	77.02	79.13	.72
exploitative_frequency	48.97 ¹	61.79 ¹	52.02 ¹	56.79 ¹	55.72	3.13*
exploitative_power	48.81	67	55.86	56.02	58.91	2.50

Note. *df* = 3,130; *denotes $p < .001$; values in bold: clinically significant values, means in the same row that do not share superscripts differ at $p < .001$.

No mean scores differences were detected between Class 1, Class 3, and Class 4 Voyeuristic Sex frequency, but these were significantly lower than Class 2, Class 3, and Class 4 as a subset. Pairwise comparisons for Voyeuristic Sex power indicated that Class 1, Class 3, and Class 4 did not differ to each other, but were significantly lower than Class 4, Class 3, and Class 2. Despite previous indication of mean differences between groups from ANOVA, neither Exhibitionistic Sex frequency nor power showed any significant group differences. No significant group differences were identified for Trade frequency either. However, means from Trade Sex power differed significantly for Class 1, Class 3, and Class 4 in comparison to Class 2, Class 3, and Class 4. No mean differences were identified from pairwise comparisons from Anonymous Sex frequency and Anonymous Sex power, Pain Sex frequency and Pain Sex power, or Exploitative Sex frequency and Exploitative Sex power, as can be observed in Table 9.

ANOVAS evaluating Axis I group differences for BSI subscale scores are depicted in Table 4.9. As seen in Table 9, group differences were statistically significant for all BSI subscales. Significant ANOVAs were followed up with Tukey post-hoc tests as seen on Table 8. BSI Hostility for the scale Class 2 was significantly higher than Class 1, Class 3, and Class 4, which did not differ as a subset and the same pattern was observed for BSI Interpersonal subscale. Class 2 was the highest mean score for BSI Obsessive subscale and differed significantly from the Classes, which formed a homogeneous subset. Pairwise differences were identified between BSI Paranoia Class 2 and the rest of the

variables, being Class 2 significantly higher, and the other groups did not differ to each other.

BSI Psychoticism mean scores comparisons revealed that Class 2 was significantly higher than the rest of Classes, and Class 1 was the lowest mean score, whereas Class 3 and Class 4 were a separate subset but did not differ from each other. Pairwise comparisons on BSI Somatization indicated that Class 2 was significantly higher than the three other Classes, which did not differ from each other. The exact same pattern was observed when class means were compared for BSI Phobia subscale.

Table 9

Analysis of Variance for Axis I Groups and BSI Correlates

<i>Latent Class (CPROB4)</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Total</i>	
<i>BSI Scale</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>F</i>
Hostility	1.81 ¹	6.09 ²	3.40 ¹	3.07 ¹	4	10.24*
Interpersonal	3 ¹	8.61 ²	5.24 ¹	4.30 ¹	5.88	16.74*
Obsessive	3.05 ¹	9.85 ³	5.69 ²	5.48 ¹²	6.67	18.23*
Paranoia	1.38 ¹	6.72 ²	3.40 ¹	3.39 ¹	4.21	14.12*
Psychoticism	2.76 ¹	9.95 ³	6.17 ²	5.09 ²	6.87	24.43*
Somatization	1.47 ¹	4.95 ²	2.22 ¹	1.86 ¹	2.90	12.25*
Phobia	.71 ¹	4.37 ²	1.74 ¹	1.16 ¹	2.33	19.64*

Note. Means in the same row that do not share superscripts differ at $p < .001$

* $p < .001$.

Axis II discriminant analysis. Discriminant analysis produced four canonical discriminant functions for Axis II variables. Eigenvalues for squared canonical squared correlations indicated that the first function accounted for 74.8% of the variance; the second for 18.6%, the third for 4.4%, and the fourth for 2.2 %. The four functions as a whole accounted for a statistically significant degree of variance. Wilk's Lambda values were: 1 through 4 = .02 (64), $p < .001$; 2 through 4 = .18 (45), $p < .001$; 3 through 4 = .54 (28), $p < .001$, and 4 = .81 (13), $p < .001$). Standardized discriminant function coefficients for the Axis II analysis are portrayed in Table 10. MCMI-III indicators of Schizotypal disorder (.314) had a meaningful and positive contribution to group discrimination on function 1. MCMI-III Narcissistic disorder contributed significantly to function 2 (.454); the contributions of Depressive disorder (.397), Histrionic disorder (.559) and Compulsive disorder were significant for function 3. Contributions were high and positive for function 4 on MCMI-III Negativistic disorder (.708), Avoidant disorder (.438), and PAI Antisocial disorder (.339). It was significant and negative for PAI Borderline disorder (-.595), and MCMI-III Antisocial disorder (-.438). Classification results revealed a significant predictive accuracy (hit ratio) of the discriminant function; 95.5% of the original grouped cases accurately classified into classes.

Axis II structure matrix. Table 10 depicts Axis II variables correlated with group membership reflected in the structure matrix. Values that accounted for the variability across Axis II groups were examined in order to identify the nature of the discrimination for each discriminant function. Structure matrix coefficients

for Axis II discriminator variables showed high correlation for Function 1 and MCMI-III Borderline, Depression, Schizotypal, Masochistic, and Paranoia, suggesting emotional instability, negative emotionality, relationship issues, and mistrust. Function 2 correlated with MCMI-III Histrionic, Narcissistic, Antisocial, Sadistic, and Avoidant PD scales. Discriminator variables best accounted for Function 3 were MCMI-III Compulsive, Negativistic, and Antisocial, suggesting impulsivity and irresponsibility, perfectionism, and passive-aggressive tendencies. Function 4 was not defined by any particular indicator.

Table 10

Structure Matrix Coefficients for Axis II Discriminator Variables

<i>Variables</i>	<i>Function 1</i>	<i>Function 2</i>	<i>Function 3</i>	<i>Function 4</i>
MCMIBor	.50	.28	-.126	-.26
MCMIDep	.42	-.04	.283	.09
MCMISzt	.41	-.05	.256	.21
MCMIMas	.41	-.01	.315	-.09
PAIBOR	.35	.11	-.140	.14
MCMIPar	.34	.02	-.141	.26
MCMIDpt	.30	-.03	.285	-.11
MCMIHis	-.30	.66	.185	.16
MCMINar	-.20	.63	.010	.26
MCMIAnt	.21	.51	-.240	-.40
MCMISad	.25	.44	-.296	-.15
MCMIAvo	.33	-.41	.370	.26

Table 10 (continued).

<i>Variables</i>	<i>Function 1</i>	<i>Function 2</i>	<i>Function 3</i>	<i>Function 4</i>
MCMIScz	.19	-.26	.077	-.05
MCMICom	-.26	-.16	.528	.05
MCMINeg	.43	.17	-.490	.38
PAIAnt	.17	.29	-.331	.20

Note: values in bold= meaningful contribution to function Axis II. Abbreviations: MCMIScz = Schizoid; MCMIAvo = Avoidant; MCMIDep = Depressive; MCMIDpt = Dependent; MCMIHis = Histrionic; MCMINar = Narcissistic; MCMIAnt = Antisocial; MCMISad = Sadistic; MCMICom = Compulsive; MCMINeg = Negativistic; MCMIMas = Masochistic; MCMISzt = Schizotypal; MCMIBor = Borderline ; MCMIPar = Paranoid; PAIBor = Borderline; PAIAnt = Antisocial.

Figure 4 depicts a plot of individual discriminant function scores with function 1 scores on the x-axis and function 2 scores on the y-axis, along with group centroids for the Axis II discriminant functions. Plotting of group means (centroids) provides a visual depiction of how well the discriminant functions distinguished between Axis II groups. As seen in Figure 4, Function 1 discriminated between groups 1 and 3 versus groups 2, 4, and 5, and Function 2 discriminated between groups 1, 2, and 5 versus 3 and 4.

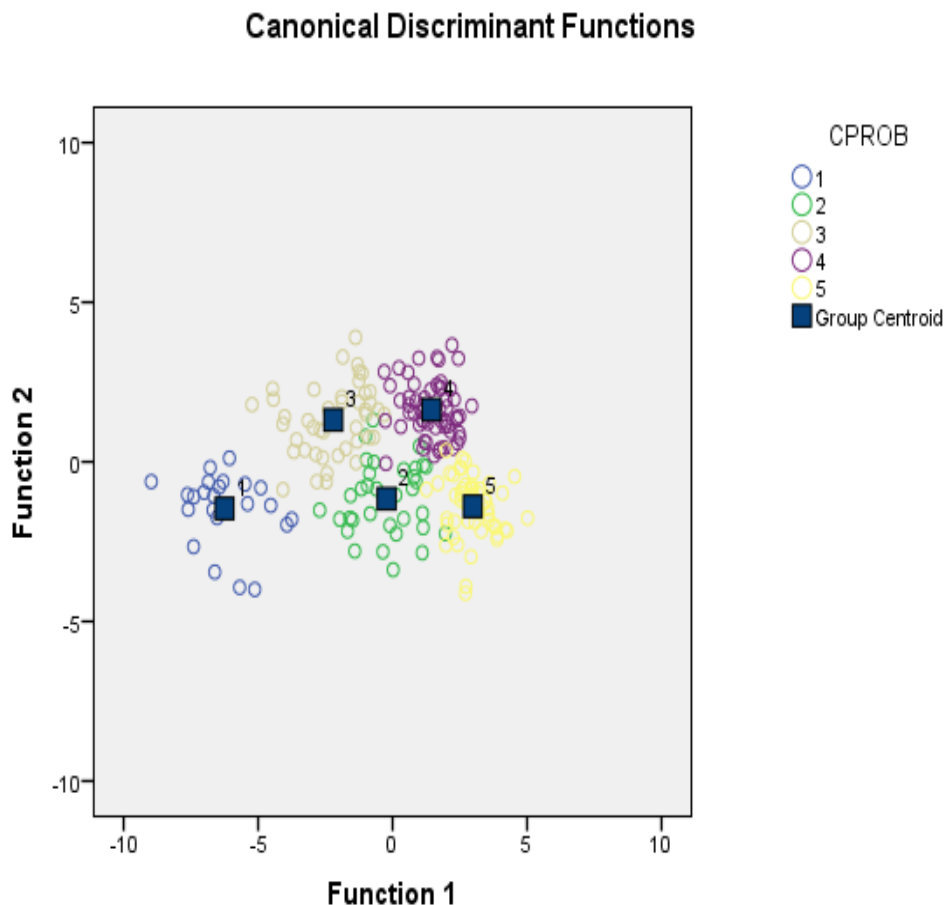


Figure 4. Discriminant Function Analysis Plot of Axis II Variables

External Validation of Axis II Latent Classes

The external validation phase intended to define and validate the Axis II latent classes. For such reason, relationships between class membership and external variables were evaluated. The same external correlates used to validate Axis I latent classes were used for Axis II latent classes, namely legal consequences, frequency and severity of sexually addictive behaviors, severity of unresolved traumatic experiences, eating disordered behaviors, types of sexually addictive behaviors, and general indicators of psychological distress as

measured by specific screening instruments. No significant correlations were identified between Axis II and legal consequences ($F = .36$; $p = .84$).

Results of analysis of variance for Axis II group membership (CPROB5) and total scores from the SAST-R four core dimensions are presented in Table 11. Total CPROB5 Sum and most SAST-R core dimensions, with the exception of Relationships disturbance reveal significant ANOVA differences. Such ANOVA differences were followed up with a Tukey's post-hoc test to determine the specific sources of differences.

As noted in Table 11, Class 1 scores appear to be significantly lower than the rest of the groups for all the SAST-R variables. Pairwise comparisons indicate that the dimension Preoccupation Class 5 yields the highest mean score but this is not significantly different than Class 4. Scores for Class 5 appear higher for the dimensions Loss of Control and Affect disturbance but values are not statistically significant from the rest of the groups, as can be observed in Table 11.

Table 11

Analysis of Variance for Axis II CPROB5 and Correlates: Sex Addiction Screening Test Inventory and Core Dimensions

<i>Latent Class</i>								
<i>(CPROB5)</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Class 5</i>	<i>Total</i>		
<i>Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>	<i>F (*sig)</i>	<i>df</i>
SUM_SAST	11.14 ¹	14.33 ²	14.30 ²	15.17 ²	16.14 ²	14.71 (3.91)	7.76*	4,212
SUM_PREO	1.14 ¹	2.06 ²³	1.91 ²	2.72 ³⁰	2.84 ⁰	2.32 (1.20)	14.58*	4,215
SUM_LOSS	2.64 ¹	3.50 ²	3.35 ²	3.48 ²	3.60 ²	3.40 (1.09)	3.51*	4,215
SUM_RELATI	3.14	3.53	3.50	3.45	3.42	3.43 (.87)	.82	4,214
SUM_AFFEC	3.77 ¹	4.41 ²	4.37 ¹	4.53 ²	4.60 ²	4.42 (1.02)	3.03*	4,215

Note. *denotes a significant difference at the .01 level, values in bold: clinically significant values, means in the same row that do not share superscripts differ at $p < .001$. Abbreviations: SUM_SAST = sum of 20 core SAST scores; SUM_PREO = sum dimension preoccupation; SUM_LOSS = sum dimension loss of control; SUM_RELAT = sum dimension relationship disturbance; SUM_AFFEC = sum dimension affect disturbance.

ANOVA suggests significant group differences for most Axis II EDI variables, as noted in table 12. Pairwise comparisons indicated that Class 5 had the highest Global EDI score. Likewise, EDI dimensions Low Self-Esteem and Maturity Fears had the highest scores for Class 5 but it was not statistically different from Class 4. Dimension Personal Alienation had the highest mean for Class 5 but this was not significantly different from Class 2, and the same pattern was observed for Interpersonal Insecurity. Pairwise comparison indicated Class 5 was the highest for Interpersonal Alienation, Interoceptive Deficits, Perfectionism, and Ascetism, but differences with other classes were not statistically significant, as noted in Table 12.

In regards to PTSI mean scores, Tukey's HSD indicated that Class 5 was the highest value and differed from the rest of the groups; comparison of Class 2 and Class 4 did not suggest significant differences between the two of them but significant differences from the rest of the groups as a subset. Class 2 did not differ from Class 3, and Class 1 and Class 3 were a homogeneous subset with mean scores that were significantly low in comparison to the rest of the groups.

Table 12

Analysis of Variance for Axis I CPROB5 and Eating Disorder Subscales (EDI) and Posttraumatic Stress Inventory

<i>Latent Class (CPROB5)</i>	<i>Class</i>					<i>Total</i>	<i>F (*sig)</i>	<i>df</i>
	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>5</i>			
<i>Test Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>		
PTSI_total	16.33 ¹	40.69 ²³	30.20 ¹²	50.82 ³	68.18 ⁰	46.16 (27.42)	27.07*	4, 179
EDI_Global	37.10 ¹	41.97	41.24	41.80	47.65	42.85 (8.62)	8.34	4,205
DThinness	44.00	40.81	44.36	43.90	45.80	44.05 (9.69)	1.40	4,205
Bulimia	30.20	30.34	32.86	33.76	35.25	33.12 (9.11)	2.17	4,205
BDissatisfac	28.45	27.22	30.02	30.56	32.88	30.37 (10.36)	1.79	4,205
LSelf_Esteem	38.50 ¹	42.58 ¹	42.69 ¹	44.10 ¹²	48.63 ²	44.27 (9.24)	6.30*	4,206
PersAlienat	46.20 ¹	48.61 ¹²	45.31 ¹	44.47 ¹	52.84 ²	47.71 (9.43)	7.73*	4,206
II insecurity	45.45 ¹	48.36 ¹²	45.79 ¹	46.24 ¹	53.05 ²	48.25 (9.56)	5.88*	4,206

Table 12 (continued).

<i>Latent Class</i>								
<i>(CPROB5)</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Class5</i>	<i>Total</i>	<i>F (*sig)</i>	<i>df</i>
<i>Test Variables</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M (SD)</i>		
IAlienation	37.15 ¹	40.79 ¹²	41.76 ¹²	41.07 ¹	45.65 ²	42.03 (8.66)	4.75*	4,206
IDeficits	42.65 ¹	45.06 ¹²	48.07 ¹²	47.68 ¹²	49.47 ²	47.36 (8.69)	3.10*	4,206
EDysregulat	43.55	47.42	45.86	46.93	45.58	46.92 (8.99)	1.31	4,206
Perfect	39.25 ¹	42.33 ¹²	41.79 ¹²	41.97 ¹²	45.95 ²	42.81 (7.98)	3.75*	4,205
Ascetism	41.65 ¹	45.09 ¹²	46.31 ¹²	46.00 ¹²	47.16 ²	45.82 (8.25)	1.79	4,206
MatFears	36.80 ¹	42.27 ¹²³	41.26 ¹²	42.93 ²³	47.18 ³	43.06 (9.45)	5.83*	4,205

Note. *denotes a significant difference at the .01 level, values in bold: clinically significant values, means in the same row that do not share superscripts differ at $p < .001$. Abbreviations: DThinness = Drive for Thinness; Bulimia; BDissatisfac = Body Dissatisfaction; LSelf_Esteem= Low Self-Esteem; PersAlienat= Personal Alienation; Insecurity = Interpersonal Insecurity; IAlienation = Interpersonal Alienation; IDeficits = Interpersonal Deficits; EDysregulat = Emotional Dysregulation; Perfect = Perfectionism; Ascetism; MatFears = Maturity Fears; EDI total = sum of total EDI scores; PTSI total = sum of PTSI total scores.

Table 13 portrays analysis of variances for Axis II group membership (CPROB5) and SDI-R scale scores. Significant results were found for scales Fantasy frequency and power ($F = 6.12$ and $F = 5.31$), Seductive frequency ($F = 3.49$), Intrusive frequency and power ($F = 4.73$ and $F = 5.05$), Voyeuristic frequency and power ($F = 6.31$ and $F = 6.93$), Exhibitionistic frequency and power ($F = 4.70$ and $F = 3.52$), Trade frequency ($F = 2.78$), Anonymous frequency and power ($F = 2.40$ and $F = 2.62$), Pay Sex frequency and power ($F = 2.57$ and $F = 2.43$), and Exploitative frequency and power ($F = 4.50$ and $F = 3.95$). As can be observed in Table 13, pairwise comparisons conducted on Axis II group membership and SDI-R Types as follow post-hoc for ANOVA portrayed specific groups that accounted for mean differences.

Table 13

Analysis of Variance for Axis II and SDI-R Subscale Correlates

<i>SDI-R Type</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Class5</i>	<i>Total</i>	<i>F</i>
fantasy_frequency	54.65 ¹	61.48 ¹²³	59.54 ¹²	63.18 ²³	69.11³	63.10	6.62*
fantasy_power	53.72 ¹	60.84 ¹²	59.14 ¹²	63.04 ²	67.81²	62.43	5.31*
seductive_frequency	53.57 ¹²	50.79 ¹	59.08 ¹²	63.58 ¹²	64.07 ²	60.09	3.49*
seductive_power	62.00	58.91	68.08	69.17	68.32	66.46	1.48
pain_frequency	50.98	51.27	54.58	57.32	61.34	56.39	1.95*
pain_power	51.87	51.72	56.25	61.70	63.28	58.61	1.95
intrusive_frequency	55.01 ¹²	49.64 ¹	54.48 ¹²	60.77 ¹²	65.82²	59.08	4.73*
intrusive_power	54.86 ¹	48.99 ¹	60.18 ¹²	62.84 ¹²	70.64²	61.63	5.05*
voyeurist_frequency	65.38¹	66.26¹	66.49¹	75.73¹²	78.19²	72.15	6.31*

Table 13 (continued).

<i>SDI-R Type</i>	<i>Class1</i>	<i>Class2</i>	<i>Class3</i>	<i>Class4</i>	<i>Class5</i>	<i>Total</i>	<i>F</i>
voyeuristic_power	63.24 ¹	66.53¹	63.76 ¹	74.60¹²	79.27²	71.45	6.93*
exhibition_frequency	59.43 ¹²	50.56 ¹	58 ¹²	62.83 ¹²	67.86²	61.06	4.70*
exhibitionistic_power	58.31 ¹²	51.22 ¹	57.36 ¹²	66.17¹²	68.98²	62.15	3.52*
trade_frequency	53.68 ¹	51.63 ¹	57.32 ¹	59.13 ¹	66.63¹	59.23	2.78*
trade_power	53.75	54.63	66.31	68.78	75.61	66.66	2.34
anonymous_frequen	52.98 ¹	50.73 ¹	55.91 ¹	56.27 ¹	61.24 ¹	56.44	2.40*
anonymous_power	54.28 ¹	51.46 ¹	57.27 ¹	59.35 ¹	63.56 ¹	58.43	2.62*
pay_frequency	71.29¹	61.88 ¹	84.82¹	81.74¹	82.09¹	78.41	2.57*
pay_power	69.11¹	62.92 ¹	83.67¹	81.33¹	85.94¹	79.13	2.43*
exploitative_frequen	53.12 ¹²	46.26 ¹	50.89 ¹²	57.03 ¹²	63.98 ²	58.91	4.50*
exploitative_power	52.37 ¹²	49.57 ¹	59.99 ¹²	60.98 ¹²	69.33²	55.72	3.95*

Note. Values in bold: clinically significant values, means in the same row that do not share superscripts differ at $p < .001$.

* $p < .001$

Table 13 shows pairwise comparisons for Axis II groups on the SDI-R subscale variables. Fantasy frequency Class 2, Class 4, and Class 5 did not differ to each other but were significantly higher from the rest of the groups, whereas Class 2, Class 3, and Class 4 were a homogeneous subset, and Class 1, Class 2, and Class 3 did not differ from each other but were significantly lower than the rest of the groups. Fantasy power Class 2, Class 3, Class 4, and Class

5 mean scores were a homogeneous subset with significantly higher scores than the other subset formed by Class 1, Class 2, and Class 3.

Pairwise comparisons on Seductive sex frequency indicated that Class 1, Class 3, Class 4, and Class 5 were significantly higher than the other subset formed by Class 1, Class 2, Class 3 and Class 4. Two mean scores subsets were identified as distinctly different for Intrusive Sex frequency; one formed by Class 1, Class 4, Class 4, and Class 5, with the highest scores, and the second composed by Class 1, Class 2, and Class 3. Intrusive sex power revealed Class 3, Class 4, and Class 5 were significantly different from subset formed by Class 1, Class 2, Class 3, and Class 4. Pairwise comparisons for Voyeuristic frequency showed Class 4 and Class 5 were significantly higher than Class 1, Class 2, Class 3, and Class 4. Voyeuristic power also revealed a subset for Class 4 and Class 5 that was significantly higher than subset formed by Class 1, Class 2, Class 3, and Class 4. As observed in Table 4.13, mean scores for Exhibitionistic frequency indicated significant differences between subset formed by Class 1, Class 3, Class 4, Class 5, and subset formed by Class 1, Class 2, Class 3, and Class 4, and the same pattern was observed for Exhibitionistic power. Trade frequency, although indicated a main effect, did not show specific differences between pairs of Class means. Exploitative Sex frequency pairwise comparisons revealed Class 1, Class 3, Class 4, and Class 5 were significantly higher than subset formed by Class 1, Class 2, Class 3, and Class 4, and same pattern was seen in Exhibitionistic sex power.

As can be observed in Table 14 ANOVA produced on Axis II Group Membership (CPROB5) and BSI correlates for Axis II revealed significant group differences for subscales Hostility ($M = 4.00$), Interpersonal ($M = 5.88$), Obsessive ($M = 6.67$), Paranoia ($M = 4.22$), Psychoticism ($M = 6.79$), Somatization ($M = 2.91$), and Phobia ($M = 2.33$) using $p < .01$ as level of significance. Pairwise comparisons indicated Class 2, Class 4, and Class 5 mean scores for BSI Interpersonal scale were a homogeneous subset, higher than Class 3, 4, and 2, which did not differ from each other, and from Class 1, 3, and 4, which were significantly lower than the other two subsets. BSI Obsessive subscale mean scores for Class 2, 4, and 5 did not differ from each other, but were significantly higher than Class 2, 3, and 4, and from Class 1, 2, and 3, which were significantly lower than the other two subsets. Pairwise comparisons identified BSI Paranoia for the scales Class 2, 3-Class 4, and Class 5 as significantly higher than Class 1, 3, and 4, which formed a different subset.

Table 14

Analysis of Variance for Axis II and BSI Correlates

<i>CPROB5</i>	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4</i>	<i>Class 5</i>	<i>Total</i>	
<i>BSI Scale</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>F</i>
Hostility	2.52	4.00	3.18	4.34	4.86	4.00	1.96
Interpersonal	3.39 ¹	7.06 ²³	4.51 ¹²	5.47 ¹²³	7.56 ²	5.88	6.17*
Obsessive	3.87 ¹	6.15 ¹²³	5.32 ¹²	7.07 ²³	8.66 ³	6.67	5.60*
Paranoia	1.48 ¹	4.68 ²	3.86 ¹²	3.92 ¹²	5.60 ²	4.22	4.27*
Psychoticism	3.96 ¹	7.03 ²³	5.09 ¹²	7.20 ²³	8.59 ³	6.78	7.42*

Table 14 (continued).

<i>CPROB5</i>	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4</i>	<i>Class 5</i>	<i>Total</i>	
<i>BSI Scale</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>F</i>
Somatization	2.00	2.82	2.30	3.08	3.58	2.90	1.24
Phobia	.82 ¹	2.76 ²³	1.41 ¹²	2.19 ¹²³	3.51 ³	2.33	5.33*

Note. Values in bold: clinically significant values, means in the same row that do not share superscripts differ at $p < .001$.

* $p < .01$ level.

BSI Psychoticism mean scores were significantly higher for Classes 2, 4, and 5 than Classes 2, 3, and 4. Class 1 and Class 3 were significantly lower than the two other groups. Pairwise comparisons on BSI Phobia subscale suggested three separate subsets; one formed by Classes 2, 4, and 5, significantly higher than the one formed by Class 2, Class 3, and Class 4, and the third formed by Class 1 Class 3, and Class 4.

Finally, correlations between Axis I and Axis II variables were explored (Table 15). A Chi Square test was performed to determine if Axis I and Axis II were distributed differently across group membership. The test indicated a significant difference (Chi square = 217.37, $df = 12$, and $p = .000$). It was found that 17 individuals who were members of Axis I Class 1 were members of Axis II Class 2; 41 participants with membership in Axis I Class 2 were members of Axis II Class 5, whereas 32 individuals from Axis I Class 3 were members of Axis II Class 4 and 25 participants from Axis I Class 4 were members of Axis II Class 3.

Table 15

Correlation Class Membership LCA4 and Class Membership LCA5

			CPROB5					
			Class1	Class2	Class3	Class4	Class5	Total
CPROB4	Class1	N	17	0	4	0	0	21
	Class2	N	0	6	0	20	41	67
	Class3	N	5	19	17	32	16	89
	Class4	N	1	9	25	8	2	45
Total		N	23	34	46	60	59	222

Note: Chi-Square < .001

CHAPTER V

DISCUSSION OF RESULTS

Sex addicts are regarded as a homogeneous group and there is limited evidence about specific personality traits or multi-trait profiles that might be associated to the problem of sexually impulsive and addictive-like behavior. The primary question addressed by the current study was whether there are qualitatively distinct personality subtypes of sex addicts. Profiles of personality and psychopathology in sex addicts were evaluated using the MCMI-III and PAI scales as indicators, and the latent personality classes were derived via latent profile analysis (LPA). Latent models based on personality and psychopathology traits were explored assuming that sex addiction has aspects in common with Axis I and Axis II disorders suggested by tests scales. Subgroups identified were validated using external correlates.

Number of Groups

The first step in the study was identifying the number of groups with well-defined profiles (Muthen, 2008). Different Axis I and Axis II model solutions were analyzed in regards to goodness of fit indexes, percentage of cases represented, and theoretical and practical significance of the models. These criteria were used to inform the decision to retain number of groups that best represented the data. Given that there is no *correct* number of groups, several models were tried. Different statistical indexes were evaluated; the Sample Adjusted BIC indicated improvement for each additional class and increased number of latent classes yielded a better fit, which would favor 8 and Class 9 solutions. However, when

latent class models are tested, parsimonious models are recommended instead of more complex models. Therefore, statistical indexes, considered *golden rules* for other studies (Marsh, Lubke, Trautwein, & Morin, 2009), were not the only criteria considered in the current study for determining the optimal number of groups. Marsh et al. noted that information provided by goodness of fit can be inconsistent and of limited value, and questioned the practice of only relying on goodness of fit indexes to determine which models best fit data. These authors also raised concerns for the assumption of a *right* number of groups and stated, ...the *right* number of groups cannot be based on a mechanical application of recommendations about fit indexes (p. 215).

When models are compared and nested, use of tests of statistical significance is recommended in addition to goodness of fit indexes (Nylund, Asparouhov, & Muthen, 2007). Hence, significance (p) values associated with *LMR* statistic were utilized in the current study to determine the solutions that best represented data. Axis I values for Class 4 solution yielded the smallest p LMR value that approached significance. When exploring Axis II the Class 3 model yielded a significant p LMR value but more distinctions were observed across more than three groups and p associated with *LMR* approached significance for Class 5 solution.

In combination with fit statistics and test of significance, the proportion of cases represented in each group was examined to inform the decision to keep Class 4 model for Axis I and the Class 5 model for Axis II. Neither Axis I Class 4 nor Axis II Class 5 solutions led to any class containing less than 5% of the

sample. In fact, the smallest proportion of individuals classified in any of the classes within the Axis I Class 4 solution was 9% and the smallest proportion for any of the classes within the Axis I Class 5 solution was 10%.

Furthermore, models were examined in regards of theoretical coherence as suggested by Marsh et al. (2009). Previous studies had suggested subtypes with high levels of compulsive behaviors and anxiety (Taylor, Reeves, James, and Bobadilla, 2006), high levels of antisocial traits and low levels of anxiety (McMahon, Malovy, & Penedo, 1998), and high levels of borderline personality traits, depression, antisocial behaviors, and alcohol and drug problems (Montaldi, 2002; Taylor et al., 2006). Axis I values for Class 4 and Axis II Class 5 solution seemed to reflect a combination of these features as expected.

Finally, the Axis I and Axis II models were followed-up with multivariate and univariate analyses of variance and discriminant function analyses. Multivariate relations were explored and indicated that group differences existed; pairwise comparisons detected specific differences between mean variables, and discriminant analysis helped identify variables that discriminated between the previously identified groups. When applied to Axis I and Axis II variables in which the groups were based, discriminant analysis helped describe differences and determine how accurately these selected variables helped classify individuals into the different groups. The proportion of cases correctly classified for Axis I variables was 92.3%, and for Axis II it was 95.5%, which was a significantly high hit rate for both dimensions.

Analysis of Qualitative Differences in LPA Profiles

Traditional models based on analysis on differences help to identify sources of variance but do not inform about the composition of groups. LPA was preferred over more other approaches to substantiate identification of distinct psychopathology features and personality traits profiles correlated with specific groups of sex addicts (i.e., class membership).

Qualitative differences for Axis I latent classes. A four-class LPA model for Axis I indicators was determined to be the best representation of the data. This analysis was followed up with multivariate analyses of variance, which revealed a significant multivariate main effect for group membership. Analysis of differences was further conducted to follow up mean differences on single variables and there was a significant effect of group membership for most Axis I indicators, except for PAI Alcohol Dependence and Drug Dependence.

Axis I Class 1, on average, tended to not endorse significant psychological concerns. Axis I Class 2 indicated prominent symptoms of mental health disorders involving anxiety, tension, and worry; possible traumatic experiences, and obsessive-compulsive manifestations; chronic and severe depression, and possibly thought dysfunction. Members of this group tended to report affective disturbance, confusion, and poor judgment; problems with decision making and distorted thinking; distractibility, difficulties with concentration, and possible impairment in functioning. A third group (Class 3) was moderate on chronic dysphoric emotionality and mild concern for alcohol use. Finally, a fourth group (Class 4) tended to report mild concerns involving alcohol and psychotropic substances.

In regards to Class 1, these individuals tended not to report significant mental health symptoms or maladaptive personal adjustment. Members from this group were high on responses that indicate the presence of sex addiction. However, their scores were low in regards to psychological distress, concurrent symptoms of eating disorder, or trauma-related problems. When compared to the other groups, these individuals' scores tended to be the lowest of all groups on symptoms of psychological disturbance (e.g., hostility, interpersonal, obsessive, paranoia, psychoticism, somatization, and phobia). These results indicate that there are groups of individuals that meet criteria for sex addiction but with little or no comorbid mental health problems. Current evidence suggests that sexual addiction can exist in some individuals as a distinct clinical entity without being driven by other sources of pathology or maladjustment. These findings may have important theoretical implications, since it has been alleged that sex addiction is one manifestation of chemical dependency, bipolar disorders, impulse-control disorders, and borderline personality disorders.

Class 2 members were high on scales reflecting negative emotionality. These individuals tended to be the highest of all the groups on depression, anxiety, and symptoms of PTSD. Members of this group consistently scored the highest of all the groups on symptoms of sexual addiction, in particular dimensions of preoccupation, loss of control, relationship and affective issues. They also reported more concerns involving eating disorder dimensions such as low self-esteem, personal alienation, interpersonal insecurity, alienation, and deficits, perfectionism, and maturity fears. This group of participants was the

highest on reporting symptoms of PTSD. These individuals were the highest on general symptoms of psychological distress as well. They were also the highest on endorsing all specific sexual behavior scales (i.e, fantasy, seductive, pain, intrusive, voyeuristic and exhibitionistic, trade, anonymous, pay, and exploitive). At the same time, they were low on alcohol and drugs problems, as well as delusional and maniac symptoms. Results suggested a latent class of participants that was predominantly characterized by negative emotionality, anxiety, tension and worry, clinically elevated and chronic levels of depression, as well as unusual ideas, confusion, and social detachment. This class of participants reported obsessive-compulsive concerns. Elevations indicated distractibility and difficulties with concentration, and possible impairment in functioning.

Carnes (1983) mentioned pathological relationship with a mood altering behavior as a pathognomonic sign of sex addiction, which involved affective instability, dysphoria, irritability, and anxiety before and following sexual acting-out. Bancroft and Vukadinovic (2004) documented increased sexual interest in states of depression and anxiety, dissociative experiences, and obsessive-compulsive mechanism in sex addict participants; uncontrolled sexual behavior associated with negative mood, high arousal and low inhibition on self-regulation was also identified. Garos (1997) identified higher prevalence of depression among individuals diagnosed with sexual addiction. More recently, Weiss (2004) evaluated sexually addicted men and found at least mild levels of depression in 28% of participants, more than double within normal population.

Several forms of anxiety-related disorders have been reported in association with sexual addictive behavior. According to Raviv (1993), more elevated anxiety, depression, obsessive-compulsiveness, and interpersonal sensitivity was reported by sex addicts when they were compared to individuals who did not report sexual concerns. Sex addicts endorsed significant psychological concerns indicating dysphoric emotionality. Coleman, Miner, Ohlerking, and Raymond (2001) proposed that sexual addiction represents a variant of obsessive compulsive disorder (OCD). Likewise, Black, Kehrberg, Flumerfelt, and Schlosser (1997) identified significant comorbidity with anxiety and mood disorders, and problems with substance use.

High scores on PTSD symptom scales seen in the current study are consistent with unresolved traumatic experiences reported by a significant proportion of sexually addicted patients in several studies. For example, Carnes (1983) found that 87% patients from an inpatient treatment program that were surveyed reported early sexual abuse. Adams (1999) postulated that sexually compulsive behavior is a type of trauma-induced addictive behavior. Prickard and Laaser (1999) found need of trauma resolution at the core of sexual acting-out in groups of sexually compulsive women. In sum, results suggest a subgroup that struggles with significant comorbid psychological disorders that affect mood stability. Concurrently, these individuals endorse low presence of irrational grandiose or persecutory ideas, and do not acknowledge a history of drinking or drug use that has produced problems in their lives. These findings are consistent

with lack of report from previous studies identifying psychotic or delusional features among sexual addicts.

Axis I Class 3 tended to be moderately high on negative emotionality and anxiety traits, suggesting a profile of specific concerns involving distress, apprehension, tension, and diminished self-confidence. Members of this group tended to not have problems with hypomania, or delusions, symptoms. They were high on reporting sexual addictive behaviors, reported some eating-disorder and post-traumatic stress symptoms, and low on concerns involving hostility, obsessiveness, paranoia, psychoticism, and phobia. It is likely that members from this group acknowledge sex addiction as a problem and report long-term worry but do not endorse severe mental health disorders.

Mild concern for alcohol and psychotropic substances was present within Axis I Class 4 members and at the same time, this group was substantially low on complaints of physical discomfort, trauma-related experiences, and irrational thinking. Analysis of variances did not identify a main effect of alcohol and drug dependence on group membership and concerns were reported across participants of all four groups. Carnes (1983) reported a high correlation between sex and chemical dependency, eating disorders, compulsive working, compulsive spending, and compulsive gambling. Black, Kehrberg, Flumerfelt, and Schlosser (1997) found that a significant majority of a sample of 36 sex addicts reported a history of substance abuse. Schneider and Irons (2001) warned about coexistence of sexual addiction and cocaine and methamphetamine as risk factors for relapse, and identified increase or abnormal sexual activity and

fantasies as triggers for drug use among participants at an outpatient treatment program. Correlations between substances, uncontrolled sex, and sexually transmitted diseases, most likely due to unprotected sexual activity while under the influence of substances were also reported (Muench & Parsons, 2004). A significant correlation was reported between female sex addiction, substance abuse, childhood abuse, and depression (Opritz, Tsytsarev, & Froh, 2009). Findings from current study may suggest a group of individuals with some concern involving other addictive behaviors but not to the extent that has been reported in literature.

Qualitative differences for Axis II latent classes. Latent profile analysis identified five groups to best represent Axis II data. Multivariate analyses of variance revealed a significant multivariate main effect for group membership. Analysis of differences that was conducted to follow up mean differences on single variables revealed a significant effect of group membership for all Axis II indicators. Pairwise comparisons revealed similarities and specific differences between the five groups. In general, no differences were found in regards to hostility and somatization tendencies, or in terms of seductive and trade power sex and pain trade sex.

Axis-II Class 1 tended to score within normal ranges on all the scales. Axis II Class 2 was high on avoidant, depressive, dependent and self-defeating personality trait scales. Axis II Class 3 was marginally elevated only on scales that tap into antisocial personality traits. Axis II Class 4 showed depressive, dependent, antisocial, masochistic tendencies, and borderline features. Finally,

Axis II Class 5 tended to be high on depressive, avoidant, dependent, masochistic, schizotypal, negativistic, and borderline scales.

In regards to Axis II Class 1, these individuals were significantly low on symptoms of severe personality disorders (e.g., sadistic, masochistic, schizotypal, borderline, paranoid). Although members of this group were high on endorsing sexual addiction behaviors, they were the lowest scorers of all groups on all types of such behaviors. They also endorsed eating disorder and post-traumatic stress concerns, but were the lowest of all groups on these aspects. Members were low in regards to psychological distress manifestations such as hostility, interpersonal concern, obsessiveness, paranoia, psychoticism, somatization, and phobia. This profile seems to depict a group that endorsed symptoms of sexual addiction but did not reflect concerns associated with major maladaptive personality functioning.

Axis II Class 2 individuals, high on avoidant, dependent, depressive, and masochistic personality features, and low on histrionic, narcissistic, negativistic, paranoia, and sadistic, likely report a sense of worthlessness, pessimism, inadequacy, and self-defeating tendencies; they may indicate conflict between social detachment and submissiveness. Interpersonal aversion and a tendency to isolate may conflict with a need to be involved and reassured by others. Members of this group were high on reporting sexual addiction behaviors, and dimensions of preoccupation, loss of control, relationship and affective issues were also the most elevated. In addition, they were the highest on reporting concerns involving eating disorder symptoms: low self-esteem, personal

alienation, insecurity, self-alienation, interpersonal deficits, perfectionism, and maturity fears. Post-traumatic stress-related symptoms were also reported with high frequency but not significantly different from other groups. They were also moderately high in regards to psychological distress involving interpersonal matters, obsessiveness, paranoia, psychoticism, and phobia but did not differ much from other groups. This group's profile suggested sexually addictive behaviors co-occurring with a negative self-perception; self-derogating and blaming tendencies, and conflicted between intense needs of attention and problems with social closeness and intimacy.

Axis II Class 3 members, on average, were high on behavioral acting-out, social independence and forcefulness, and low on inhibition, respectfulness and conscientiousness, as well as low on social isolation, suspiciousness, and mistrust. Group members were high on sexual addiction behaviors and specific types of sexually addictive behaviors such as fantasy sex, intrusive sex, exhibitionistic and voyeuristic sex, but not significantly higher from other groups. These individuals had the highest scores in paying for sex. In addition, members of this group reported some eating-disorder symptoms and traumatic-stress symptoms, although not remarkably different from other groups. Finally, this group was moderately high on several manifestations of psychological distress but not significantly different than other groups in terms of interpersonal issues, psychoticism, and phobia. Members of this group appeared high on sex addictive behaviors, and it is likely that they act disinhibited, impulsive, and independent from social restrictions.

Muench and Parsons (2004) report rates of personality disorders in sex addicts that range from 41% to 46%, particularly borderline personality disorder. Muench and Parsons suggest that trauma should be studied in association with sexual compulsivity, since its reported frequency ranges from 30% to 78%, as well as diminished self-esteem, social anxiety, poor social skills, and problems with intimacy, and impulse dyscontrol. However, these authors also suggest that sexual compulsivity represents a distinct clinical phenomenon.

Axis II Class 4 is characterized by pessimism, pleasure-detachment, and hopelessness, as well as low opinion of selves and tendency to self-devalue, a pattern of instability in self-image, mood, and interpersonal relationship; emotional lability and impulsivity; a tendency to act out, conflict between dismissal of rules and submissiveness, dependence, or overcompliant tendencies; low conscientiousness, and low agreeableness. The average score profile for this group suggests interpersonal domineering and manipulative tendencies for members of this latent class. It is likely that participants from this group tend to be impulsive and have low responsible behavior, and possible callousness and manipulative tendencies. This latent class appears predominantly affected by a sense of intense psychological discomfort, depression and dysphoria. It is likely these individuals report self-defeating and self-destructive tendencies (e.g., shame), appear emotionally unstable, and are conflicted between dismissal of rules and submissive or overcompliant tendencies. Impulsivity and socially irresponsible behavior are predominant, and

these individuals do not seem to experience remorse but experience significant psychological misery and discomfort.

Membership to Axis II Class 4 was the highest of all the groups on reporting general concerns about sexual addictive behavior; they were also high (but not significantly higher than other groups) on specific types of sexually addictive behaviors, such as fantasy intrusive, voyeuristic, exhibitionistic, trade, and exploitative sex. Although not significantly different, their highest scores were noted for seductive power.

Members of this group also reported moderately high eating disorder behaviors, PTSD symptoms and several forms of psychological distress, particularly obsessiveness, psychoticism, and interpersonal concerns. Being a member of this group also involved a set of maladaptive and inflexible traits characteristic of personality disorders, as well as impulse control or behavioral inhibition problems that are pathognomonic of some disorders. Cluster B disorders are particularly associated with impulsivity, disinhibition and negative emotionality, weak behavioral inhibition and strong behavioral activation system. Disorders characterized by impulsivity and affective instability, low behavioral inhibition, and high behavioral activation motivational systems have commonalities with substance use related problems (Taylor, Reeves, James, & Bobadilla, 2006). It is likely that some traits of disinhibitory psychopathology and negative emotionality are manifested on Class 4 in relation to sexual addictive behaviors. Results also suggest that this group is very high on sexually addictive

behavior and display a number of behaviors to obtain what they need from others but their psychological experience is unpleasant, shameful, and unhappy.

Axis II Class 5 members were the highest of all groups on reporting sexually addictive behaviors and specific sexual behavior forms, such as fantasy, intrusive, voyeuristic, exhibitionistic, trade and anonymous sex. Members of this group were also significantly higher than other groups on reporting symptoms of several maladaptive personality features involving social anxiety, and detachment, pessimism and loss of pleasure in life, self-defeating tendencies and expectation of mistreatment, instability in mood, interpersonal relationships and self-image; and vacillation between deference and defiance. Members of Axis II Class 5 were low on sociability, agreeableness, and interpersonal arrogance. Individuals from this group may characterize by self-destructive tendencies, emotional instability, helplessness, pessimism and feelings of inadequacy. They may have limited social skills and tend to be socially detached and expect to be shamed. This profile also suggests conflict between dependency versus oppositional and argumentative tendencies. Membership to this group appeared correlated with several types of addictive sexual behavior. Members of this group were the highest on reporting fantasy, intrusive, voyeuristic, exhibitionistic, pain, trade, and exploitative sexual behaviors. It is likely that members of this group are emotionally instable and have severe problems with adjusting to life situations in association to sexually addictive behavior.

Different multi-trait profiles found in association with a disorder may be more informative than one single personality trait since these might be

associated differently with personality disorder subtypes (Hicks, Markon, Patrick, & Krueger, 2004). For example, impulsivity may be coupled in a different manner with low constraint, a weak behavioral inhibition system, strong behavioral activation system, and high negative emotionality. Thus, quite often problems with excessive activation are described as an effort to reduce negative emotionality. Membership to Class 5 may reveal concerns for sexually addictive behaviors, associated with significant difficulties in personal and social adjustment, poor coping skills, personal instability, and inner conflict between defiance and submissiveness.

Finally, significant correlations were found between Axis I and Axis II membership profiles. Axis I group membership predicted accurately different Axis II membership groups. Profiles from Axis I and Axis II belong to the same individuals and were analyzed separately only for instrumental purposes. However, this finding is not unimportant and may suggest that diverse forms of pathology and personal maladjustment coexist in individuals with different sexually addictive profiles. Montaldi (2002) found in his study some differences between Axis II and Axis I patterns of hypersexual behavior. Axis I hypersexual patterns in the current sample seem to represent lack of control over sexual behavior, which involves a need for emotional excitation or mood regulation but tend to less in conflict with the person's sense of well-being, whereas Axis II related patterns represent maladaptive patterns involving inability to learn from previous experiences, but which seem create low personal distress and may involve a need of self-validation.

Conclusions

This study used LPA to uncover latent Axis I and Axis II personality classes of individuals seeking treatment for sexually addictive behaviors. As opposed to traditional approaches more focused on finding orthogonal dimensions within individuals, purpose of this study was to look at configurations across individuals and portray different personality aspects. Decisions based on several statistical, clinical and practical criteria led to the selection of a model with four subgroups based on Axis I indicators and five subgroups based on Axis II indicators. These models were further validated with statistical comparisons and correlations with external measures.

The study provides compelling evidence of different subgroups within a group of sex addicts. Some of these subgroups' profiles are suggestive of severe pathology and personality traits, which is consistent with previous reports of rates of comorbidity in this population comparable to patients in treatment for other disorders. Significant correlations found between Axis I and Axis II suggest that if one exists, it increases the likelihood that another exists. Comorbidity seems to be frequent for this clinical group in the same way as it is for other types of addictive disorders.

Evidence from this study suggests that relatively high levels of negative emotionality traits are present in most of the subgroups, but that there are different configurations of compulsive and impulsive traits across some of the groups, providing some support for both sexual compulsivity and sexual impulsivity theoretical models. In other words, it may be the case that for some

sex addicts, the addiction manifests as more of a problem with compulsion whereas for others it may be more tied to problems in impulsivity. Some groups also showed mild concerns with alcohol and/or chemical dependency, which may be consistent with the sexually addictive model. Some of the subgroups from Axis I appeared more disturbed and disorganized than the other subgroups, presenting with poor judgment, difficulties to cope with stress, and being more prone to develop sexual behaviors that are potentially more harmful such as pain-related sex, intrusive, exploitative, voyeuristic and exhibitionistic sexual behaviors.

It is significant that some of the subgroups presented with social irresponsibility, impulsivity, and social maladjustment. These individuals were more prone to pay for sex but did not report significant legal consequences. This may suggest more of an exploitative nature within these individuals but probably difference with groups of sexual offenders.

Symptoms of post-traumatic stress disorders were higher for one group from Axis I (Class 2) and one group from Axis II (Class 5). Interestingly, both groups with the highest reports of PTSD were also the highest on reporting symptoms of clinical anxiety, chronic depression, poor judgment, and isolation, as well as self-defeating behavior, instability, hostility, dependence and passive-aggressive tendencies, mistrust, and eating disorder symptoms. Elevations in symptoms of post-traumatic stress trauma are consistent with previous studies indicating that unresolved sexual trauma is identified as a source of major

distress in patients with sexual addiction, and associated with concurrent psychological or mental health concerns.

Significant correlations noticeable between group membership and symptoms of eating disorder involving low self-esteem, interpersonal deficits and sense of alienation, perfectionism, and maturity fears. It is also significant that the current study uncovered a few subgroups that do not present with symptoms of psychological disorders coexisting with sexual addiction, which may have implications for understanding sexual addiction as a clinical disorder independent from other clinical categories such as bipolar disorder or borderline personality disorder.

Significance of Findings

Findings of this study are relevant for many reasons. First, a sophisticated statistical technique used for the first time to study sexual addiction made possible an innovative approach to the problem that is complimentary to more traditional correlational approaches. Second, the study provides clinical information that is highly needed for this group, whose diagnostic status is still uncertain, and contributes to better understanding of this problem. Third, the study is consistent with previous evidence of coexisting disorders with negative emotionality and low constraint, and inhibitory and excitatory neurobiological processes. Fourth, highlighting subtypes associated with clinical differences provides paths for treatment and considerations for clinical psychotherapy or Twelve-Step oriented programs for different subgroups across this population.

Treatment considerations for patients with sexual addiction should be formulated subsequently to comprehensive personality assessment, given that some of other Axis I and Axis II traits present in some of the groups would need to be specifically addressed in treatment in order for this to be successful. Otherwise, it is likely that some of the maintaining factors for sexual addiction may persist and create conditions for relapse. In addition, given the variety of Axis I and Axis II traits, if maintaining factors of the sexually addictive behavior are different across different individuals, this would have implications for the case conceptualization and therefore implications for individualized treatment plans. This possibility of different driving forces behind the addiction across the different classes is something else to discuss in the future research section.

Suggestions for Future Research

Questions arise from the current study that merit further research. An important area of future exploration will be replication of the study for purposes of validation. Latent profile analysis approach for the study of sexual addiction has been underutilized and it may become important to continue exploring the existence of subgroups across individuals identified with sexual addiction: it becomes important to explore distinct patterns of sexual addictive behavior and determine whether distinct profiles can be consistently identified. In addition, sexual addictive behaviors and different combinations of personality traits may need to be explored more in depth. Groups of sex addicts that do not report any elevated psychological concerns should be compared to other groups of sex addicts. Comparison may involve larger groups of individual identified as sex

addicts reporting high negative emotionality, trauma, and self-harming and more extreme sexual practices, versus sexual addicts endorsing more social irresponsibility, impulsivity and objectification of sexual partners and low personal distress, and finally, sexual addicts which indicate concerns with chemical dependency. Future research should also explore possible effect of different variables such as gender, socioeconomic status, level of education, and clinical status) on group membership and psychopathology and personality profiles. An important area of study will be group membership, psychological profiles, and response to treatment. Three approaches should be tried with different groups such as: (a) Medical treatment outcomes on sex addicts with more dysphoric and negative emotions; (b) Twelve Step programs for sex addicts with substance-related concerns and with social maladjustment; and (c) and psychotherapy on sex addicts with more instability and personal distress. Finally, it becomes important to conduct studies on sex addicts with distinct personality profiles and new sex addiction scales according to the most current classifications.

Limitations of the Current Study

One of the main limitations of the study was the small sample size since larger numbers are recommended for the types of statistical analysis. Secondly, a limited number of scales from the personality assessment inventories were used instead of a configural interpretation of the information; a configural approach is highly recommended when interpreting these types of tests. Third, the use of archival data limited access to direct scores that would have allowed

finding internal consistency (α Cronbach) of some of the scales; it also restricted access to more specific information of some of the instruments, such as subscales from the EDI. Fourth, this study has an exploratory nature, which restricts the possibilities of generalization of results. Further research is required.

APPENDIX

INSTITUTIONAL REVIEW BOARD NOTICE OF COMMITTEE ACTION



INSTITUTIONAL REVIEW BOARD
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NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **11112902**
 PROJECT TITLE: **Identification of Subtypes of Sexual Addiction Based on Normal and Clinical Personality Traits: A Latent Cluster Analysis**
 PROJECT TYPE: **Dissertation**
 RESEARCHER/S: **Maria Nino de Guzman**
 COLLEGE/DIVISION: **College of Education & Psychology**
 DEPARTMENT: **Psychology**
 FUNDING AGENCY: **N/A**
 IRB COMMITTEE ACTION: **Expedited Review Approval**
 PERIOD OF PROJECT APPROVAL: **12/17/2012 TO 12/16/2013**

Lawrence A. Hosman, Ph.D.
Institutional Review Board Chair

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