Diagnostic instruments for behavioural addiction: an overview

Diagnostische Instrumente der Verhaltenssucht: ein Überblick

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Abstract

In non-substance-related addiction, the so-called behavioural addiction, no external psychotropic substances are consumed. The psychotropic effect consists of the body's own biochemical processes induced only by excessive activities. Until recently, knowledge was limited with respect to clinically relevant excessive reward-seeking behaviour, such as pathological gambling, excessive shopping and working which meet diagnostic criteria of dependent behaviour. To date, there is no consistent concept for diagnosis and treatment of excessive reward-seeking behaviour, and its classification is uncertain. Therefore, a clear conceptualization of the so-called behavioural addictions is of great importance. The use of adequate diagnostic instruments is necessary for successful therapeutical implications.
This article provides an overview of the current popular diagnostic instruments assessing the different forms of behavioural addiction. Especially in certain areas there are only few valid and reliable instruments available to assess excessive rewarding behaviours that fulfill the criteria of addiction.

Keywords: behavioural addiction, diagnoses, psychometric instruments

Zusammenfassung

Bei der stoffungebundenen Sucht, der sog. Verhaltenssucht, werden keine psychotropen Substanzen von außen zugeführt bzw. eingenommen. Der psychotrope Effekt ergibt sich aus körpereigenen biochemischen Veränderungen, die durch bestimmte exzessive, belohnende bzw. belohnungssuchende Verhaltensweisen ausgelöst werden.
Bisher gibt es wenig Kenntnisse über klinisch relevantes exzessives, belohnendes bzw. belohnungssuchendes Verhalten wie pathologisches Spielen, exzessives Kaufen und Arbeiten, das die diagnostischen Kriterien einer Abhängigkeitserkrankung erfüllt. So gibt es bislang auch kein einheitliches Konzept für die Diagnostik und Behandlung solcher exzessiven, belohnenden bzw. belohnungssuchenden Verhaltensweisen, da ihre Klassifikation weiterhin unklar ist. Deshalb ist eine eindeutige Konzeptualisierung der sog. Verhaltenssucht von wesentlicher Bedeutung.
Für die Ableitung erfolgreicher therapeutischer Maßnahmen ist der Einsatz adäquater diagnostischer Instrumente notwendig. Dieser Artikel gibt einen Überblick über die derzeit gängigen Diagnoseinstrumente der verschiedenen Formen der Verhaltenssucht. Dabei zeichnet sich ab, dass für bestimmte Bereiche exzessiver Verhaltensweisen, die die Kriterien einer Abhängigkeitserkrankung erfüllen, nur wenig valide und reliable Diagnoseinstrumente verfügbar sind.

Introduction

At the end of the 19th century, gambling addiction as a non-substance-related or behavioural addiction was already well-known by experts. In addition to several forms of substance-related addiction, such as alcohol, morphine and cocaine, gambling addiction was described in the literature of that time [1]. Recently, discussion of an adequate nosology and classification of behavioural addiction has been revived.

To date, there is no consistent concept for diagnosis and treatment of excessive reward-seeking behaviours, and its classification is uncertain. Therefore, a clear conceptualization of these so-called behavioural addictions is of great importance, and the use of adequate diagnostic instruments is necessary for successful therapeutical implications. Not every excessively conducted behaviour is addictive behaviour. Subjects had to fulfill the criteria of addiction regarding their excessive behaviour for at least twelve months. Only an accurate diagnosis allows the differentiation between addictive behaviour, non-pathological excessive behaviour and excessive behaviour caused by other mental diseases.

Until recently, "non-substance related behavioural addiction" was not listed in the two internationally used diagnostic manuals of mental disorders, neither in the DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders) [2] nor in the ICD-10 (International Classification of Mental and Behavioural Disorders) [3]. Since 1980, pathological gambling has been included in the Diagnostic and Statistical Manual of Mental Disorders. Pathological gambling is listed in the category of "disorder of impulse control not elsewhere classified". It is only possible to categorize these excessive behaviours as "disorders of impulse control". Therefore, an appropriate classification and a clear diagnosis with respect to the current state of knowledge is required for establishing effective strategies for both the prevention of and interventions for these psychological disorders.

From a neurobiological point of view, behavioural strategies that only *indirectly* affect neurotransmitter systems of the brain, can serve as reinforcers comparable to pharmacological substances that *directly* affect these systems (e.g., dopaminergic system, [4], [5], [6]). Indeed, recent findings support the assumption of common mechanisms that underlie development and maintenance of both behavioural and substance-related addiction (cf. [7], [8]). This leads to the assumption that excessively conducted behavioural strategies (e.g., excessive shopping/sport, pathological gambling/computer game-playing), which induce a specific reward effect in the body's own biochemical processes, do have an addictive potential as well. This assumption is also supported by several clinical experiences and scientific investigations. Therefore, several authors have postulated that the criteria of behavioural addiction are comparable with the criteria of substance-related addiction (e.g., [9], [5], [10], [6], [11]). Patients suffering from a behavioural addiction describe addiction-specific phenomena and diagnostic criteria, such as craving to conduct the behaviour excessively, psychological and physical withdrawal symptoms, loss of control, development of tolerance (increased behaviour) to induce and perceive the expected psychotropic effect (e.g., pathological gamblers gamble several slot machines at the same time). In addition, the high comorbidity between behavioural addiction and substance-related addiction suggests comparable etiological mechanisms for their development. All in all, it seems appropriate to categorize excessivly conducted behaviours which lead to suffering as behavioural addictions.

In addition, the frequent appearance of comorbidity, such as personality and affective disorders as described for substance-related addiction, is also observed in patients with behavioural addiction, but not in patients with impulsive-compulsive disorders (e.g., [12]). Furthermore, the frequently described impulsivity as a personality feature is not only observed in behavioural addicts, but also in several other psychological disorders (e.g., [13]). Based on recent findings, it does not seem to be sufficient to categorize behavioural addiction as an impulse control disorder because of therapeutical implications and effective methods of intervention [8]. The analogy of clinical characteristics between substance-related and behavioural addiction also favors the classification of behavioural addiction as an addictive behaviour and thus as an impulse control disorder (e.g., [14], [15], [16], [7]). The most evident characteristic of addiction, i.e. continuous substance intake (addictive behaviour) despite negative consequences, which is associated with craving and lack of control, is also dominant in patients with behavioural addiction.

Due to the lack of a diagnostic guide, several authors developed psychometric instruments to assess the different forms of behavioural addiction. Using a standardized instrument to assess diagnostic criteria is of great importance for counteracting an inflationary use of the concept of behavioural addiction and for distinguishing pathological behaviour from normal (non-pathological) excessive behaviour.

Published instruments of behavioural addiction consist of newly developed or modified instruments that existed previously and were then refined. Due to the lack of statistical validation, the expressiveness of most of the instruments presented here is limited. Therefore, the presentation of the statistic quality criteria of most of these instruments has yet to be accomplished.

Statements on the statistical quality (e.g., validation and reliability) as well as the selectivity are frequently missing. Therefore, an accurate diagnosis is often not possible. The strength of most of the instruments presented here is their ability of delivering extensive and essential information for the diagnostic and therapeutical process. Further studies are necessary for the characterization and appropriate diagnosis of the different forms of behavioural addiction.

In the following, an overview of the most popular and most frequently described diagnostic instruments of behavioural addiction pertaining to several areas (gambling,

shopping, sport, working, computer, internet and sex) will be provided.

As a basic premise, considering the still limited practical use of the various assessment tools, validity and reliability data should be at least satisfactory for all of the instruments used in diagnostic assessment of "behavioural addiction".

Most of the presented instruments are predominantly designed to establish a diagnosis. Furthermore, several instruments are also appropriate for assessing therapeutical processes sequentially, such as e.g. the "Gambler's Belief Questionnaire" (GBQ) [17], which assesses gambling-associated cognitions, or the "Yale-Brown Obsessive Compulsive Scale - Shopping Version" (Y-BOCS-SV) [18].

Assessment of pathological gambling

Excessive gambling is the most commonly described form of behavioural addiction. Therefore, the amount and diversity of existing psychometrics is enormous. Many of the diagnostic instruments for assessing excessive gambling are derived from the existing diagnostic criteria of the classifications of mental disorders (ICD-10 [3]; DSM-IV-TR [2]), in which "pathological gambling" is indeed classified as an impulse control disorder, but operationalized as an addiction. New research results have increasingly led to the integration of further models of development and maintenance of pathological gambling into its diagnostics. Therefore, and due to new empirical evidence from basic psychobiological research, the addiction concept is widely discussed (e.g., [19], [20], [21]; for a review cf. [22], [9]). Furthermore, the significance of irrational beliefs, respectively contortions in the development and maintenance of pathological gambling (e.g., [23], [24]), is widely accepted and considered in its diagnostics. A crucial task regrading the diagnostics of excessive gambling lies in the precise assessment of the different, clinically relevant grades of risky, problematic and pathologic gambling.

Below, a few selected, commonly used self-assessment instruments and structured clinical interviews in assessing pathological gambling will be introduced, followed by instruments that assess beliefs and assumptions concerning pathological gambling.

The most commonly used and thoroughly evaluated screening instruments in assessing pathological gambling is the "South Oaks Gambling Screen" (SOGS) [25], which was developed twenty years ago for use in clinical samples in the context of self-assessment or in clinical interviews. The underlying criteria used by the SOGS are derived from the diagnostic criteria for pathological gambling used by the DSM-III-R (APA) [26]. On a critical note, we would like to point out that changes in the diagnostic criteria (e.g., in DSM-IV [27]) have not been incorporated into the SOGS. Furthermore, it needs to be considered that its application in non-clinical samples leads to a decrease in its accuracy in differentiating between pathological and non-pathological gamblers. The evaluation of its reliability and validity resulted in a good consistency and convergent validity in relation to other instruments used in the assessment of pathological gambling, especially in comparison to the diagnostic criteria of the DSM-IV.

The "Canadian Problem Gambling Index" (CPGI) [28] was developed as a new instrument to assess problematic gambling in the general public. This questionnaire is divided into three sections. The first section is "Gambling Involvement", which consists of items concerning the frequency of involvement, spending, and duration of involvement in a long list of gambling activities. The second section, "Problem Gambling Assessment", consists of items which are based on criteria for pathological gambling according to the DSM-IV (APA) [27] and the items of SOGS [25], respectively. The third section, "Correlates of pathological gambling", was designed to assess gambling-related attitudes, expectancies of winning und cognitive occupation with gambling as well as a family history of problematic gambling. According to the overall score, each respondent can be classified into five categories of gambling behaviour (ranging from non-gambling to problematic gambling). Evaluation so far has indicated satisfactory reliability and validity.

Another screening instrument for the assessment of pathological gambling, also referring to DSM-IV criteria (APA) [27], is the "Massachusetts Gambling Screen" (MAGS) [29]. MAGS assesses biological (tolerance, symptoms of withdrawal), psychological (impulse control disorder, guilt) and social concomitants and accompanying symptoms of pathological gambling by using two subscales, one being based on items from the "Short Michigan Alcoholism Screening Test" (SMAST) [30] and the other on DSM-IV criteria (APA) [27]. MAGS exhibits good validity regarding DSM-IV criteria and a satisfactory consistency.

A simpler and more economical instrument for clinical use is the adaptation of the general "Yale-Brown Obsessive Compulsive Scale" (Y-BOCS, [31]; cf. "Assessment of Compulsive Buying" below) to pathological gambling (PG-Y-BOCS) [32]. This specific version of the Y-BOCS shows a high concurrent validity with the SOGS and satisfactory psychometric characteristics.

The "National Opinion Research Center DSM-IV Screen for Gambling Problems" (NODS) [33], which is also based on DSM-IV criteria for pathological gambling, contains two scales assessing problematic gambling in one's lifetime and in the last 12 month. Individual classification into non-problematic, problematic and pathological gambling is possible by using the overall score. According to preliminary findings, NODS exhibits a good test/retest reliability as well as reasonable sensitivity and specificity in recognizing pathological gamblers.

A concise self-assessment instrument with high sensitivity and specificity is the "Lie/Bet Questionnaire" [34], [35]. It consists of only two items: "Have you ever felt the need to bet more and more money?" and "Have you ever had

to lie to people important to you about how much you gambled?".
Structured clinical interviews for diagnosing pathological gambling are scarce. Of the few interviews (still in the pilot stage) the "Structured Clinical Interview for Pathological Gambling" (SCI-PG) [36] is introduced here as an example. The SCI-PG consists of 10 items that assess DSM-IV criteria (APA) [27] for pathological gambling (10 items assessing inclusion and one item assessing exclusion criteria). As for a DSM-IV diagnosis of pathological gambling, subjects have to fulfill five or more items regarding inclusion criteria and one regarding the exclusion criterion ("is not better accounted for by a manic episode") to be diagnosed with pathological gambling. In clinical samples of pathological gamblers the SCI-PG is highly sensitive, specific and possesses good prognostic validity.
It is well known that cognitive contortions, such as gambling-related cognitions and effect expectancies play an important role in the development and maintenance of pathological gambling (e.g., [23], [24]). These specific cognitive contortions, which are relevant for treatment, are most commonly assessed using self-assessment instruments. Some of them will be introduced below.
The "Gambling Attitudes Scale" (GAS) [37] assesses attitudes (affective, cognitive and behaviour-related aspects) concerning gambling in general and specifically in casinos, horse betting and lottery, which can foster the development of pathological gambling.
Even though extensive evaluations concerning its validity have yet to be performed, internal consistency and test/retest reliability of the GAS scales are good.
The "Gambling Attitude und Belief Survey" (GABS) [38] assesses cognitive contortions, irrational assumptions and positive attitude towards gambling. In addition, the degree of excitement during gambling is obtained. Gamblers that generate a high overall score, experience gambling as exciting, socially meaningful and focus on luck and winning strategies. The GABS exhibits good internal consistency and high convergent validity with the SOGS.
The "Gambler's Belief Questionnaire" (GBQ) [17] assesses cognitive contortions, especially regarding chances of winning (e.g. assumptions on lucky and losing streaks). The GBQ shows high internal consistency, a suitable test/retest reliability and good convergent and concurrent validity, e.g. with the SOGS and the MAGS.
The "Informational Biases Scale" (IBS) [39] which exhibits good internal consistency, can be administered when estimating specific cognitive contortions in gamblers that mainly use so-called video lotteries. In order to assess the irresistible craving for the addictive agent, which is regarded as a relevant specificity for both maintenance and relapse (e.g., [40], [15]) in gambling addicts the "Gambling Urge Questionnaire" (GUS) [41] was developed. It can be administered to clinical as well as non-clinical populations. The GUS shows a satisfactory internal consistency and good characteristics of concurrent, predictive and criteria-related validity.
In the manner of the "Situational Confidence Questionnaire-39" (SCQ-39) [42] the "Gambling Self-Efficacy Questionnaire" (GESQ) [43] assesses the self-efficacy pertaining to the subjective level of control over the gambling behaviour in varying risk situations. The items of the GESQ describe specific situations corresponding to the eight so-called "high risk situations" (negative and positive emotional state, negative physical state, experiencing urges and temptations, testing control, interpersonal conflict, social pressure and pleasant times with others) [44]. This makes the GESQ especially valuable in relapse prevention. The GESQ shows satisfactory internal consistency und possesses a high test/retest reliability coefficient.

Assessment of compulsive buying

One of the first instruments aimed at diagnosing excessive buying was the "Compulsive Buying Measurement Scale" [45]. According to the authors, its items reflect the four dimensions of pathological buying: a tendency to spend, feeling an urge to buy or shop, post-purchase guilt, and family environment. While its evaluation showed a good reliability and validity, it was noticed that high scores also corresponded to heightened anxiety levels and frequent occurrence of comorbid disorders such as bulimia nervosa, depression or alcoholism within the family.
The "Hohenheimer Kaufsuchttest [Hohenheim Shopping Addiction Test]" [46] is a modified German version of the "Compulsive Buying Measurement Scale" [45] and hence it differentiates between normal and pathological buyers by the same token. The "Hohenheimer Kaufsuchttest" exhibits high reliability and construct validity.
A newer screening instrument is the "Erhebung von kompensatorischem und süchtigem Kaufverhalten [Survey on Compensatory and Addictive Shopping Behaviour]" (SKSK) [47]. It is a self-assessment tool to record a potential tendency to and risk for compulsive shopping. The SKSK is also based on the "Compulsive Buying Measurement Scale" [45] and contains 16 items that assess the tendency for uncontrolled, maladaptive and excessive shopping. The instrument is one-dimensional and constitutes a continuum, reaching from inconspicuous and compensatory to compulsive buying. It postulates that compulsive buying is an extreme form of compensatory buying (meaning that the diverted behaviour is a problem-solving tool). The instrument features high reliability and construct validity.
Another screening instrument, the "Compulsive Buying Scale" [48] was introduced shortly thereafter. Its items were obtained from previous research and reports from affected individuals. The aim was to obtain knowledge of specific feelings, motivations and aspects of behaviour regarding compulsive buying. Scale evaluation revealed that the "Compulsive Buying Scale" is a valid and reliable instrument.
The structured "Minnesota Impulsive Disorder Interview" (MIDI) [49] assesses several psychopathological symptom

complexes, which, according to the authors, can be considered to reflect impulse control disorders, including cleptomania, trichotillomania, intermittent explosive disorder, pathological gambling, excessive engagement in sex and sports as well as compulsive buying. One part of the MIDI is the compulsive buying screen. It consists of four questions, each leading to five subsections. A subject's MIDI screen is positive for compulsive buying if all related questions are answered affirmatively. In that case the administration of another 82 items is recommended for a more accurate diagnosis. So far no data regarding its validity and reliability have been published.

In 1996 the "Yale Brown Obsessive-Compulsive Scale" (Y-BOCS) [50], [32] was modified to develop the "Yale-Brown Obsessive Compulsive Scale – Shopping Version" (Y-BOCS-SV) [18] to assess cognitions and behaviours associated with compulsive buying. This 10-item scale rates time involved, interference, distress, resistance, and degree of control for both cognitions and behaviours. The instrument is designed to measure severity and change during clinical trials. The Y-BOCS-SV shows high internal consistency and good inter-rater reliability.

Christo and colleagues (2003) developed a short form of the "PROMIS Addiction Questionnaire" (PROMIS) [51], the "Shorter PROMIS Questionnaire" (SPQ) [52], which like the "PROMIS Addiction Questionnaire" assesses substance-related addictions as well as several forms of behavioural addiction (work, food, sports, sex and shopping) in an abbreviated approach. An evaluation regarding its psychometric characteristics has yet to be performed.

Assessment of compulsive exercise

Prequels to diagnostic instruments used to assess exercise addiction were a psychoanalytically oriented interview [53] and the "Commitment to Running Scale" (CR) [54]. Some authors [55] criticized the underlying concept of the CR by claiming that an "addiction" and a "commitment to physical activity" are two separate constructs. While compulsive exercising is a process forcing individuals to engage in exercise despite any obstacles or to exhibit withdrawal symptoms in case that exercising cannot be conducted ("addicition"), commitment constitutes an engagement in physical activity out of pleasure and expected satisfaction. According to the assumptions that addictions can be classified into positive and negative ones (e.g., excessive running is positive, drugs are negative) [56] the interview by Sachs and Pargman and the CR screening instruments consider compulsive exercise to be a positive addiction. The CR has good to very good reliability and internal consistency. In contrast, the "Negative Addiction Scale" (NAS) [57] conceptualizes compulsive exercise, especially running, as a negative addiction [56]. Its items focus on the psychological and not the physiological aspects of compulsive running. Due to the lack of any psychometric characteristics, final estimations cannot be made about which score defines an individual as addicted to running.

The "Exercise Beliefs Questionnaire" [58] assesses individual assumptions regarding exercise based on four factors: "social desirability", "physical appearance", "mental and emotional functioning", and "vulnerability to disease and aging". It possesses good or satisfactory reliability, respectively.

The "Exercise Dependence Questionnaire" (EDQ) [59] assesses compulsive exercise as a multidimensional construct. It can be administered in assessing compulsion regarding a variety of sporting activities. The included scales are "interference with social/family/work life", "positive reward", "withdrawal symptoms", "exercise for weight control", "insight into problem", "exercise for social reasons", "exercise for health reasons", and "stereotyped behaviour". According to the authors, the EDQ is a reliable and valid instrument.

The "Bodybuilding Dependency Scale" (BDS) [60] was developed especially to assess compulsive bodybuilding and possesses a satisfactory reliability. The three subscales are: "social dependence" (individual's need to be in the weightlifting environment), "training dependence" (individual's compulsion to lift weights) and "mastery dependence" (individual's need to exert control over his/her training schedule).

The "Exercise Dependence Interview" (EXDI) [61] assesses compulsive exercising as well as eating disorders. The EXDI evaluates excessive engagement in sporting activities in the previous three months, associated thoughts, its effects on and connections to the individual's eating behaviour, self-assessment of exercise dependence and further history data. So far no evaluation of its psychometric characteristics has been performed.

The "Commitment to Exercise Scale" (CES) [62] covers the pathological aspects of physical activities (e.g., continued exercising despite injuries) as well as compulsory activities (e.g., guilt after skipping exercise). CES exhibits a satisfactory level of reliability.

The "Exercise Dependence Scale" (EDS) [63] operationalizes compulsive exercise based on the DSM-IV criteria for substance dependence or addiction (APA) [27] and reasonably reliably differentiates between at-risk, dependent and non-dependent athletes as well as between physiological and non-physiological addiction.

The "Exercise Addiction Inventory" (EAI) [64], [65] is a short screening instrument aimed at identifying compulsive exercise. The EAI assesses the characteristic components of addictive behaviour: salience, mood modification, tolerance, withdrawal symptoms, social conflict and relapse [66]. The EAI features high internal consistency and convergent validity with the EDS.

The "Exercise Orientation Questionnaire" [67] reliably evaluates attitudes towards exercise as well as related behaviours. It consists of six factors: "self-control", "orientation to exercise", "self-loathing", "weight reduction", "competition", and "identity".

Assessment of workaholism

Since varying definitions of workaholism exist, its operationalizations also differ. Accordingly, the corresponding checklists and questionnaires have very distinct approaches. Futhermore, very few of these instruments possess the minimally recommended characteristics regarding scale assessment to estimate distinct aspects of behaviour.

In addition, most of these instruments are not based on theory and propose different dimensions. In general, there is a lack in the evaluation of psychometric characteristics and empirical analysis [68], [69]. Mentzel [70] equates workaholism with alcoholism and utilizes Jellinek's diagnostic criteria for alcoholism [71]. Mentzel's instrument is merely a list of items designed to encourage the affected individual to reflect on his/her behaviour (cf. [72]). Accordingly, no psychometric characteristics have been evaluated.

The "Work Attitude Questionnaire" (WAQ) [73] contains two scales covering the "commitment to work" and the extent of healthy vs. unhealthy attitudes and behavioural patterns regarding work. According to the authors, workaholism is not derived from the extent of qualitative and quantitative subjective focus on work, but from the attitudes and behaviours regarding mental health. The scale "commitment to work" assesses attitudes towards work and related behaviour. It was designed to divide interviewees into those with low vs. high commitment to work. The second so-called "health scale" is intended to establish a healthy or an unhealthy attitude towards work. The overall score is obtained by adding the scores of the two scales. WAQ enables discrimination between people who are extremely committed to work and workaholics. A high commitment combined with beneficial attitudes and behaviour concerning health indicates that the interviewee is challenged, stimulated and satisfied by work. In contrast, the combination of high commitment with unhealthy attitudes and patterns of behaviour is characteristic of employees exhibiting emotional, interpersonal and health problems, who are likely to be ineffective in their tasks. Accordingly, the authors distinguish between healthy and unhealthy workaholics. So far, no details about this instrument's reliability and validity have been published.

The "Workaholism Battery" (WorkBAT) [74] consists of three scales: "work involvement", "drive" as well as "enjoyment of work". The WorkBat shows satisfactory reliability, adequate internal consistency and reasonable convergent validity with organizational and personal variables.

The "WorkBAT-R" [75] is a revised version of the "Workaholism Battery" [74]. While its authors identified three underlying factors in their instrument, other authors [74] could only establish the existence of two factors: "fun" (at work), that possesses very good reliability, and "drive" (to work), that appears to have good reliability.

Based on the observation that anankastic personality disorder and workaholism are intertwined diseases, the "Schedule for Non-adaptive Personality Workaholism Scale" (SNAP-Work) [76] was developed, which accordingly assesses personality-determined maladaptive, compulsive work habits. The SNAP-Work was found to exhibit a high internal consistency and good split half reliability.

Mudrack and Naughton [77] developed an instrument, which estimates the "tendency to engage in non-required work activities" (typically, spending time thinking of ways to perform work better) and "to intrude actively on the work of others" (typically, time and energy spent on taking responsibility for others). It can be adjusted to the specific work situation of the interviewee. The inter-item correlations are satisfactory.

Assessment of computer addiction

The existing instruments used to assess computer addiction are mostly based on the diagnostic criteria of pathological gambling and substance-related addictions, respectively. Since the symptom complex of computer addiction was initially reported in children and teenagers that excessively played video games, most of the instruments focus on video gaming behaviour in adolescence. Due to the increasing relevance and public discussion of the topic of "excessive computer use in adolescence", several instruments pertaining to excessive computer gaming have been developed in the past few years. A few of those are introduced here.

Griffith [78] developed a questionnaire of excessive video game-playing in reference to slot machine addiction in adolescence, using the adapted DSM-III-R criteria for pathological gambling (APA) [26]. The behaviour is diagnosed as an addiction, if at least four criteria are met. Scale evaluation has yet to be performed.

The DSM-IV-JV (J = Juvenile, V = Arcarde video game) [79] is a reliable instrument for diagnosing pathological video game use in adolescence. It is based on DSM-IV (APA) [27] criteria for pathological gambling. A diagnosis of pathological computer gaming can be made if at least four of its criteria are met.

The "Problem Video Game Playing Scale" (PVB) [80] assesses problematic video game playing in adolescence (13 to 18 years) with satisfactory reliability.

In order to assess computer game addiction of children in primary school age, Chiu, Lee and Huang [81] developed the "Game Addiction Scale", which differentiates between "game addiction" and "game concern". No psychometric characteristics have been established yet.

Modifying the "Internet Addicition Test" for adults [82], the "Computer-Related Addictive Behavior Inventory" (CRABI) [83] was developed in order to record computer-associated addictive behaviour. The reliability of CRABI is satisfactory.

A comprehensive instrument in assessing computer game behaviour in children is the "Fragebogen zum Computerspielverhalten bei Kindern [Questionnaire of Computer Game Behaviour in Children]" (CSVK) [84]. The CSVK was developed for the German-speaking area in reference to the diagnostic criteria of pathological gambling as well

as substance-related addictions according to the international classifications of mental disorders (DSM-IV [2] and ICD-10 [3]). It is a self-assessment tool which enables a diagnosis of "excessive computer gaming" as well as a survey on various related fields such as "family and living", "leisure time and friends", "school" and "television consumption". It also provides information on emotional state, self-esteem, social acceptance and preferred problem-solving techniques. Previous analysis revealed that all seven items of the scale "diagnostic criteria" can be reduced to a single factor and that the instrument exhibits good specificity, internal consistency as well as reasonable reliability. Further evaluation of the CSVK items should involve an analysis regarding their psychological content.

Assessment of internet addiction

Based on the rising popularity of the internet in all parts of the society during the last decade, a variety of instruments assessing internet addiction were developed. Most of them are based on the DSM-IV criteria for substance-related disorders (APA) [27] . Since, in practice, it is a common experience that computer and internet addiction are difficult to differentiate, adequate diagnostics should involve the consideration of the two symptom complexes and, therefore, the use of instruments assessing both internet and computer addiction as well.

A few select instruments will be introduced below.

Egger and Rauterberg [85] developed an "Online-Internetsucht-Fragebogen" [Online Internet Addiction Questionnaire] based on DSM-IV criteria assessing substance-related diseases (APA) [27]. Its validity and reliability have yet to be established.

Based on the same criteria, another instrument consisting of 32 items for estimating excessive internet use has been developed recently. This instrument, the "Internet-Related Addictive Behavior Inventory" (IRABI) [86] exhibits a satisfactory level of reliability.

Furthermore, the "Internetsuchtskalen [Internet Addiction Scales]" (ISS) [87], a German instrument designed to obtain information on addiction-immanent features pertaining to internet addiction (e.g. loss of control, withdrawal symptoms, development of tolerance, continued execution of the excessive behaviour despite negative consequences regarding work and performance as well as social relationships) has proven to be both reliable and valid for diagnostics.

Other authors focus on the diagnostic criteria of pathological gambling of the DSM-IV for scale assessment. The "Diagnostic Questionnaire" (YDQ) [82] - in its revised version - distinguishes between "non-problematic internet use", "frequent problems related to internet use" as well as "serious problems related to internet use", employing 20 items. In a psychometric evaluation six valid and reliable factors could be extracted: "salience", "neglecting work", "neglecting social life", "excessive use", "anticipation" and "lack of control".

Recently, additional comprehensive and multi-dimensional instruments for the diagnosis of internet addiction have surfaced. One of them [88] is based on the four factors "problem behaviour/hard-core internet user", "utilization of computer technology", "internet use for sexual gratification/shyness/introversion", as well as "absence of concern".

The "Generalized Problematic Internet Use Scale" (GPIUS) [89] is based on the theoretical concept of the "generalized problematic internet use" [90]. The scale consists of seven subscales: "mood alteration", "perceived social benefits available online", "negative outcomes associated with internet use", "compulsive internet use", "excessive amounts of time spent online", "withdrawal symptoms when away from the internet", as well as "perceived social control available online". The subscales of GPIUS correlate positively with depression, loneliness as well as shyness and negatively with the extent of self-esteem. According to the authors, the GPIUS is a reliable and valid instrument.

The "Online Cognition Scale" (OCS) [91] specifically focuses on internet-related cognitions and contains four dimensions: "diminished impulse control", "loneliness/depression", "social comfort", and "distraction". The OCS appears to be reliable.

The "Sample Questions for a Screening Interview Assessing Problematic Internet Use" [92] represent a half-standardized instrument for the assessment of problematic internet use. The five main sections of the interviews (presenting problem; biological, psychological and social areas, respectively; relapse prevention) are derived from a biopsychosocial approach [93]. Its reliability and validity have yet to be demonstrated.

Assessment of sexual addiction

The phenomenon of excessive sexual behaviour has hardly been examined until now and valid instruments in its assessment are scarce. The establishment of the quantity of sexual engagement (e.g., [93]) or the estimation of the frequency of risky sexual activities [94] neglects the complexity of the disorder and does not contribute to obtaining relevant addiction-related aspects, such as loss of control and development of tolerance.

So far, the screening test of sexual addiction [95] is the only available instrument in estimating sexual addiction. This test (like all other screening instruments) is designed to merely provide hints of the existence of the symptom complex and is available as a short (24 items) as well as a long (184 items) version. The short version requires 13 affirmative answers in order to establish the possibility of a sexual addiction. On a critical note it has to be said that the test is limited to being administered to homosexual males. It has not been validated for its use in women.

There are a variety of screening instruments on the internet for the special diagnosis of online sexual addiction. They cannot be discussed in detail here.

Assessment of various forms of bevavioural addictions

A first approach for the comprehensive and standardized assessment of different forms of behavioural addictions (e.g., pathological gambling, workaholism, compulsive buying) is the German self-assessment questionnaire "Fragebogen zur Differenzierten Anamnese exzessiver Verhaltensweisen" (FDAV, Questionnaire on Differentiated Assessment of Excessive Behaviours) [96]. The FDAV is based on the criteria of substance-related addictions, pathological gambling and impulse control disorders of the ICD-10 [3] and the DSM-IV-TR [2].
The FDAV is a modified version of the "Fragebogen zur Differenzierten Drogenanamnese" (FDDA; Questionnaire on Differentiated Assessment of Addiction, QDAA) [97]. Its seven modules obtain "sociodemographic information" (e.g., age, profession, marital status), "history of excessive behaviour" (e.g., diagnostic criteria for addictions and impulse control disorder, individual patterns of behaviour, craving symptoms), "critical life events" (stress caused by traumatic events), "legal situation", "medical history", "physical and psychological complaints", and "emotional state" (triggering psychological conditions, or consequences of the addictive behaviour, respectively). Every module can be administered separately according to the suspected behavioural addiction, thereby making the FDAV an economical tool in assessing behavioural addictions. The FDAV is suitable for diagnostics, evaluation of therapy and follow-up in clinical practice and research. Currently, the FDAV is being validated in clinical and non-clinical samples.

Characteristics of behavioural addictions

Grüsser and Thalemann [9] described relevant diagnostic characteristics of the different forms of behavioural addictions based on the present state of scientific findings and discussions. The authors view these characteristics as hints for the potential diagnosis of a behavioural addiction. However, they emphasize that in order to work against the inflational use of the term behavioural addiction, each individual case needs to be examined as to whether the suspected behaviour is in fact an addictive or just an excessive one (non-pathological or belonging to other diseases).
Characteristics of behavioural addictions according to Grüsser and Thalemann [9] include:

1. The behaviour is exhibited over a long period of time (at least 12 months) in an excessive, aberrant form, deviating from the norm or extravagant (e.g., regarding its frequency and intensity)
2. Loss of control over the excessive behaviour (duration, frequency, intensity, risk) when the behaviour started
3. Reward effect (the excessive behaviour is instantly considered to be rewarding)
4. Development of tolerance (the behaviour is conducted longer, more often and more intensively in order to achieve the desired effect; in unvaried form, intensity and frequency the desired effect fails to appear)
5. The behaviour that was initially perceived as pleasant, positive and rewarding is increasingly considered to be unpleasant in the course of the addiction
6. Irresistible urge/craving to execute the behaviour
7. Function (the behaviour is primarily employed as a way to regulate emotions/mood)
8. Expectancy of effect (expectancy of pleasant/positive effects by carrying out the excessive behaviour)
9. Limited pattern of behaviour (also applies to build-up and follow-up activities)
10. Cognitive occupation with the build-up, execution and follow-up activities of the excessive behaviour and possibly the anticipated effects of the excessively executed behaviour
11. Irrational, contorted perception of different aspects of the excessive behaviour
12. Withdrawal symptoms (psychological and physical)
13. Continued execution of the excessive behaviour despite negative consequences (health-related, occupational, social)
14. Conditioned/learned reactions (resulting from the confrontation with internal and external stimuli associated with the excessive behaviour as well as from cognitive occupation with the excessive behaviour)
15. Suffering (desire to alleviate perceived suffering)

The clinical perception as well as the increasing amount of scientific investigations emphasize the commonalities of substance-related and non-substance related behavioural addictions, respectively. Therefore, the standardized classifications of mental disorders should classify excessive behaviours meeting the criteria of addictions as an addiction disorder and operationalize them accordingly in the diagnostic criteria. Only then will it be possible to establish accurate diagnoses (by using valid and reliable instruments) and thus to facilitate effective treatment of affected individuals.

Notes

Conflicts of interest

None declared.

References

1. Kellermann B. Glücksspielsucht aus psychiatrischer Sicht. In: Fett A, editor. Glück-Spiel-Sucht. Freiburg: Lambertus; 1996. p. 23-35.
2. Saß H, Wittchen H-U, Zaudig M, Houben I. Diagnostisches und Statistisches Manual psychischer Störungen (DSM-IV-TR). Göttingen: Hogrefe; 2003.
3. Dilling H, Mombour W, Schmidt MH. Internationale Klassifikation psychischer Störungen: ICD-10, Kapitel V (F), klinisch-diagnostische Leitlinien. Weltgesundheitsorganisation. Bern: Huber; 2000.
4. Böning J. Psychopathologie und Neurobiologie der "Glücksspielsucht". In: Alberti G, Kellermann B, editors. Psychosoziale Aspekte der Glücksspielsucht. Geesthacht: Neuland; 1999.
5. Holden C. "Behavioral" Addictions: Do they exist? Science. 2001;294:980-2.
6. Marks, I. Behavioral (non-chemical) addictions. Br J Addict. 1990;85:1389.
7. Potenza MN. Should addictive disorders include non-substance-related conditions? Addiction. 2006;101:142-51.
8. Grüsser SM, Poppelreuter S, Heinz A, Albrecht U, Saß H. Verhaltenssucht - eine eigenständige diagnostische Einheit? Nervenarzt. 2007; online first.
9. Grüsser SM, Thalemann CN. Verhaltenssucht- Diagnostik, Therapie, Forschung. Bern: Huber; 2006.
10. Lejoyeux M, McLoughlin M, Adès J. Epidemiology of behavioral dependence: literature review and results of original studies. Eur Psychiatry. 2000;15:129-34.
11. Petry J. Glücksspielsucht: Entstehung, Diagnostik und Behandlung. Göttingen: Hogrefe; 2003.
12. Blanco C, Moreyra P, Nunes EV, Saiz-Riuz J, Ibáñez A. Pathological gambling: addiction or compulsion? Semin Clin Neuropsychiatry. 2001;6:167-76.
13. Petry NM, Casarella T. Excessive discounting of delayed rewards in substance abusers with gambling problems. Drug Alcohol Depend. 1999;56:25-32.
14. Grüsser SM, Albrecht U. Rien ne va plus. Wenn Glücksspiele Leiden schaffen. Bern: Huber; 2007.
15. Grüsser SM, Plöntzke B, Albrecht U. Pathologisches Glücksspiel - eine empirische Untersuchung des Verlangens nach einem stoffungebundenen Suchtmittel. Nervenarzt. 2005;76:592-6.
16. Rosenthal RJ. Distribution of the DSM-IV criteria for pathological gambling. Commentaries. Addiction. 2003;98:1674-5.
17. Steenbergh T, Meyer A, May R, Whelan J. Development and validation of the Gamblers' Belief Questionnaire. Psychol Addict Behav. 2002;16:143-9.
18. Monahan P, Black DW, Gabel J. Reliability and validity of a scale to measure change in persons with compulsive buying. Psychiatry Res. 1996;64:59-67.
19. Potenza MN. Gambling: an addictive behavior with health and primary care implications. J Gen Intern Med. 2002;17:721-32.
20. Reuter J, Raedler T, Rose M, Hand Y, Glascher J, Büchel C. Pathological gambling is linked to reduced activation of the mesolimbic reward system. Nat Neurosci. 2005;8:147-8.
21. Crockford DN, Goodyear B, Edwards J, Quickfall J, el-Guebaly N. Cue-induced brain activity in pathological gamblers. Biol Psychiatry. 2005;58:787-95.
22. Grant JE, Potenza MN. Pathological gambling: a clinical Guide to treatment. American Psychiatry Publishing, Washington; 2004.
23. Sharpe L. A reformulated cognitive-behavioral model of problem gambling. A biopsychosocial perspective. Clin Psychol Rev. 2002;22:1-25.
24. Toneatto T, Blitz-Miller T, Calderwood K, Dragonetti R, Tsanos A. Cognitive distortions in heavy gambling. J Gambl Stud. 1997;13:253-66.
25. Lesieur H, Blume S. The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. Am J Psychiatry. 1987;144:1184-8.
26. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (3rd ed. rev.). Washington, DC: Author; 1987.
27. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: Author; 1994.
28. Ferris J, Wynne H. The Canadian Problem Gambling Index: user's manual. Toronto (ON): Canadian Centre on Substance Abuse; 2001.
29. Shaffer HJ, LaBrie R, Scanlan KM, Cummings TN. Pathological gambling among adolescents: Massachusetts Gambling Screen (MAGS). J Gambl Stud. 1994;10:339-62.
30. Selzer ML, Vinokur A, van Rooijen L. A self-administered short version of the Michigan Alcoholism Screening Test (SMAST). J Stud Alcohol. 1975;36:117-26.
31. Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischman RL, Hill CL et al.. The Yale-Brown Obsessive Compulsive Scale-I. Development, use, and reliability. Arch Gen Psychiatry. 1989;46:1006-11.
32. Hollander E, DeCaria CM, Mari E, Wong CM, Mosovich S, Grossman R, Begaz T. Short-term single-blind fluvoxamine treatment of pathological gambling. Am J Psychiatry. 1998;155:1781-3.
33. Gerstein DR, Volberg RA, Harwood R, Christiansen EM. Gambling impact and behavior study: report to the national gambling impact study commision. Chicago, Illinois: National Opinion Research Center, University of Chicago; 1999.
34. Johnson E, Hamer, R, Nora R. The Lie/Bet Questionnaire for screening pathological gamblers: a follow-up study. Psychol Rep. 1998;83:1219-24.
35. Johnson E, Hamer R, Nora R, Ran R. The Lie/Bet Questionnaire for screening pathological gamblers. Psychol Rep. 1997;80:83-8.
36. Grant JE, Steinberg MA, Kim SW, Rounsaville BJ, Potenza MN. Preliminary validity and reliability testing of a structured clinical interview for pathological gambling. Psychiatry Res. 2004;128:79-88.
37. Kassinove J. Development of the Gambling Attitude Scales: preliminary findings. J Clin Psychol. 1998;54:763-71.
38. Breen R, Zuckerman M. Chasing in gambling behavior: personality and cognitive determinants. Pers Individ Dif. 1999;27:1097-111.
39. Jefferson S, Nicki R. A new instrument to measure cognitive distortions in video lottery terminal users: the Informational Biases Scale (IBS). J Gambl Stud. 2003;19:387-403.
40. Tiffany ST, Conklin CA. A cognitive processing model of alcohol craving and compulsive alcohol use. Addiction. 2000;2:145-53.
41. Namrata R, Oei TPS. The Gambling Urge Scale: development, confirmatory factor validation, and psychometric properties. Psychol Addict Behav. 2004;18:100-5.
42. Annis HM, Graham JM. Situational Confidence Questionnaire (SCQ-39): user's guide. Toronto: Addiction Research Foundation; 1988.

43. May R, Whelan J, Steenbergh T, Meyers A. The Gambling Self-Efficacy Questionnaire: an initial psychometric evaluation. J Gambl Stud. 2003;19:339-57.
44. Marlatt GA. Situational determinants of relapse and skill-training interventions. In: Marlatt GA, Gordon JR, editors. Relapse prevention: maintenance strategies in the treatment of addictive behaviors. New York: The Guilford Press; 1985. p. 71-127.
45. Valence G, D'Astou A, Fortier L. Compulsive buying: concept and measurement. J Consum Behav. 1988;11:419-33.
46. Scherhorn G, Reisch LA, Raab G. Addictive buying in West Germany: an empirical study. J Consum Policy. 1990;13:699-705.
47. Raab G, Neuner M, Reisch LA, Scherhorn G. SKSK-Screeningverfahren zur Erhebung von kompensatorischem und süchtigem Kaufverhalten. Göttingen: Hogrefe; 2005.
48. Faber RJ, O'Guinn TC. A clinical screener for compulsive buying. J Consum Res. 2005;19:459-69.
49. Christenson GA, Faber RJ, de Zwaan M, Raymond NC, Specker SM, Ekern, MD et al. Compulsive buying: descriptive characteristics and psychiatric comorbidity. J Clin Psychiatry. 1994;55:5-11.
50. Goodman WK, Price LH, Rasmussen SA, Mazure C, Delgado P, Heninger G R, Charney DS. The Yale-Brown Obsessive Compulsive Scale-II. Validity. Arch Gen Psychiatry. 1989;46:1012-6.
51. Lefever R. How to identify addictive behavior. London: PROMIS Publishing; 1988.
52. Christo G, Jones SL, Haylett S, Stephenson GM, Lefever RM, Lefever R. The shorter PROMIS questionnaire: further validation of a tool for simultaneous assessment of multiple addictive behaviors. Addict Behav. 2003;28:225-48.
53. Sachs ML, Pargman D. A depth interview examination. J Sport Behav. 1979;2:143-55.
54. Carmack MA, Martens R. Measuring commitment to running: a survey of runners' attitudes and mental states. Int J Sport Psychol. 1979;1:25-42.
55. Chapman CL, De Castro JM. Running addiction: measurement and associated psychological characteristics. J Sports Med Phys Fitness. 1990;30:283-90.
56. Glasser W. Positive addiction. New York: Harper & Row; 1976.
57. Hailey BJ, Bailey LA. Negative addiction in runners: a quantitative approach. J Sport Behav. 1982;5:150-4.
58. Loumidis KS, Wells A. Assessment of beliefs in exercise dependence. The development and preliminary validation of the Exercise Beliefs Questionnaire. Pers Individ Dif. 1998;25:553-67.
59. Ogden J, Veale D, Summers Z. Development and validation of the Exercise Dependence Questionnaire. Addict Res. 1997;5:343-56.
60. Smith DK, Hale BD, Collins D. Measurement of exercise dependence in body builders. J Sports Med Phys Fitness. 1998;38:66-74.
61. Bamber D, Cockerill IM, Rodgers S, Carroll D. The pathological status of exercise dependence. Br J Sports Med. 2000;34:125-32.
62. Davis C, Brewer H, Ratusny D. Behavioral frequency and psychological commitment: necessary concepts in the study of excessive exercising. J Behav Med. 1993;16:611-28.
63. Hausenblas HA, Symons Down D. How much is to much? The development and validation of the Exercise Dependence Scale. Psychol Health. 2002;17:387-404.
64. Terry A, Szabo A, Griffiths M. The Exercise Addition Inventory: a new brief screening tool. Addict Res Theory. 2003;12:489-99.
65. Griffiths MD, Szabo A, Terry A. The Exercise Addiction Inventory: a quick and easy screening tool for health practitioners. Br J Sports Med. 2005;39:e30.
66. Griffiths MD. Computer game playing in children and adolescents: a review of the literature. In Gill T, editor: Electronic Children: How children are responding to the information revolution. London: National Children's Bureau; 1996. p. 41-58.
67. Yates A, Edman J, Crago M, Crowell D, Zimmerman R. Measurement of exercise orientation in normal subjects: gender and age differences. Pers Individ Dif. 1999;27:199-209.
68. Burke RJ, Richardsen AM, Martinussen M. Psychmetric properties of Spence and Robbins' measures on workaholism components. Psychol Rep. 2002;91:1098-104.
69. Poppelreuter S. Arbeitssucht. Weinheim: Beltz; 1997.
70. Mentzel G. Über die Arbeitssucht. Z Psychosom Med Psychoanal. 1979;25:115-27.
71. Jellinek EM. The disease concept of alcoholism. New Haven: Yale University Press; 1960.
72. Rohrlich J. Arbeit und Liebe. Frankfurt: Fischer; 1984.
73. Doty MS, Betz NE. Manual for the Work Attitude Questionnaire. Columbus: Marathon Consulting and Press; 1981.
74. Spence J, Robbins A. Workaholism. Definition, measurement, and preliminary results. J Pers Assess. 1992;58:160-78.
75. McMillan LHW, Brady EC, O'Driscoll MP, Marsh NV. A multifaceted validation of Spence and Robbins (1992) Workaholism Battery. J Occup Organ Psychol. 2002;75:357-68.
76. Clark C. Manual for the schedule for nonadaptive and adaptive personality. Minneapolis: University of Minnesota Press; 1993.
77. Mudrack PE, Naughton TJ. The assessment of workaholism as behavioral tendencies: scale development and preliminary empirical testing. Int J Stress Manag. 2001;8:93-111.
78. Griffiths M. Pinball wizard: the case of a pinball machine addict. Psychol Rep. 1992;71:160-2.
79. Fisher S. Identifying video game addiction in children and adolescents. Addict Behav. 1994;19:545-53.
80. Salguero RAT, Morán RMB. Measuring problem video game playing in adolescents. Addiction. 2002;97:1601-6.
81. Chiu S-I, Lee J-Z, Huang D-H. Video game addiction in children and teenagers in Taiwan. Cyberpsychol Behav. 2004;7:571-81.
82. Young K. Internet addiction: the emergence of a new clinical disorder. Cyberpsychol Behav. 1998;1:237-44.
83. Yang C-K. Sociopsychiatric characteristics of adolescents who use computers to excess. Acta Psychiatr Scand. 2001;104:217-22.
84. Grüsser SM, Thalemann R, Albrecht U, Thalemann CN. Exzessive Computernutzung im Kindesalter- Ergebnisse einer psychometrischen Erhebung. Wien Klin Wochenschr. 2005;117:188-95.
85. Egger O, Rauterberg M. Internet behavior and addiction. Electronic document. 2006. Available from: http://www.idemployee.id.tue.nl/g.w.m.rauterberg/ibq/report.pdf.
86. Brenner V. Psychology of computer use: XLVII. Parameters of internet use, abuse and addiction: the first 90 days of the internet usage survey. Psychol Rep. 1997;80:879-82.
87. Hahn A, Jerusalem M. Reliabilität und Validität in der Online-Forschung. In: Theobald A, Dreyer M, Starsetzki T, editors. Handbuch zur Online-Marktforschung. Beiträge aus Wissenschaft und Praxis. Wiesbaden: Gabler; 2001.

88. Pratarelli M, Browne B, Johnson K. The bits and bytes of computer/internet addiction: a factor analytic approach. Behav Res Methods Instrum Comput. 1999;31:305-14.

89. Caplan S. Problematic internet use and psychosocial well-being: development of a theory-based cognitive-behavioral measurement instrument. Comput Human Behav. 2002;18:553-75.

90. Davis RA. A cognitive-behavioral model of pathological internet use. Comput Human Behav. 2001;17:187-95.

91. Davis R, Flett G, Besser A. Validation of a new scale for measuring problematic internet use: implications for pre-employment screening. Cyberpsychol Behav. 2002;5:331-45.

92. Beard K. Internet addiction: a review of current assessment techniques and potential assessment questions. Cyberpsychol Behav. 2005;8:7-14.

93. Kalichman S C, Rompa D. The Sexual Compulsivity Scale: further development and use with HIV-positive persons. J Pers Assess. 2001;76:376-95.

94. Gaither GA, Sellbourn M. The Sexual Sensation Seeking Scale: reliability and validity within a heterosexual college student sample. J Pers Assess. 2003;81:157-67.

95. Carnes P. Don't call it love. New York: Bantam Books; 1991.

96. Grüsser S M, Mörsen C, Thalemann R, Albrecht U. Fragebogen zur differenzierten Anamnese exzessiver Verhaltensweisen (FDAV). [Unpublished manuscript]; 2007.

97. Grüsser SM, Mörsen CP, Wölfling K, Düffert S, Albrecht U, Flor H. Fragebogen zur differenzierten Drogenanamnese (FDDA) [Questionnaire on the Differential Assessment of Addiction]. Göttingen: Hogrefe Testsystem (in press); 2007.

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