

Behavioral Addiction Disorder: Definition, Classifications, Clinical Contexts, Neural Correlates and Clinical Strategies

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Abstract

Starting from the categorical definition of "behavioral addiction disorder", we proceeded to list the individual forms provided by the DSM-V, with a particular focus on historical, clinical, neurobiological and therapeutic profiles, concluding the analysis of the possible strategies to be used to finalize the resolutions to problems arising from the disorder in question.

Keywords psychology ;neuroscience; prefrontal cortex; frontal lobe, temporal lobe; limbic system gambling; TV-internet-social networks- videogames addictions; sex addiction; compulsive shopping; psychotherapy; psychopharmacology; benzodiazepines, antidepressants, mood stabilizers; strategic approach

Introduction

1.1. Introduction

The psychiatric disorder under examination assumes clinical relevance when the patient's conduct is strongly compromised following an "addiction", understood as an alteration of behavior that from a simple or common habit becomes an exaggerated, extreme and continuous search of pleasure, through means, substances or behaviors that will lead to the pathological condition. The dependence on more substances or more pathological behaviors is called "polydependence". Therefore, the "dependent" subject tends to progressively lose, until complete cancellation, his ability to control (healthy) the habit itself. The reference nosographic manuals focus on the compulsive use of a substance or behavior despite the awareness of the negative consequences, in essence, the loss of voluntary control of behavior [1].

Other, different and in some cases complementary perspectives depend on the concept of "dependence":

a) if the "dependence" (or "state of dependence") is therefore the medical state deriving from the compulsive search for gratifying stimuli, the "addictive behavior" is the material action that reinforces the state of dependence, able to obtain the rewarding object. The more time passes the more the tolerance goes down and the search becomes more and more frenetic and constant, until it absorbs many hours a day.

b) the "drug addiction" is the medical condition deriving from the abuse of the material substance (eg drugs, alcohol) and that involves a withdrawal syndrome as soon as the effects of the physical intake of the substance end. By degrees, it stands out: the administration; the state of intoxication; abstinence status; the overt status of drug addiction. The latter can be physical, psychic or mixed: "physical addiction" is addiction that includes persistent symptoms of physical-somatic abstinence (for example, fatigue and delirium tremens); "psychic drug addiction" is addiction that includes emotional-motivational withdrawal symptoms (eg dysphoria and

anhedonia); "mixed drug addiction" is addiction that interferes as much with the physical sphere as with the psychic one [2].

1.2. Definition, parallels and historical profiles

Here, only accidentally, we will talk about "substance dependence", as we will focus more on behavioral dependency profiles. It is interesting, however, to focus attention on these aspects for a moment, to better understand the underlying mechanism [2].

For DSM-IV-TR (1994) [3]: << Dependence means a pathological mode of use of the substance that leads to clinically significant impairment and discomfort, as manifested by three (or more) of the following conditions, which occur at any time during the same 12-month period:

- 1) tolerance, as defined by each of the following:
 - a) the need for significantly higher doses of the substance to achieve intoxication or the desired effect;
 - b) an effect significantly diminished with the continuous use of the same quantity of the substance;
- 2) abstinence, as shown by each of the following:
 - a) the characteristic abstinence syndrome for the substance (refer to Criteria A and B of the set of criteria for Abstinence from specific substances);
 - b) the same substance (or a closely related one) is taken to mitigate or avoid withdrawal symptoms;
- 3) the substance is often taken in larger quantities or for longer periods than the subject envisages;
- 4) persistent desire or unsuccessful attempts to reduce or control the use of the substance;
- 5) a great deal of time is spent in procuring the substance (for example, by visiting several doctors or driving long distances), by taking it (for example, by smoking "in a chain"), or by recovering from its effects;
- 6) interruption or reduction of important social, work and recreational activities due to the use of the substance;
- 7) continuous use of the substance despite the awareness of having a persistent or recurrent problem, of a physical or psychological nature, probably caused or exacerbated by the substance (for example, the subject continues to use cocaine despite the recognition of a depression induced by

cocaine, or continues to drink despite the recognition of the worsening of for an ulcer caused by the consumption of alcohol) >>.

Extremely interesting is the proposal to modify the previous criterion, suggested in 2006 [4]:

<< (...)

A) Persistent and recurrent maladaptive dependence behavior that leads to clinically significant impairment or discomfort, as indicated by a total of behavior five (or more) of the following criteria [with at least two from (1), of which one is (c), two from (2) and one from (3)] for a period of time not less than 12 months:

1) Obsessiveness:

a) recursive thoughts and images about addictive experiences or addiction-related ideas (eg, they are excessively absorbed in reliving past addictive experiences or in fantasizing or planning future addiction experiences);

b) the thoughts and images related to addictive behavior are intrusive and constitute inappropriate tension and excitement and cause marked anxiety or discomfort;

c) at some point in the disturbance the person has recognized that thoughts and images are products of their own mind (and not aroused from outside).

2) Impulsiveness:

a) restlessness, anxiety, irritability or agitation when addictive behavior cannot be implemented;

b) recurrent inability to resist and regulate inappropriate desires for dependence and impulses to implement addictive behavior.

3) Compulsiveness:

a) repetitive addictive behaviors that the person feels obliged to implement, even against his own will, despite the possible negative consequences, as a consequence of the recurrent addictive fantasies and the impulse control deficit;

b) forced addictive behavior or actions are aimed at avoiding or preventing states of distress or to alleviate a dysphoric mood (eg feelings of impotence, irritability, inadequacy).

B) Recurrent and compulsive addictive thoughts and behaviors engage the subject most of the time, or significantly interfere with his or her normal habits, work (or school) functioning, or usual activities or social relationships.

C) Recurrent and compulsive addictive thoughts and behaviors do not occur exclusively during a manic episode, or general medical condition >>>.

In the recent DSM-5 (2013) [5], the category "addictive disorders and substance-related disorders" has experienced substantial changes compared to previous editions of the DSM: the categories of "abuse" and "substance dependence" are they were reunited into a single disorder, measured on a mild to severe continuum, whose criteria for diagnosis (almost identical to the previous criteria), were combined into a single list of 11 symptoms. In the same category appears the gambling disturbance, indicated as an example of a new category of dependencies: those "behavioral". This change reflects a new vision that certain behaviors, such as pathological play, activate the brain's reward system with effects similar to those of drugs, which is why many authors are beginning to consider "substance addictions", "drug addictions" and "behavioral addictions" as clinical manifestations with different similarities between them and treatable according to similar approaches.

The DSM has long avoided the term 'addiction', using rather 'substance use' and 'dependence'. According to the fourth edition of the manual, substance abuse refers to repeated drug use that creates problems at work, in school and in social life. On the other hand, the definition of substance dependence corresponds to what many people mean by 'drug addiction': an excessive amount of time spent to get the substance, greater tolerance to it, physical or psychological damage due to its consumption, failed attempts to stop taking them and withdrawal symptoms. The DSM-5 eliminates the confusion between the two terms: all dependencies and related problems fall into the category 'substance use disorders' in a chapter entitled 'addictive and substance-related disorders'. The DSM-5 also strengthens the criteria for the diagnosis of these disorders, grading them into mild, moderate or severe. While only one symptom was required in the DSM-IV

a substance abuse diagnosis, in the new edition a mild substance use disorder requires at least two symptoms.

The DSM 5 therefore sets the following conditions for the diagnosis of a Substance Use Disorder (such as caffeine, alcohol, cannabis, inhalants, drugs, drugs and tobacco):

1)"Tolerance": phenomenon for which it is necessary to intensify the use (for example by increasing the amount of drug to be used or the frequency of hiring) to achieve the same effects on the organism.

2)"Abstinence": it is characterized by the presence of emotional or physical symptoms that occur when the subject cannot carry out the recruitment behavior.

3)"Interruption or reduction of social, work or recreational activities": the use of drugs and the onset of the disorder cause a series of damages on the functioning of the person who uses it (conflicts with people who are emotionally important, work problems, influences on the consideration of oneself, etc ...) that increase in intensity, progressively damaging the patient.

4)"Unsuccessful attempts to reduce and control the use": it is frequent that the patient, before formally asking for help from the psychologist or the services, has tried alone to reduce the use or to "control it". Generally we observe a phase in which the patient is firmly convinced that he can, by himself, limit his conduct by creating a reconcilable mode of use (but only ideally) with the rest of his life, his commitments and his duties.

5)"Expenditure of time": when the disturbance is established, or is occurring, a criterion to look at is the time that the patient dedicates to research, use or recovery from the effects of the substance. The more the dependence is overdone, the more time the substance will be dedicated to over the course of a day, until it becomes the only activity present, in the most serious cases.

6)"Loss of control over use": the pathological behavior of use of the substance tends to occur despite the negative consequences that it has evidently made over time and despite the person's awareness of it (the behavior of use becomes "compulsive").

7)"Continuous use despite the awareness that drugs represent a problem": many patients do not stop even in the face of the onset of serious health risks or in front of clear family crises.

8)"Recurring use with inability to perform their duties": many patients lose their jobs due to drug hiring, interrupt their studies, or become unable to perform their family or parenting duties.

9)"Use in risky situations": over time the ability to estimate the risk associated with hiring is progressively reduced, becoming compulsive hiring may happen to feel "forced" to make use despite having to drive or be they must perform precision tasks that cannot be "rationally" reconcilable with the state of alteration given by the substances.

10)"Recurrent use despite this leads to social or interpersonal problems": as previously stated, the use of drugs becomes salient, even at the expense of one's own emotional relationships.

11)"Craving": impelling desire of the substance.

The focus on "behavioral addictions" or "new dependencies" is relatively recent. Despite the studies and the clinical observation of the cases there is no official classification that frames them all among the dysfunctional behaviors and in precise diagnostic categories; DSM-V itself speaks only of pathological gambling and not of other disorders in a specific and detailed manner[6].

In drafting the DSM-5 [7], the APA had originally proposed the inclusion of a new chapter entitled "Behavioral Dependencies", but this chapter was not included in the new edition. For the first time, however, the manual includes gambling disorder, along with substance use disorders, which was previously classified as an impulse control disorder. Another behavioral addiction, 'Internet Addiction', is included in section 3, reserved for conditions that require further research before being formally considered 'disturbances'. The hypothesized "hypersexuality", which many considered as another name for sex addiction, was instead rejected by the editors of the new manual.

Mark Griffith (2005) defines a "behavioral dependence" based on six criteria:

- a)"pre-eminence" (behavior tends to assume the greatest relevance in the person's life, to the detriment of other thoughts, feelings and actions),
- b)"influence on mood" (emotional consequences of addictive behavior),

- c) "tolerance" (intensification of behavior to induce effects of sufficient intensity),
- d) "withdrawal symptoms" (moods or unpleasant physical consequences, resulting from the implementation of the behavior),
- e) "conflict" (interpersonal conflicts deriving from the dependency established or incompatibility with other personal tasks or activities),
- f) "recurrence" (presence of multiple repercussions in the disturbance after phases of suspension).

Both classical substance dependencies and behavioral addictions have many common elements:

- initially they are sought for the pleasure and the relief that they derive from it: it is the phase of the "honeymoon", during which the negation of the problem is also almost always present;
- substance (or behavior) constantly dominates thought: there is the impossibility of resisting the impulse to assume it (or perform the behavior), lived with compulsive modality;
- presence of the craving: increasing desire or state of tension that precedes the assumption of the substance (or the implementation of the behavior);
- presence of mood instability: initially before the assumption of substance (or behavior), then increasingly generalized;
- presence of tolerance, or progressive need to increase the amount of substance (or time devoted to behavior) to obtain the pleasant effect;
- presence of a growing feeling of loss of control over the taking of the substance (or the execution of the behavior);
- presence of a profound mental and physical discomfort when the intake of the substance (or the period dedicated to the behavior) is interrupted or reduced;
- the use of the substance (or performance of the behavior) continues despite the progressive and increasingly serious repercussions on personal and interpersonal functioning (working, emotional, friendly, personal ...);
- frequent tendency to get closer to substance (or behavior) after a period of interruption (relapse phenomenon);
- high frequency of taking more substances (or carrying out more behaviors), as well as switching from one dependency to another;
- the similarity of the main risk factors: impulsiveness, sensation-seeking, inharmonious metacognitive capacities, inadequate parenting environment.

1.3. Epidemiological and etiological profiles of behavioral addictions [8]

The official data of the World Health Organization, in 2012, estimated the spread of the use of illegal substances among the world population aged between 15 and 64, in a number varying between 153 and 300 million, equal to 3.6 - 6.6% of the population, and among these those who reported problematic use were around 12%. The same organization, two years later, reports that 4.1% of the world population presents a disorder related to the use of alcohol, which is more widespread in Europe (7.5%) than in other geographical areas. The data is however difficult to estimate precisely because the information is complicated to find; therefore, they are often underestimated assessments of the problem.

Compared to the etiopathogenic profile, the process that leads to the manage problematic use of a substance is complex and articulated: as with all dysfunctional behaviors, it is believed that it derives from a complex interaction between genes and the environment. In line with the most recent biopsychosocial models, rather than causal factors, it is appropriate to speak of risk factors, of type:

- a) "biological", hence the genetic and biological predisposition. Dopaminergic brain circuits guide behavior towards stimuli that are fundamental for survival. By artificially activating the nerve pathways, the psychoactive substances induce to repeat the behavior as the nervous system is "deceived" and responds as if the substance were necessary for survival. With repeated exposures the association between substance and stimulus becomes stronger and stronger, evolving into complex behavioral responses
- b) "psychological", therefore the dysfunctional behaviors you appreciate that reinforce. Many studies have highlighted the importance of learning processes in the development of pathological dependencies and

problematic use of substances: according to learning theory, pathological dependence can be seen as a learned behavior. People learn to engage in abusive behavior due to conditioning processes. The classical conditioning requires that there is an association between the pleasure of using the substance with environmental stimuli. Some psychological factors have been found to be important risk factors and maintenance of pathological addictions and problematic use of substances: high levels of anxiety, impulsiveness, boredom, hypercontrol, expectations of therapeutic efficacy of the substance used and rumination.

c) "social", therefore the environmental and family component. The other risk factors identified are: the socio-economic situation in which one lives (availability of the substance, deviant contexts, economic disadvantage, poverty, peer group culture, social instability), exposure to stressful or traumatic events (abuse infantile, family problems, social deprivation) and familiarity with pathological addiction or other psychiatric disorders (mood disorder, alcohol dependence, personality disorders).

1.4. Classifications and clinical contexts of behavioral addictions

1.4.1. Theoretical premise.

Having no official nosographic points of reference, the intention of the writer is to refer to the best bibliography on the subject to offer an overview that is as clear, concise and complete as possible, with respect to the knowledge possessed today on the subject in question, including clinical profiles, pharmacological and neurobiological. For this reason, compared to the researches and reviews on the topic, the publication of the Dott.ssa Marazziti D. [7], in a note, from which we will take a significant cue appears to be the most complete, under all the survey profiles.

1.4.2. Pathological gambling. [7]

The pathological gambling is characterized by the persistent inability to control and resist the impulse to implement behaviors aimed at gambling. The persistence and intensification of such behaviors (bets and stakes become increasingly high and risky so as to cause progressively greater levels of excitement) determine with the passage of time relevant repercussions on family, social, emotional and working adaptation, up to trigger, in some cases, an irreversible deterioration of the same. A circular behavioral modality can also be established, which induces to continue playing with the intent of nullifying the losses, triggering a dangerous vicious circle capable of chronicizing an already critical situation. In the most serious cases, the exhaustion of the available credit can induce to resort to loans from usurers, frauds or thefts in order to procure the money necessary to play. Symptoms, course and complications of the disorder are almost similar to those of substance use disorders, including specific phenomena (craving, addiction, tolerance, abstinence) and non-specific (depression, irritability, asthenia, cognitive function disorders, increase in anxiety generalized, somatoform disorders, sleep-wake rhythm disturbances). Custer [9],

identified six different types of players:

- a) professional players: they keep themselves with gambling which is a real profession for them. They are not gambling addicts, which is why they to control the amount of money wagered and the time spent playing;
- b) antisocial players: through gambling they get money illegally; they play with marked cards or are involved in rigged runs;
- c) occasional or "adequate" social players: they play to have fun and to socialize and the game does not interfere with their life;
- d) constant "serious" social players: they invest time in the game, which represents their main form of relaxation and fun; they are able to maintain control over their gaming activities and do not neglect work and / or family;
- e) players for "escape" and "alleviation" without addiction syndrome: through the game they are able to alleviate feelings of anxiety, depression, loneliness and boredom; more than a euphoric answer the game is for them a powerful analgesic that helps not to think about the difficulties;
- f) compulsive gamblers with addiction syndrome: they no longer have control of the game that has become the most important thing for them; they can no longer stop playing, regardless of their will and commitment. Family, friends and work are negatively influenced by the playful activity. Whether

you can be addicted to behavior like gambling in the same way that you can be addicted to a substance remains a very controversial issue.

(...) The personological profile of the pathological gambler does not seem to possess particularly specific characteristics, while some common traits with other types of addiction are evident, such as high impulsivity, reduced resistance to stress, ease of control, low self-esteem, feelings of loneliness, deficit cognitive with concentration difficulties, dimensions present in the borderline area, narcissistic and antisocial. The games that seem to induce addiction more quickly are those that allow the greatest space-time proximity between bet and prize, such as for example slot machines, scratch cards, roulette. (...).

1.4.3. Compulsive shopping. [7]

The (...) term (...) compulsive shopping was coined by the German psychiatrist Emil Kraepelin, who, together with Eugen Bleuler, first identified his symptoms around the end of the 19th century; (...) it is a dedicated disorder characterized by the continuous creative polarization and by the loss of control towards compulsive buying activity, generally not finalized. More recently, Susan McElroy [10] proposed a set of diagnostic criteria to distinguish normal buying from pathological activity:

1. the worry, the impulse or the buying behavior are perceived as irresistible, intrusive or senseless;
2. the purchase is frequently above its possibilities and / or concerns useless objects (or items that are not needed);
3. the worry, the impulse or the act of buying cause marked stress, determine a significant waste of time, significantly interfere with social and work functioning or cause financial problems;
4. excessive purchase does not occur exclusively during periods of mania or hypomania.

It is possible to distinguish 2 types of pathological purchases:

- a) "Abusive consumerism": the purchase represents a compensatory psychopathological mechanism of a primary psychiatric disorder, such as depression, bipolar disorder, some anxiety disorders. The excess in purchases follows a substantially syntonetic course to the course of the primary disorder and is attenuated until it disappears in the remission of the affective and / or psychotic picture.
- b) "Morbid consumerism": buying compulsiveness is the primary phenomenon. If during the initial phases of the disturbance every new object bought creates a pleasant sensation, over time, this is reduced in parallel with the appearance of the impossibility of curbing the impulse to purchase, while a state of increasing tension and feelings begin to appear of guilt and shame.

In the female sex, more frequently affected by the disorder, the purchase is mainly directed towards clothing, undergarments, shoes, cosmetics and jewelry, while in the male electronic items and car accessories seem to be preferred. There are employees who diversify purchases, while others focus exclusively on a particular object in a sort of compulsive "hoarding". Items purchased most often are put aside, given away or thrown away. Also in this disorder there are a series of symptomatological and behavioral manifestations similar to the phenomenology of addiction to substances (craving, addiction, tolerance, abstinence).

1.4.4. New dependencies on a technological matrix. [7]

In 1995, Ivan Goldberg proposed in an ironic and provocative way the introduction in the DSM of a new dependence syndrome called "Internet Addiction Disorder" [11]. The diagnosis was made using a specific test, which was published directly on the web, in which the cut-off was reached when the interviewee answered affirmatively at least 5 out of 7 questions:

1. Do you feel overly absorbed by the Internet (do you think about the previous connection or do you plan the next online session already)?
2. Do you feel the need to spend more and more time connected to the network to get the same satisfaction?
3. Have you repeatedly tried to control, reduce or interrupt the use of the Internet, but without success?
4. Do you feel restless, nervous, depressed or irritable when you try to reduce or stop using the Internet?
5. Do you stay online longer than you originally intended?

6. Have you lied to family members, therapists or others to hide the extent of your involvement in the network?

7. Do you use the Internet as a means to escape from problems or to alleviate the dysphoric mood (for example, feelings of impotence, guilt, anxiety, depression)?

Other non-specific, and therefore more subtle, manifestations can be represented by alterations of the sleep-wake rhythm, chronic fatigue (due to the frequent preference for nocturnal connections), reduced efficiency of the immune system, alterations of appetite, poor self-care, headache, visual changes, appearance of orthopedic problems such as frequent back pain and carpal tunnel syndrome (for the continued use of the mouse). Some predisposed subjects may present the onset of photosensitive epilepsy phenomena that occur due to the incessant visual stimulation due to the long stay in front of the computer screen.

Always Goldberg described 5 subtypes of "Internet addiction":

- a) the "Cybersexual Addiction", which identifies a compulsive use of sites dedicated to virtual sex and pornography;
- b) the "Cyber-Relational Addiction", characterized by an excessive involvement in the relationships born in the network;
- c) the "Net-Compulsion", in which we highlight compulsive behaviors connected to various online activities such as gambling, shopping and e-trade;
- d) the "Information Overload", characterized by an obsessive search for information on the web;
- e) "Computer Addiction", which is characterized by a tendency to over-engage in virtual games, such as MUD's (Multi User Dimensions - role-playing games).

(...) Like a computer, mobile phones also represent an increasingly widespread and sophisticated technological tool. Parallel to the remarkable and very rapid increase in available accessories and communication services and the multiplication of technical functions (SMS, MMS, video call, mail, instant-messaging) the psycho-social functions of this instrument have also been transformed (...). The dynamics of cell dependence can develop and take root so as to present phenomena analogous to substance addictions, with the appearance of craving, tolerance and addiction. Other behaviors that can lead to suspect a cellular addiction are an attitude of intense attachment to the mobile phone, the refusal to detach from it even for a short time, and its use as the only means of knowledge and interpersonal exchange. Excessive use of mobile phones has led to the development of specific disorders, such as the "disconnection syndrome" and the "ring or phantom vibration syndrome". Like other addictions, cell addiction also appears to occur more easily in individuals with low self-esteem, social difficulties, widespread anxiety, marked interpersonal sensitivity, obsessive thinking and compulsive behaviors. The 'dependence' configures an excessive use ('telebuso': exaggerated permanence in front of the screen) and / or distorted ('telefissazione': habit of watching TV alone, immobile, in strict silence, avoiding contact or showing accesses of ira if interrupted during the observation of the television instrument). Also the dependence, possible at all ages of life, can determine a significant decline in performance, cognitive, relational and affective abilities.

1.4.5. Workaholism. [7]

Robinson [12] has defined this phenomenon as an "obsessive-compulsive disorder that manifests itself through self-imposed demands, an inability to regulate one's work habits and excessive indulgence in work up to the exclusion of other major activities of life" . The workaholic would be a "person whose need to work is so excessive as to create considerable discomfort and interference in the state of health, in personal happiness, in personal and family relationships and in its social functioning". The workaholic presents high levels of aggressiveness, continuous tension, inability to relax, is always self-confident, cultivates feelings of invincibility, not tolerating criticism or obstacles, is arid, anaffective, rigid on the cognitive level, concentrated almost exclusively on professional success, tends to control every aspect of its existence, without putting a boundary between professional and personal life. He spends his free time and holidays in activities that may have some use for work and for his career, and if he cannot, he feels unbearable feelings of restlessness and boredom. Try a strong disdain for activities that you consider non-constructive, therefore

useless and futile, such as concerts, theaters, sports; he does not cultivate any hobbies unless those connected to his work are somehow connected with a work advantage.

1.4.6. **Sex-addiction.** [7]

Sexual dependence is a pathological relationship with sex which, like other addictive behaviors, can be interpreted as an attempt to alleviate stress and / or negative or painful feelings that the subject is unable to manage. On the basis of the current pharmaco-therapeutic possibilities, the differential diagnosis between the dependence on orgasmic reaction (DRO) and the egosynthonic hypersexual behavior (CISES) must be taken into account; the latter represents, in fact, a more arguable condition from the pharmaco-therapeutic point of view than the DRO [13]. Addiction with increasing tolerance to endorphinic substances, determined by genetic factors, is the cause of DRO, in which the endorphinic increase produced by orgasm is no longer sufficient to dampen erotic desire, so subjects are always led to repeat plus additional orgasms to prevent the onset of withdrawal. The CISES is characterized by some fundamental elements:

- a) "centrality": sexuality plays a prominent role in the life of sex addicts; the subject directs his existence in relation to the possibility of satisfying the sexual desires he knows he cannot control. There is a continuous search for situations of a sexual nature, capable of stimulating desire or giving opportunities for sexual behavior. At first the sexual behavior attenuates the malaise linked to the present dysphoric states, but then the guilt, depression, shame, that strengthen sexual behavior take over. Shame leads to closing in on itself, hiding from others its impulses and its conduct, isolating itself more and more and deteriorating the quality of life, activating the circle of shame that reinforces dependence [14];
- b) "pervasiveness": sexual behavior tends to extend to all plans (mental and practical) of existence;
- c) "altered relationship between objectives and **consequences**": the subject orients choices based on an altered hierarchy of values and priorities precisely because it places the satisfaction of his sexual appetites at the center of interest and underestimates or ignores the devastating consequences for himself and / or for others;
- d) "inability to refrain despite harmful consequences": in a distorted perception of reality, the individual can go so far as to deny such consequences by revealing the impossibility of managing his own impulses;
- e) "compulsiveness": sexual behaviors are not intended to provide pleasure, but to reduce anxiety and suffering [15] [16];
- f) "inability to control the sexual impulse": the sexual instinct is present with high frequency and intensity and the person is unable to resist his satisfaction;
- g) "tolerance" (increasing frequency of dependent behaviors and increase in stimuli aimed at activating behavior) and abstinence (withdrawal symptoms, such as instability and emotional lability, irritability, reactivity, in case of impossibility to perform sexual behavior) [17].

1.4.7. **Dependence on emotional relationships.** [7]

The problem of emotional dependency has been addressed for the first time in the psychoanalytic field: in 1945, Otto Fenichel [18], in the Treatise on Psychoanalysis of Neuroses and Psychosis, where he introduces the term "dependent love" to indicate people who need love how others need food or drugs. (...) Despite this and despite the discreet specificity of some of its behavioral manifestations, this condition does not yet find nosographic dignity in the various international diagnostic systems, including the DSM. If it is normal that in a relationship, particularly during the phase of falling in love, there is a certain degree of dependence, a sort of desire for fusion with the other, this tends physiologically to diminish with the stabilization of the affective relationship. In the affective pathological dependence, on the other hand, the fusional drive persists unaltered over time, if not intensified. Because of the abandoned anxieties, the employee dedicates and himself completely to the other, in order to pursue exclusively his well-being and not his own, as instead he should be in a "healthy" relationship. The partner thus becomes the primary purpose of existence and its absence, even temporary, gives the subject the feeling of having no meaning, of "not

existing". The dimension of dependence often leads to the choice of 'problematic' partners, affected in turn by mood instability, pathological addictions and impulse control disorders: this is always in order to deny one's own needs, because the other is to have need help. However, it is a 'sick' aid, in which not only does one become 'codependent', but dependence on the other is strengthened, so that he can be and always remain 'ours': but almost always they are present lack of respect, different life plans if not opposed, needs and desires not shared. This is the phase in which the person can no longer leave a relationship that he himself admits is hopeless, unsatisfactory, humiliating and often self-destructive. Similarly to addictions to substances, even in this condition there are phenomena of "intoxication" (the sentimental relationship gives a feeling of euphoria which becomes increasingly indispensable to maintain an inner "balance"), of tolerance (the subject searches for more and more affective doses great, more and more continuous concrete manifestations of his love, he tries to spend more and more time in his company, of abstinence (his absence throws him into a state of prostration). The increase in the dose of 'substance' not infrequently excludes the couple from the rest of the world, and, if the dependence is mutual, the couple ends up feeding themselves. The awareness of entering a dangerous psychopathological circuit is not always completely present, or is not always present in time: anxiety, feelings of guilt, dysthymic elements sometimes give way to internal tension, reactivity, irritability, jealousy, possessiveness, paranoid cues that, by invading the field of ideas, they can trigger an encroachment into a psychotic thought with the risk of aggressive reactions even of extreme gravity.

1.4.8. **Orthorexia.** [7]

Orthorexia (...) was first described by the dietician Steve Bratman in 1997 and then systematized in 2000 [19] on the basis of a Questionnaire consisting of 10 items:

- Do you spend more than 3 hours a day thinking about your diet?
- Do you plan your meals several days before?
- Is the possibility that the foods you eat make you fatten up is always more important than the pleasure of eating them?
- Has the state of anxiety in your life increased since you reflected on your diet?
- Have you become more severe with yourself about your daily behavior and food?
- Does your self-esteem increase when you feed yourself properly?
- Have you radically eliminated different foods that you liked in favor of healthier foods?
- Do you find it harder to eat outside in different restaurants?
- Do you feel guilty when you don't eat properly?
- Do you feel at peace with yourself and in full control when eating properly?

The clinical picture is characterized by the presence of a prevailing idea on the control of the diet, on the choice of food and on its characteristics (giving absolute priority to foods considered 'healthy', such as organic farming or similar), which can be linked not only to fear of facing a weight gain, but above all of building a nutritional behavior that is able to allow him to achieve a perfect state of health. The orthorex tends to progressively isolate itself in its own standardized existential style and dictated exclusively by precise and unavoidable rules connected to the control of the alimentary conduct, defending itself and closing the communication with who does not understand his choices or does not fully share his ideas. He lives in a state of continuous tension, which he "surpasses" with the conviction that his choices are absolutely the only right ones. Even if the disorder can occur at various levels of intensity, it is possible to experience a progressive distortion of the content of the thought such that the subject can become progressively inaccessible to criticism, structuring a modality of psychotic thought.

1.4.9. **Overtraining syndrome.** [7]

The "overtraining syndrome" defines an altered balance between quantity and quality of training and recovery times, with a decrease in performance capacity due to saturation. The obsessive search for "giving the maximum" or "losing weight" or "defining the musculature at any cost" can in fact undermine, even in a dangerous way, the neuroendocrinological control systems. Once it has appeared, it is a chronic condition, stabilized, which

requires long recovery periods (many months) and in this it differs from the banal 'fatigue', which lasts for one or two days after an overload of training, or from the so-called 'over-reaching' which is however short-lived (about two weeks on average). The main physiological symptoms of this condition are represented by the appearance of excessive fatigue in the face of every minimum effort, bradycardia at rest, alterations of pressor homeostasis, alterations of the sleep-wake rhythm, abnormal changes in the ratio lean-fat mass with weight loss, muscular pains, onset of food intolerances favored by stereotyped or forced feeding, technical deterioration with reappearance of errors already overcome, less tolerance to workloads. From the psychological-vegetative point of view alterations of the thymic tone appear with instability, lability and mood reactivity, reduced motivation towards training, reduced confidence in oneself, hyporexia, headache, gastrointestinal disorders, greater ease of infection. At the biochemical level there may be elevation of the serum levels of catecholamines, cortisol and urea, reduction of plasma testosterone and calcemia, less glycogen synthesis, menstrual irregularities.

2. The neural correlates in behavioral addiction disorder [1][7] [20] [21] [22]

Compulsiveness is associated with the need to take the substance or to repeat the gratifying dysfunctional behavior (and in general the substance or the stimulating behavior of dopamine) in ever greater doses, because it is addictive, with an increase in the tolerance threshold and at the same time desensitization: in order to have the same pleasure in receptors, you need larger amounts of dopamine (which are tolerated, but at the same time you are less sensitive), and secondly, with the same amount of dopamine produced in the brain, you always need larger amounts of the stimulant.

Dependence occurs not only with an excess of neurotransmitters (dopamine), but also with their deficit. For example, the compulsion to repeat and the mania of order and cleanliness manifest themselves as an addiction, and are symptoms of a deficiency of serotonin.

The neurons involved are those of the orbitofrontal cortex and the anterior cingulate, that is the areas of the brain activated to make any decision, whether crucial (the type of school, a job) or whether they are trivial choices (like eating or drinking something). Respectively, the neuronal activity is modulated in the orbitofrontal in proportion to the severity of the decision (to identify the best alternative), and in the cingulate based on the correspondence to the starting expectations (follow the alternative that was assessed as better). The anterior cingulate was the subject of the strongest stimuli for the comparison between expected pay-off, probability of success and cost in terms of time and effort required. As evidence, those who presented damage in these areas tended to behave in a self-injurious manner, with the same dynamic of addictions, ie to choose the worst and least satisfying alternative for themselves, consciously and not.

Others: << (...) neurobiological data, such as the evidence of alterations in the functioning of the mesolimbic dopaminergic circuit, the reduction of D2-type dopaminergic receptors, the presence of cortical orbitofrontal anomalies and the cingulum, the presence of genetic variants of the receptor for the CB1 cannabinoids, the up-regulation of the BDNF gene, the alteration of leptin activity, seem to indicate the existence of a close etiopathogenetic relationship between the two subtypes of dependence. Primary impulses, such as food and sex, but also gambling, compulsive shopping, overwork, etc., represent "experiences" capable of activating the circuits responsible for gratification in a similar way to what happens in gratification induced by the consumption of psychoactive substances. The addictive, behavioral and substance syndromes could therefore be subtended by a common process deriving from the altered functioning of the three neurofunctional systems 'motivation-gratification' (with consequent crystallization of negative reinforcement mechanisms), 'affect regulation' (with appearance of progressive inability to tolerate painful emotions, which are 'cured' through behavior) and 'behavioral inhibition' (with inability to interrupt the execution of a clearly unsuccessful and self-destructive behavior). Neuropsychological observations, starting from the clinical observation of the similarities between behavioral addictions and

addictions to psychoactive substances, have highlighted, as already noted in the latter, significant deficiencies of complex executive functions, such as planning, modulation, attention and inhibition capabilities of response, of elaboration of problem solving strategies, with a tendency to persevere in error, to the exasperated sensitivity to reward, to the maintenance of abnormal and increased levels of overexcitement. The urgent need to satisfy a consummatory pleasure is practically always present, while in parallel the progressive aggravation of the clinical picture, altering the correct functioning of the reward systems, makes the waiting for a deferred pleasure impossible. The self-control deficit was clearly associated with the frontal areas of the brain, particularly in the prefrontal cortex, also in relation to what was observed in alcohol and opiate dependence. Biochemical and genetic studies have suggested the presence of anomalies of the main catecholaminergic systems (dopaminergic, serotonergic, noradrenergic) and of the beta-endorphinergic system, highlighting also a strong correlation between the presence of these 'peripheral' anomalies and the malfunctioning of the genes that preside to the regulation of these systems. (...)>>.

3. Clinical strategies for the management of the pathological conditions

3.1 Pathological gambling [7]

(...)Although the potential efficacy of various pharmacological classes has been confirmed and demonstrated, it has been investigated in a fair number of double-blind placebo studies, and despite an accurate meta-analysis that included published randomized trials between 2000 and 2006 confirmed a general efficacy of the pharmacological treatment with timoleptics, timoregulatori, antagonists of opioids and glutamatergic agents, to date no drug has received specific indication in the treatment of pathological gambling. Given the still empirical character of gambling treatment, the setting of the therapy can be positively affected by an under-typing of the disorder in: 1) obsessive-compulsive subtype; 2) impulsive subtype; 3) additive subtype. Specific studies aimed at investigating the outcome of pharmacological treatment have been conducted mostly on numerically limited series, consisting of case-reports, open-label studies and single and double-blind studies, often not very homogeneous as regards the evaluation of the objectives (reduction of symptomatology vs. cessation of playful behavior) [23]. The alteration of serotonergic control is an important element in the genesis of the disorder [24]. This is supported by the observation of reduced levels of 5-hydroxyindolacetic acid, the main serotonin metabolite at the cerebrospinal level of male subjects suffering from pathological gambling [25], or of the platelet serotonin transporter in a group of players of both sexes [26], and from the clinical evidence of efficacy of treatment with non-selective serotonin reuptake inhibitors such as clomipramine [27] and selective serotonin reuptake inhibitors (SSRIs) in the short-term reduction of symptoms and compulsive behaviors, regardless of the presence of depressive symptoms [28] [29]. Three studies conducted (in single and double-blind) on samples of modest entities constituted by subjects suffering from pathological gambling, without a significant co-morbidity for other psychiatric disorders, have investigated the efficacy of the treatment with fluvoxamine (100-250 mg / day) [30] [31]. The efficacy of paroxetine treatment (10-60 mg / day) was evaluated in two double-blind controlled studies vs. placebo; in the first the drug proved to be effective, in the second the improvement was not confirmed, although a positive modification of the scores at the Clinical Global Impression Scale (CGI) was highlighted. Two open-label studies have evaluated the efficacy of citalopram [32] and escitalopram [33]. Citalopram has been used in a sample of 15 subjects and it has been shown that the drug caused a decrease both in gaming behaviors (assessed on the basis of the reduction in the number of days dedicated to the game, the amount of money used and the ideation and the desire to play) in parallel with an improvement in the quality of life. The second trial was conducted in a sample of 16 subjects, 14 of which showed a significant reduction in scores both at the appropriately modified Yale-Brown Obsessive-Compulsive Scale (YBOCS-PG 16), used as a primary efficacy measure, which in the other scales used for the evaluation of secondary outcomes. Similarly to what has been observed both in controlled studies and in clinical practice in the treatment of obsessive-compulsive disorder, SSRIs seem to be able to play a role in the treatment of pathological gambling, but

at higher doses than those used in the treatment of depressive disorders. compensating feelings of insecurity, relaxation techniques and systemic Among the other monoaminergic reuptake inhibitors it is interesting to use desensitization.

bupropion, which appears to be particularly useful in the treatment of gambling in the presence of comorbidities for ADHD [34], and of 3.3. Dependence on technological matrix. [7] nefazodone [35]. There are few studies regarding the efficacy of mood stabilizers (mainly lithium salts, carbamazepine, valproate, topiramate, gabapentin). The rationale for the use of these drugs can be identified in the commonness of poorly controlled and impulsive behaviors between gambling and mixed phases, hypomanic or manic of bipolar disorder [36]. A randomized single-blind study demonstrated the efficacy of treatment with lithium salts or valproic acid in non-bipolar ludopathic patients [37]; topiramate monotherapy also showed good efficacy [38]. Naltrexone (an opioid m receptor antagonist, effective in modulating dopaminergic transmission at the mesolimbic level), commonly used in the treatment of alcohol and opioid dependence, has shown efficacy (average dose of 188 mg / day) in the treatment of play pathological hazard and efficacy was greater in subjects characterized by more pronounced impulsive tracts [39]. Its use is limited by the non-negligible risk of liver toxicity. From this perspective, the role of the new opioid antagonist nalmefene could be more promising [40]. Since the improvement in glutamatergic tone at the accumbens level was related to a reduction in reward-seeking behavior in drug addiction, N-acetylcysteine, a glutamatergic modulator, was tested showing an action on craving for gambling [41]. Along the same lines, the use of other GABAergic modulators such as acamprosate, d-cycloserine, the gabapentin, pregabalin, lamotrigine seems to be promising [42]. There are few data on the efficacy of atypical antipsychotics, sometimes successfully used in strengthening the treatment of resistant obsessive-compulsive disorder; in particular the efficacy of olanzapine versus placebo in the treatment of subjects with video-poker dependence was evaluated [43]. The treatment with modafinil, an atypical stimulant, was also tested in a group of impulsive gamblers [44]. While a reduction in game search was observed in subjects with high levels of impulsivity, subjects with low levels showed the opposite behavior. This data indicates potential future directions of research, which will have to examine the possible modifications of the effects of a given treatment based on the different clinical characteristics and comorbidity of the individual subject. Regarding non-pharmacological treatments, the most tested therapeutic strategies include cognitive-behavioral psychotherapy, bifocal intersocial psychotherapy, group meetings on the model of 'Alcoholics Anonymous', reorganization of the existential schema in specific units related to time dedicated to family, social activities, work, rest and leisure.

3.2. Compulsive shopping. [7]

(...) Although no specific guidelines are currently available for the pharmacological treatment of compulsive shopping, the first report of a psychopharmacological intervention in this disorder dates back to 1991 when McElroy et al. [45] documented the response to antidepressant precisely treatment (bupropion, nortriptyline and fluoxetine) in three cases of 'compulsive buying'. In 1994 the same authors [46] repeated the study on 20 compulsive shoppers who had comorbid mood disorders (14 with bipolar disorder and 5 with major depressive disorder); of the 13 patients treated pharmacologically with antidepressant monotherapy or in combination with mood stabilizers, 10 showed a complete or partial remission of the purchase stimuli. However, it must be emphasized that antidepressant treatment could act either through a specific effect on compulsive shopping or through the improvement of the comorbid mood disorder. Lejoyeux et al. [47] reported two cases of compulsive buying in depressed patients where complete symptomatic remission was observed after treatment with a tricyclic antidepressant, clomipramine. Thymic-regulating SSRIs (fluvoxamine and citalopram) were investigated on small samples (also in combination; in particular a case report by a subject who has benefited significantly from the monotherapy treatment with topiramate [48] and naltrexone, with good results [49] More recently, memantine, an N-methyl-D-aspartate receptor antagonist capable of inhibiting glutamatergic excitatory activity, was able to favor the reduction of impulsive behavior in 9 subjects with pathological shopping [50]. (...) Non-pharmacological techniques include cognitive-behavioral psychotherapy with a particular focus on strengthening self-esteem and

(...) Although no specific guidelines are currently available for the pharmacological treatment of addiction to new technologies, recent data have suggested the potential efficacy of bupropion and methylphenidate in reducing craving for video games [51] [52] and naltrexone in reducing dependence on pornographic sites [53]. A case report suggested the possible efficacy of escitalopram (10 mg / day) [54], later confirmed in an open trial [55].

3.4. Workaholic. [7]

(...) Although there are currently no specific guidelines or clinical trials for the pharmacological treatment of work-related addiction, in practice they are used with good timoleptic (especially SSRI) and timoregulatory (valproic acid) results.

3.5. Sex-addiction [7]

(...) Currently, controlled studies on these behaviors are not yet available; available literature consists of a series of open trials and some case reports, mainly oriented to the study of the therapy of some sexual deviations. Good results have been observed with the use of lithium salts and tricyclic antidepressants [56] [57] [58], SSRIs [59] [60] [61] [62], buspirone [63] [64], nefazodone [65] and naltrexone [66]. The first indication of the possible efficacy of a pharmacological treatment of disorders characterized by compulsive sexual behavior is attributed to Renynghe de Voxvrie [67], who underlined a good result with clomipramine. However, Ananth et al. [68] reported that in subjects with compulsive behaviors subjected to clomipramine therapy, the improvement in symptoms mainly concerned the anxious component rather than the compulsive behaviors. As regards this drug, and also and above all the SSRIs, it should be remembered that the reduction of libido represents one of the most frequent and unpleasant side effects; the therapeutic ideal would obviously consist instead of obtaining a reduction in compulsiveness without a complete suppression of the libido, since this would be equivalent to transforming the egodysonic sexual behavior, ie the DRO, into an egosynthonic sexual behavior, that is normally manageable according to the physiological need and of the situational opportunity. Therefore, the most targeted pharmacotherapy should substantially reinforce the inhibitory activity exerted by the GABAergic suppressive areas located in the frontal lobes, probably inefficient in subjects affected by DRO. The use of timoregulatori (such as sodium valproate, valpic acid dipropylacetamide, lamotrigine, gabapentin, pregabalin, topiramate, vigabatrin), among which specific neurochemical activity is that of inducing an enhancement of GABAergic activity, would seem more appropriate [69] [70]. Finally, it is interesting to recall the role of endogenous cannabinoids in the determinism of compulsiveness. The disinhibiting action of exogenous D-9-tetrahydrocannabinol (THC), which has specific receptors implicated in the system of cerebral gratification, has long been known [71]. It has been observed that the endocannabinoid 2-AG the production of the inhibitory neurotransmitter GABA [72] [73], in turn reducing its inhibitory action. It is therefore conceivable that compounds effective in blocking the excessive release of some endocannabinoids at the level of specific brain circuits can determine an increase in the control of compulsive sexual behaviors. Similarly, since the intravenous administration of naltrexone, totally blocking the release of oxytocin [74], considerably reduces the orgasmic pleasure and therefore the concomitant production of b-endorphin, with consequent failure to post-orgasmic libidinal sedation and failure to achieve the refractory period, for whose need for another orgasm still remains urgent, it suggests that compounds capable of positively modulating oxytocinergic transmission could promote a harmonious organization of sexual desire. The abnormal sexual instinct characteristic of CISES seems to be effectively modulated by the administration of antiandrogenic drugs (medroxyprogesterone acetate or cyproterone acetate), however, the possible onset of serious side effects such as thrombophlebitis, pulmonary embolism, liver dysfunction, as well as favoring reduced

compliance [75], indicates its use only in cases of resistance to other types of treatment. Among these, the administration of traditional neuroleptics (thioridazine, pimozide, chlorpromazine, fluphenazine) [13] appears to be effective, among which the most suitable for this purpose, by virtue of the greater selectivity for dopaminergic receptors concentrated in the basal ganglia and in limbic projections -proencephalic, thioridazine would appear (...).

36 Affective addiction.[7]

(...) At the moment, there is no specific pharmacological indication for this type of addiction. Clinical practice suggests the possible utility of antidepressants, anxiolytics, timoregolatori and sometimes even neuroleptics in the control of anxiety, affective and sometimes psychotic related symptoms.

37 Orthorexia. [7]

(...) No data are currently available regarding possible pharmacological treatments of orthorexia. However, the presence of common psychopathological characteristics with anorexia nervosa suggests the possible utility of SSRIs, TCAs and traditional and atypical antipsychotics.

38 Overtraining syndrome [7]

(...) No data are currently available regarding possible pharmacological treatments of the overtraining syndrome. The presence of common psychopathological characteristics with obsessive-compulsive spectrum disorders, such as dysmorphophobia and anorexia nervosa, suggest the possible utility of SSRIs, anxiolytics and even typical and atypical antipsychotics.

4. Conclusions.

<<(...) Some of the disorders examined in this review, such as pathological gambling, compulsive shopping, internet addiction and some forms of sexual addiction, have been well described and analyzed in the scientific literature which is quite consistent. For others, such as work addiction, sports addiction and orthorexia, available knowledge undoubtedly requires further investigation. It should be emphasized that each of these entities offers an absolutely original form of presentation, easily identifiable on a clinical level and therefore widely justifiable as an autonomous nosographic dignity. As for the proposal to group these entities into a category called 'addictions without substance', these, although very heterogeneous on a descriptive level, are also strongly united by a central element characterized by involvement in a repetitive and persistent habit, progressively dysfunctional, able to induce a significant compromise of the working, affective, relational and social sphere. Other elements that are constantly detectable are the progressive and unavoidable loss of control over behavior despite the evidence of the negative consequences it determines, the impossibility of delaying the satisfaction of need, the induction of an initial state of euphoria resulting from the implementation of the behavior. Finally, similarly to what is well known for the classic psychoactive addictive syndrome, real phenomena of craving, tolerance and abstinence can be clearly observed. (...) Despite these large amounts of clinical, neuropsychological, biochemical and genetic data, the area of behavioral addictions still highlights many critical areas. In fact, the determination of the relationship between physiopathological and etiopathogenesis mechanisms is still insufficient; no valid epidemiological data are available for a correct sizing of these phenomena; there is a heterogeneity of the tools used for the diagnostic evaluation, of the treatments and of the outcome of the interventions, from which derives the unavailability of specific prevention protocols, nor programs of interception and early diagnosis of vulnerable subjects, nor standardized treatment interventions and rehabilitation; it is not yet possible to define the essential levels of assistance (...) scientifically oriented; in some cases (eg in gambling), too intrusive, persuasive and incentive advertising, which carries misleading and disvalerous messages, is allowed (...)>>. [7]

To date it therefore appears complex to be able to reconstruct such a fragmented and inorganic nosographic framework, deriving from the fact that research and studies on the subject cannot be based on an officially recognized sub-stratum thus categorized in an orderly manner. We therefore hope for a structural modification of the international nosographic categorical models, which will integrate all these pathological classes.

References

1. Perrotta G., Psicologia clinica, Luxco Ed 2019.
2. Angres D.H., Bettinardi-Angres K,(2008) The disease of addiction: origins, treatment, and recovery, in Dis Mon, vol. 10, oct., pp. 696–721.
3. DSM-IV-TR, Manuale diagnostico e statistico dei disturbi mentali, 1994.
4. D. La Barbera, V. Caretti, G. Craparo, (2006) Ipotesi di nuovi criteri diagnostici per l'addiction, in & P Salute e Prevenzione, 43.
5. DSM-V (2013), Manuale diagnostico e statistico dei disturbi mentali.
6. Kosten T., Disturbi da uso di sostanze, in Manuale MSD.
7. D. Marazziti, S. Presta, M. Picchetti, L. Dell'Osso,(2015) Behavioral addiction: clinical and therapeutic aspects, Journal of Psychopathology;21:72-84.
8. Source:StudiCognitivi S.p.a.
9. Custer RL. Profile of the pathological gambler. J Clin Psychiatry (1984); 45:35-38.
10. McElroy SL, Pope HG, Keck PE, et al. (1996) Are impulse control disorders related to bipolar disorder? Compr Psychiatry;37:229-240
11. Goldberg I. Internet addictive disorder (IAD) diagnostic criteria. 1995. Retrieved July 27, 2007, from www.psychom.net/iadcriteria.html
12. Robinson BE.(1998) Chained to the desk: a guidebook for workaholics, their partners and children, and the clinicians who treat them. New York: New York University Press.
13. Liggio F, (2007)La terapia farmacologica della dipendenza da reazione orgasmica. In: Avenia F, Pistuddi A, editors. Manuale sulla sexual addiction. Definizioni, diagnosi, interventi. Milano: FrancoAngeli.
14. Fossum M, Mason M.,(1986) Il sentimento della vergogna. Roma: Astrolabio.
15. Coleman E.(1990)The obsessive-compulsive model for describing compulsive sexual behaviour. Am J Prev Psychiatry Neurol;2:9-14.
16. Goodman A.(1998) La dipendenza sessuale. Un approccio integrato. Roma: Astrolabio.
17. Griffin Shelley E., (1991) Sex and Love. Addiction, Treatment and Recovery. London: Praeger.
18. Fenichel O. (1945)The psychoanalytic theory of neuroses. New York: Norton .
19. Bratman S, Knight D., (2000)Health food junkies. New York: Broadway Books.
20. Hollander E, Frenkel M, DeCaria C, Trungold S, Stein DJ (1992) Treatment of pathological gambling with clomipramine. Am J Psychiatry;149:710-711.
21. Jonathan D. Wallis, (2007) Orbitofrontal Cortex and Its Contribution to Decision-Making, Annual Review of Neuroscience, Vol. 30: 31-56.
22. Kennerley SW, Dahmubed AF, Lara AH, Wallis JD,(2009) Neurons in the Frontal Lobe Encode the Value of Multiple Decision Variables, J Cogn Neurosci. June; 21(6): 1162–1178.
23. Grant JE, Kim SW, Potenza MN. (2003) Advances in the pharmacological treatment of pathological gambling. J Gamb Stud 19:85-109.
24. Conversano C, Marazziti D, Carmassi C, et al. (2012) Pathological gambling: a systematic review of biochemical, neuroimaging, and neuropsychological findings. Harv Rev Psychiatry;3:130-148.
25. Nordin C, Eklundh T.(1999)Altered CSF 5-HIAA disposition in pathologic male gamblers. CNS Spectrums; 4: 25-33.

26. Marazziti D, Golia F, Picchetti M, et al.(2008). Decreased density of the platelet serotonin transporter in pathological gamblers. *Neuropsychobiology*;57:38-43.
27. Hollander E, Frenkel M, DeCaria C, et al., Treatment of pathological gambling with clomipramine. *Am J Psychiatry* 1992;149:710-711.
28. Hollander E, De Caria CM, Finkell JN, et al. (2000), A randomized double-blind fluvoxamine/placebo crossover trial in the pathological gambling. *Bio Psychiatry*;47:813-817.
29. Kim SW, Grant JE, Adson DE, et al.(2002) A double-blind placebocontrolled study of the efficacy and safety of paroxetine in the treatment of pathological gambling. *J Clin Psychiatry*;63:501-507.
30. Hollander E, De Caria CM, Mari E (1998) Short-term single-blind fluvoxamine treatment of pathological gambling. *Am J Psychiatry*;155:1781-1783.
31. Blanco C, Petkova E, Ibanez A, et al.,(2002) A pilot placebo-controlled study of fluvoxamine for pathological gambling. *Ann Clin Psychiatry* 14:9-15.
32. Zimmerman M, Breen RB, Posternak MA.(2002) An open-label study of citalopram in the treatment of pathological gambling. *J Clin Psychiatry* 63:44-48.
33. Black DW, Shaw M, Forbush KT, et al.,(2007) An open-label trial of escitalopram in the treatment of pathological gambling. *Clin Neuropharmacol* 30:206-212.
34. DeCaria CM, Hollander E, Begas T.,(1998)Reliability and validity of a pathological gambling modification of the Yale-Brown Obsessive-Compulsive Scale: preliminary findings. III International Conference on OCD. Madeira, Portugal.
35. Black DW. (2004) An open-label trial of bupropion in the treatment of pathologic gambling. *J Clin Psychopharmacol* 24:108-118
36. Pallanti S, Baldini-Rossi N, Sood E.(2002) Nefazodone treatment of pathological gambling: a prospective open-label controlled trial. *J Clin Psychiatry* 63:1034-1039.
37. McElroy SL, Pope HG, Keck PE, et al.(1996) Are impulse control disorders related to bipolar disorder? *Compr Psychiatry* 37:229-240.
38. Pallanti S, Quercioli L, Sood E, et al.(2002) Lithium and valproate treatment of pathological gambling: a randomized singleblind study. *J Clin Psychiatry* 63:559-566.
39. Dannon P, Lowengrub K, Gonopolsky Y., Topiramate versus fluvoxamine in the treatment of pathological gambling: a randomized, blind-rater, comparison study. *Clin Neuropharmacol* 2005;28:6-10.
40. Kim SW, Grant JE, Adson DE, et al., Double-blind naltrexone and placebo comparison study in the treatment of pathological gambling. *Biol Psychiatry* 2001;49:914-921.
41. Grant JE, Potenza MN, Hollander E., Multicenter investigation of the opioid antagonist nalmefene in the treatment of pathological gambling. *Am J Psychiatry* 2006;163:303-312.
42. Grant JE, Black DW, Stein DJ, et al., Clinical case discussion: pathological gambling and nicotine dependence. *J Addict Med* 2009;3:120-127.
43. Olive MF, Cleva RM, Kalivas PW, et al., Glutamatergic medications for the treatment of drug and behavioral addictions. *Pharmacol Biochem Behav* 2012;100:801-810.
44. Fong T, Kalechstein A, Bernhard B, et al., A double-blind, placebo-controlled trial of olanzapine for the treatment of video poker pathological gamblers. *Pharmacol Biochem Behav* 2008;89:298-303.
45. Zack M, Poulos CX., Effects of the atypical stimulant modafinil on a brief gambling episode in pathological gamblers with high vs. low impulsivity. *J Psychopharmacol* 2009;23:660-71.
46. McElroy SL, Satlin A, Pope HG, et al. Treatment of compulsive shopping with antidepressant: a report of three cases. *Ann Clin Psychiatry* 1991;3:199-204.
47. McElroy SL, Keck PE, Pope HG., Compulsive buying: A report on 20 cases. *J Clin Psychiatry* 1994;55:242-248.
48. Lejoyeux M, Hourtane M, Ades J., Compulsive buying and depression. *J Clin Psychiatry* 1995;56:38.
49. uzman CS, Filomensky T, Tavares H., Compulsive buying treatment with topiramate, a case report. *Rev Bras Psiquiatr* 2007;29:383-384.
50. Bullock K, Koran L., Psychopharmacology of compulsive buying. *Drugs Today* 2003;39:695-700.
51. Grant JE, Odlaug BL, Mooney M, et al., Open-label pilot study of memantine in the treatment of compulsive buying. *Ann Clin Psychiatry* 2012;24:119-263.
52. Han DH, Lee YS, Na C, et al., The effect of methylphenidate on Internet video game play in children with attention-deficit/hyperactivity disorder. *Compr Psychiatry* 2009;50:251-256.
53. Han DH, Hwang JW, Renshaw PF., Bupropion sustained release treatment decreases craving for video games and cueinduced brain activity in patients with Internet video game addiction. *Exp Clin Psychopharmacol* 2010;18:297-304.
54. Bostwicl JM, Bucci A., Internet sex addiction treated with naltrexone. *Mayo Clin Proc* 2008;83:226-230.
55. Sattar P, Ramaswamy S., Internet gaming addiction. *Can J Psychiatry* 2004;49:869-870.
56. Dell'Osso B, Altamura AC, Hadley SJ, et al., An open label trial of escitalopram in the treatment of compulsive-impulsive Internet usage disorder. *Eur Neuropsychopharmacol* 2006;16(S1):82-3.
57. Cesnik JA, Coleman E., Use of lithium carbonate in the treatment of autoerotic asphyxia. *Am J Psychoter* 1989;43:277-285.
58. Coleman E, Cesnik J, Moore A., An exploratory study of the role of psychotropic medications in treatment of sex offenders. *J Offend Rehabil* 1992;18:75-88.
59. Kruesi MJ, Fine S, Valladres L(1992) Paraphilias: A double-blind cross-over comparison of clomipramine versus desipramine. *Arch Sex Behav* 21:587-593.
60. Emmanuel NP, Lydiard RB, Ballenger JC(1991) Fluoxetine treatment of voyeurism. *Am J Psychiatry* 148:950.
61. Stein DJ, Hollander E, Anthony DT(1992) Serotonergic medications for sexual obsessions, sexual addiction, and paraphilias. *J Clin Psychiatry* 53:267-271.
62. Fedoroff JP (1993) Serotonergic drugs treatment of deviant sexual interests. *Annals Sex Res* 6:105-21.
63. Kafka MP (1994) Sertraline pharmacotherapy for paraphilias and paraphilia-related disorders: an open trial. *Ann Clin Psychiatry* 6:189-95.
64. Fedoroff JP(1988) Buspirone hydrochloride in the treatment of transvestic feticism. *J Clin Psychiatry* 49:408-419.
65. Fedoroff JP.(1992) Buspirone hydrochloride in the treatment of atypical paraphilia. *Arch Sex Behav* 21:401-406.
66. Coleman E, Gratzner T, Nesvacil L.(2000) Nefazodone and the treatment of nonparaphilic compulsive sexual behavior: a retrospective study. *J Clin Psychiatry* 61:282-284.
67. Raymond NC, Grant JE, Kim SM.,(2002) Treatment of compulsive sexual behavior with naltrexone and serotonin reuptake inhibitors: two case studies. *Int Clin Psychopharmacol* 17:201-5.
68. Renynghe de Voxvrie GV.,(1968) Use of anafranil (g34586) in obsessive neuroses. *Acta Neurol Psychiatr Belg* 68:787-92
69. Ananth J, Solyom L, Bryntwick S, et al.,(1979) Clomipramine therapy for obsessive compulsive neurosis. *Am J Psychiatry*136:700-1.
70. Godin Y, Henier L, Mark J, et al.,(1969) Effects of DI-n-propylacetate, and anticonvulsive compound, on GABA metabolism. *J Neurochem*;16:869-73.
71. Marazziti D, Dell'Osso B(2006) Topiramate plus citalopram in the treatment of compulsive-impulsive sexual behaviors. *Clin Pract Epidemiol Ment Health*;2:9.
72. Herkenham M.,(1992) Cannabinoid receptor localization in brain: relationship to motor and reward system. *Ann Am Acad Sci* 654:19-32.
73. Alger B.,(2002) Retrograde signaling in the regulation of synaptic transmission: focus on endocannabinoids. *Prog Neurobiol* 68:247-86.

74. Wilson RI, Nicoll RA(2002) Endocannabinoid signaling in the brain. *Science* 296:678-82.
75. Murphy MR, Checkley SA, Seckl JR, et al.,(1990) Naloxone inhibits oxytocin release at orgasm in man. *J Clin Endocrin Metab* 71:1056-99.
76. Bradford JM.,(1983) The hormonal treatment of sexual offenders. *Bull Am Acad Psychiatry Law* 11:159-69.