Construction of a Standardized Clinical Interview to Assess Internet addiction: First Findings Regarding the Usefulness of AICA-C

Wölfling K1, Beutel ME2 and Müller KW*3

1Outpatient Clinic for Behavioural Addiction, Department of Psychosomatic Medicine and Psychotherapy, University Medical Center, Johannes Gutenberg University Mainz, Germany
2Director of the Department of Psychosomatic Medicine and Psychotherapy, University Medical Center, Johannes Gutenberg University Mainz, Germany
3*Corresponding author: Kai W. Müller, Department of Psychosomatic Medicine and Psychotherapy, University Medical Center, Johannes Gutenberg University Mainz, Unlere Zabibacher Straße 8, 55131 Mainz, Germany, Tel: + 49 - 6131 - 17 4039; Fax: + 49 - 6131 - 17 4039; E-mail: muellkai@uni-mainz.de

Abstract

Study background: Inclusion of Internet addiction into the upcoming revision of DSM-V has been discussed recently. However, its nosological features and diagnostic criteria have remained a matter of debate. Core criteria have been suggested for classification, including craving, tolerance and loss of control. Whereas some questionnaire-based diagnostic tools assess internet addiction, of standardized clinical interviews are still missing. Operationalizing internet addiction by such an interview, akin to the structured clinical interview for DSM Disorders would be beneficial identifying internet addiction, also as a co-morbid disorder in patients suffering from any form of mental illness.

Methods: In a specialized clinic a short clinical interview (checklist for the Assessment of Internet and Computer game Addiction, AICA-C) including six core criteria of internet addiction was developed. To generate clinical cut-offs, test its psychometric property and clinical validity, 141 patients were assessed with AICA-C along with further clinical questionnaires and expert ratings, like global assessment of functioning. Trained clinician’s rating regarding presence of internet addiction was used as an external criterion to determine the predictive validity of AICA-C.

Results: Items of AICA-C display sound psychometric properties. A preliminary cut-off was determined by using therapist’s rating of internet addiction. This cut-off yielded a sensitivity of 85.1% and specificity of 87.5%. Significant correlations to both, self-report data, like Symptom Checklist-90R and expert ratings, like global assessment of functioning were found.

Conclusion: AICA-C can be regarded as a useful and economic tool to assess internet addiction in an oral clinical exploration. Due to its economic applicability in combination with good detection rates, its implementation in the daily routine of psychosomatic and psychiatric institutions can be considered as a promising way to diagnose (co-morbid) internet addiction.

Keywords: Cut-Off; Expert rating; Diagnostics; Internet addiction; Sensitivity; Specificity

Introduction

Internet addiction – a new issue for health care

Although there is still no general agreement on the clinical classification of a phenomenon, sometimes called Pathological Internet Use (PIU) or Internet addiction (IA), there is less doubt on its adverse impact on (psychosocial) health and well-being in those who are suffering from it. After some years of intense research on this topic numerous clinical and epidemiological studies demonstrated, that internet overuse respectively IA is often is associated with increased feelings of loneliness [1], depressive symptoms [2], anxiety [3] and general distress [4]. For example, an epidemiological survey in Asia [5] revealed that college students fulfilling criteria of IA scored higher in the Global Severity Index of the Symptom-Checklist 90R (SCL-90R) [6] than a reference group that made regular use of the internet but did not show signs of IA. Likewise another epidemiological investigation in the UK by Morrison and Gore [7] found that IA was related to elevated depression scores, measured with the Beck Depression Inventory (BDI). Accordingly, investigations patients treated for IA, point out that this mental disorder is accompanied by high rates of co-morbid disorders, mostly affective and anxiety disorders [4,8].

In addition, first empirical data indicated that internet addiction occurs with higher probability among patients in treatment for other mental disorders. For instance, in a large-scale screening-study on approx. 2000 patients of inpatient rehabilitation treated for substance abuse in Germany, Müller et al. [9,10] found that 4.2% suffered from co-morbid internet addiction. Especially persons in treatment because of cannabis dependence or pathological gambling had significantly increased risk addictive internet behaviour. Likewise, an exploratory investigation in an adolescent psychiatry came to a clinical prevalence of 11.3% [11]. Among those adolescents, especially being treated because of internalizing mental problems (depressive disorder, anxiety disorder) was related to co-morbid Internet addiction.

As empirical evidence grows, the American Psychiatric Association (APA) currently considers including internet addiction - provisionally labelled as “Internet Use Disorder”, - into the upcoming revision of DSM [12], in Section III, where additional mental disorders are located that are in need of further empirical substantiation. As mentioned above, clinical classification of IA is still a matter of debate. Various proposals have been made so far, considering IA as being subsumed best as an impulse control disorder, a personality disorder or as a mere symptom of an underlying primary mental disorder like depression (for a detailed review on classification and nosology of internet addiction [13]). However, preliminary research, especially in regard to underlying...
neurobiological mechanisms indicate similar cortical processing of emotional information related to the problem behaviour [14] and cognitive distortions [15] in IA and substance-related addictions. This has been shown especially in computer game addiction, a common subtype of Internet addiction, by some studies making use of EEG- [14] or fMRI-techniques [16]. Taken together, these findings show substantial parallels between IA and (substance-related) addiction disorders like cocaine dependence [17] and pathological gambling [18]. Accordingly, there is growing consent that Internet addiction might be best classified as a variant of non-substance-related addiction, as it has been proposed for pathological gambling too [12].

Looking at diagnostic criteria for IA proposed so far strengthens the position mentioned above. Criteria like craving, tolerance and withdrawal are classical core criteria from substance-related addictions and research has demonstrated that those adapted criteria can be applied to IA as well [13]. However, although there are some self-report questionnaires operationalizing IA by the criteria mentioned above, there is still a lack concerning diagnostic clarification of IA, especially in clinical settings. Contrary to other forms of mental disorders, most of the self-report measures used in empirical projects have not been validated sufficiently in clinical context. Furthermore, standardized clinical interviews – analogous to the Structured Clinical Interview for DSM Disorders (SCID) – do not exist for Internet addiction. However, as research has shown that IA also occurs as a co-morbid disorder among patients suffering from other mental disorders, relating to a potential presence of IA during a clinical exploration can be expected to be beneficial in terms of early detection of co-morbid IA. Detection of IA therefore would be the first step to transfer such patients to indicative respectively specialized therapy or counselling programs, additional to interventions regarding the primary diagnosis.

Rationale, need and principle of constructing a structured clinical interview for internet addiction

The growing issue of Internet addiction has been documented nearly all over the globe. Its prevalence can be estimated at 1.0% in the general population with higher rates among minors and young adults [19] and its impact on level of functioning, job-performance and psychosocial well-being of the affected has to be regarded to be considerably momentous [4,20,21]. Moreover, among patients suffering from different kinds of mental and addictive disorders, co-occurring Internet addiction as a "hidden" co-morbidity apparently plays a role, what was shown in different clinical studies [9,22].

At present diagnostic tools for internet addiction are scarce. There are some self-report measures, like the internationally most employed Internet addiction Test by Young (IAT) [23], Compulsive Internet Use Scale (CIUS) by Meerkerk et al. [24] or the Scale for the Assessment of Internet and Computer game Addiction (AICA-S) by Wölfling et al. [25,26]. However, most of these questionnaires available have not been examined in terms of their clinical or statistical validity. Also, they have not been administered regularly in general health care due to their administrative effort. Standardized clinical interviews to assess Internet addiction in the context of a short clinical exploration are lacking. For clinical practice such standardized interviews can be expected. Screening for Internet addiction by administering a few diagnostic questions would allow for more complete and accurate diagnostics at an economic basis.

Recent publications on diagnostic features of Internet addiction have used criteria similar to substance-related disorders respectively pathological gambling – which also can be considered as a non-substance related addiction disorder. Tao et al. [27] for example enumerate preoccupation with internet-related activities, tolerance, symptoms of withdrawal, insufficient control, negative consequences,
attains to hide the behaviour from others, and alleviation from negative emotions. Based on statistical analyses related to epidemiological data, Wölfling et al. [25] demonstrated that criteria of craving, tolerance, withdrawal, and loss of control, preoccupation and negative consequences concerning poorer health, family conflicts or deteriorating achievements differentiated most accurately between addicted users and regular respectively intense users.

Consequently, in the developmental process of an external clinical interview for Internet addiction, called Checklist for the Assessment of Internet and Computer game Addiction (AICA-C), these six criteria were included as main indicators for Internet addiction. In order to create a dimensional measure for the degree of their manifestation within the patient a rating scale for each global criterion ranging from 0 (not at all) to 5 (very distinct) was constituted. Thus, total score of AICA-C can range between 0 and 30 points. Main topics and questions were developed in order to operationalize the six core criteria. Table 1 displays these main topics and exemplary questions centering on these six criteria that may be appropriate in patient contact during clinical exploration. Note that these examples are to be understood as mere suggestions. As AICA-C is a semi-structured interview, single questions operationalizing the main criteria may be adapted individually within certain boundaries (Table 1).

Rating procedure requires a trained clinician to rate all of the six core criteria on the basis of single diagnostic questions posed to a person suspected suffering from Internet addiction. Since AICA-C is a semi-structured clinical interview, the rater may operationalize the six core criteria using a varying amount of single questions before rating total manifestation of the core criterion on the 6-point likert-scale. In order to determine the internet application used in an addictive way, nine different applications (e.g. games, gambling, social networking sites, pornography etc.) can be rated additionally concerning frequency of usage and perceived functionality of use (functional vs. dysfunctional use). Finally, one more estimation centering on the main problematic application used by the client in an addictive way has to be made. There is also a possibility to refer to different periods of time. The presented suggestion here refers to manifestation of the six core criteria within last 30 days and their highest expression during lifetime. The complete version of AICA-C can be found in the attachment.

Material and Methods

Self-report measures and expert ratings

In order to determine criterion-related validity and construct validity of AICA-C several questionnaires and ratings were administered.

The Assessment of Internet and Computer game Addiction (AICA-S) [25,26] is a self-report scale whose items are derived from the adapted criteria of substance-related addiction of the DSM-IV. 14 items are relevant for clinical classification of internet use behaviour, accounting for e.g. craving, tolerance, loss of control, unsuccessful attempts to cut back, and withdrawal. Negative repercussions of internet use are differentiated according to six areas (e.g. problems with school, work, health etc.). Moreover, time spent online and preferred online activity is inquired. Preliminary cutoffs were defined 1) by analyses of score distributions in former epidemiologic surveys and 2) by comparisons with external criteria (e.g. self-efficacy expectancy, social insecurity). Following these two approaches, a score of 7 points (3 criteria fulfilled) is considered as an indicator for moderate addictive use, while a score of 13.5 points (5 criteria fulfilled) and higher corresponds to a severe addictive use. Its reliability (internal consistency of α=.89) and validity (factorial and construct validity) were determined in two large-scale German epidemiologic surveys [25,28].

The SCL-90R ([6] German version by Franke [29]) is a self-report questionnaire assessing psychological distress by 90 items in nine subscales. Items range from 0 to 4 points indicating the degree to which the individual has been distressed by the symptom in the last seven days. Computation of the Global Severity Index (GSI) represents the overall distress. The measure is popular in clinical departments and research and has sound psychometric properties [30].

Additionally, these questionnaire-based data were endorsed by external assessments completed by trained therapists and psychologists at the Outpatient Clinic for Behavioural Addictions of the University Medical Centre Mainz. In these ratings, implemented within clinical exploration with the patient, the person in charge examined presence of Internet addiction, conducted Global Assessment of Functioning (GAF) and one additional rating concerning Impairment-Severity-Score [31].

The Global Assessment of Functioning (GAF) developed by the American Psychiatric Association (APA) is an external assessment that is based on axis V of the DSM. It assesses the level of functioning concerning three areas (psychological, social and occupational). It is organized into 10 different levels of functioning and the full interval scale ranges from 0 (inadequate information) to 100 (superior functioning). In each of the 10 levels, severities of the symptoms as well as the functionality are categorized. The inter-rater reliability of GAF ranges between r=.65 to .95 [32].

The Impairment-Severity-Score (ISS) [31] is a rating procedure which gives an estimate of the impairment of a human caused by his psychogenic illness. It is divided into three main dimensions (physical, psychological and impairment in social communication skills) which are rated separately in 5-point likert-scales (0= no impairment; 4= severe impairment). ISS has been validated for patients with mental disorders: personality disorders, addictions, psychoneuroses, psychosomatic (especially functional) disorders.

In respect of the external assessment of Internet addiction, the therapist was asking for general patterns of use, time spent online, as well as proposed clinical criteria of Internet addiction, like craving, mood modification and loss of control. Additionally, therapists made use of AICA-S as a self-report completed by the patients before oral exploration. After clinical exploration the therapist had to decide if the diagnosis Internet addiction was existent or not.

Recruitment and procedure

Every patient seeking counselling respectively treatment because of suspected Internet addiction in the Outpatient Clinic for Behavioural Addictions between summer 2010 and spring 2012 was informed about the study’s purpose and asked to give informed written consent. If the client was underage, parents were also informed and asked to give additional consent. Participation was fully voluntary and clients did not receive any payment for it. The investigation was approved by local ethical commissions and was in accordance to the declaration of Helsinki.

Patients consenting to the study were interviewed by therapists or psychologists. After a short introduction the client was given the opportunity to tell something about the reason for presenting in the outpatient clinic, general internet use, occurring psychosocial respectively psychopathological symptoms in general and presence of the single diagnostic criteria for Internet addiction. The duration
Clinical classification and sample characteristics

After clinical exploration, Internet addiction was diagnosed in 71.6% (n=101; addicted group) of the cases. Accordingly, 40 subjects (28.4%) were not diagnosed with Internet addiction (non-addicted group). Comparisons between both groups regarding socio-demographic characteristics yielded that the addicted group was older than the non-addicted group (M=24.9; SD=9.74 vs. M=19.1; SD=8.38; U=795.00, p ≤ 0.001). Accordingly, significantly (χ²(5) =19.56; p ≤ 0.001) more members of the non-addicted group still attended school (90.9% vs. 26.8%) and more often reported living with their parents (92.3% vs. 50.5%; χ²(3)=20.97; p ≤ 0.001). No significant differences were found concerning partnership and marital status.

Frequent usage of online games and online information resources (both 76%) and chats (63.5%) were the most popular online activities. The addicted group spent significantly more time online (on a weekday: M=6.0; SD=3.12; U=1056.00, p ≤ 0.001 and at the weekend: M=7.7; SD=4.17; U=1225.00, p ≤ 0.05) than the non-addicted group (on a weekday: M=4.1; SD=2.92 and on the weekend: M=5.8; SD=2.96). Analyses of online contents used revealed few differences between both groups. The addicted group used more often online-sex (M=0.9; SD=1.08 vs. M=0.3; SD=0.62; U=832.50, p ≤ 0.01) and less often chats (M=1.6; SD=1.00 vs. M=2.1; SD=1.05; U=855.50, p ≤ 0.05).

Results

Psychometric properties of AICA-Checklist and determination of clinical cut-offs

Table 2 shows mean values of the six items of AICA-C in both groups (addicted vs. non-addicted users).

As apparent from Table 2 addicted user’s means in AICA-C exceed those of non-addicted users significantly with respect to every criterion with highest effect sizes for preoccupation (d=1.53) and negative consequences (d=1.52).

In order to evaluate AICA-C basic psychometric parameters (internal consistency, mean inter-item-correlation and discriminatory power of items) were analysed as well as the factor structure. The internal consistency (Cronbach’s alpha) of α=0.90 can be considered as sufficient as the mean inter-item-correlation of ρii=0.61. Discriminatory power of the single items varied between 0.78 (negative consequences) and 0.68 (withdrawal respectively tolerance; Table 2).

Based on the Kaiser-Guttman-Criterion and inspection of the scree-test a principal component analysis revealed one single factor under the Curve (AUC) was consulted as a measure for the general usability of AICA-C.
A correlational matrix was significantly different from random ($\chi^2=445.38$, df=15, $p < 0.001$) indicating the sample was apt for the conduction of a principal component analysis. Also Bartlett’s test of sphericity confirmed that the extracted $\kappa = 0.89$, $p < 0.001$) Kaiser-Meyer-Olkin Criterion were suitable for principal component analysis. Concerning $p < 0.001$) the sample was apt for the conduction of a principal component analysis.

Results show that using a cut-off of 13 points leads to a detection rate of patients suffering from Internet addiction of 85.1% (sensitivity) while detection-rate of subjects not suffering from Internet addiction amounts to 87.5% (specificity).

### Relations to external criteria

To test if scores of AICA-C are associated with different parameters related directly or indirectly to Internet addiction a set of outcome variables was defined. This included Global Assessment of Functioning (with sub-dimensions concerning psychic, social and achievement-related functioning) and ISS (with sub-dimensions concerning physical, psychological and social impairment). Table 4 shows correlations between single criteria and total score of AICA-C and the different measures of GAF (Table 4).

As can be seen, every criterion, as well as AICA-C total score correlate significantly with (lower) GAF in every domain. Moreover, also group differences based on AICA-C between addicted and non-addicted differ significantly; for GAF total: $M=61.4$ vs. $M=15.20$; $U=626.00$, $p < 0.001$), for psychic GAF: $M=62.2$; $S D=16.07$ vs. $M=79.9$; $S D=12.47$; $U=609.50$, $p < 0.001$), for social GAF: $M=61.7$; $S D=17.09$ vs. $M=79.4$; $S D=13.06$; $U=718.00$, $p < 0.001$) and for achievement-related GAF: $M=60.2$; $S D=16.18$ vs. $M=77.2$; $S D=13.95$; $U=752.50$, $p < 0.001$).

Similar findings were observed for the three dimensions of Impairment-Scale, in detail for physical impairment: $M=0.71$; $S D=0.77$ vs. $M=0.20$; $S D=0.46$; $U=897.00$, $p < 0.001$, psychological impairment: $M=1.89$; $S D=0.81$ vs. $M=0.86$; $S D=0.82$; $U=580.50$, $p < 0.001$) and social impairment: $M=1.97$; $S D=0.97$ vs. $M=0.84$; $S D=0.89$; $U=591.00$, $p < 0.001.$

### Relations to self-report data

Global severity Index (GSI) of SCL-90R, hours spent online derived

<table>
<thead>
<tr>
<th>Diagnosed by AICA-C</th>
<th>AICA-C &lt; 13.0</th>
<th>AICA-C ≥ 13.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>14.9% (n=15)</td>
<td>87.5% (n=35)</td>
</tr>
<tr>
<td></td>
<td>35.5% (n=50)</td>
<td>12.5% (n=5)</td>
</tr>
</tbody>
</table>

Comments: Clinical judgements of Internet Addiction by trained psychologists was chosen as a gold standard; $n=141$

Table 3: Sensitivity and specificity of AICA-C using a cut-off score of 13 points.

In order to define an external criterion as a reference (“gold standard”) for Internet addiction, diagnosis of Internet addiction after clinical-diagnostic exploration by trained therapists was chosen to that purpose. To further estimate a potential cut-off of AICA-C, the Receiver Operating Characteristics (ROC-curve) were estimated in order to specify property of classification of Internet addiction using AICA-C as a dimensional measure (Figure 1).

The calculated Area under the Curve (AUC) yielded a value of 0.94 ($p < 0.001$), suggesting that AICA-C yields significant contribution in predicting Internet addiction [33]. Analysis of ROC-curve revealed that a cut-off of 13 points was associated with most beneficial values concerning sensitivity and specificity (Table 3).

$$r = r_{Pearson}; level of significance:** p<.05; *** p<.01; GAF=Global Assessment of Functioning; n=141$$

Table 4: Correlations between dimensions of Global Assessment of Functioning and AICA-Checklist.

<table>
<thead>
<tr>
<th>AICA-C</th>
<th>Craving</th>
<th>Tolerance</th>
<th>Withdrawal</th>
<th>Loss of control</th>
<th>Preoccupation</th>
<th>Negative consequences</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>$-0.51^{**}$</td>
<td>$-0.54^{**}$</td>
<td>$-0.46^{**}$</td>
<td>$-0.48^{**}$</td>
<td>$-0.51^{**}$</td>
<td>$-0.57^{**}$</td>
<td>$-0.55^{**}$</td>
<td>$-0.50^{**}$</td>
</tr>
</tbody>
</table>

Comments: $r_{Pearson}$; level of significance:** p<.05; *** p<.01; GAF=Global Assessment of Functioning; n=141

Table 5: Correlations between Global Severity Index and time spent online and AICA-Checklist.
from AICA-S and the single items out of AICA-S representing craving, tolerance, loss of control, withdrawal, negative repercussions and decreasing level of functioning were defined as markers for Internet addiction and correlated with total score of AICA-C as well as the six single components of AICA-C. The results show that the total score of AICA-C as well as all of the six components were related to higher scores of GSI (Table 5) as well as to time spent being online (Table 5).

Concerning categorical classification due to cut-off of AICA-C, patients exceeding a score of 13.0 showed (M=7.1; SD=0.65) significantly elevated scores in GSI (U=1256.50, p ≤ 0.001) than those patients with a score below 13.0 (M=0.39; SD=0.46).

The same was true regarding correlations between AICA-C total score and hours spent online on a weekday (r=31; p ≤ 0.001) and on the weekends (r=36; p ≤ 0.001). Moreover significant group differences were observed with patients above the cut-off in AICA-C displaying more excessive usage on weekdays (M=6.0; SD=3.02; U=1281.50, p ≤ 0.001) and weekends (M=8.0; SD=4.07; U=1205.00, p ≤ 0.001) than the other subjects (on a weekday: M=4.5; SD=3.23; on weekends: M=5.5; SD=3.14).

In order to evaluate if single components of AICA-C correspond to self-report data of the same criteria, correlational analyses were conducted between external ratings according to AICA-C and items of the self-report measure AICA-S. For every criterion significant correlations (all p ≤ 0.01) were found: r=0.60 for negative consequences, r=0.59 for craving, r=0.52 for withdrawal, r=0.49 for loss of control, r=0.40 for tolerance and r=0.37 for preoccupation.

Discussion

In this study we investigated the applicability of a standardized clinical interview to diagnose Internet addiction. To that purpose, six core criteria, commonly accepted for the classification of Internet addiction, were respected, possible sub-dimensions identified and separately operationalized by different diagnostic questions. The AICA-Checklist was developed, a semi-structured interview. As an external reference in terms of a "gold standard", clinical impressions of trained therapists and psychologists working at the Outpatient Clinic for Behavioural Addictions were respected. The present validation based on a clinical sample of 141 persons seeking treatment.

After generation of this set of contents, statistical analyses of psychometric properties of AICA-C were conducted to determine its internal consistency and factorial structure. It was shown that item characteristics of AICA-C fulfilled the common quality standards. The single items had well to excellent discriminatory power with negative consequences and craving displaying the best values. Both, internal consistency as well as homogeneity were corresponding to common standards [34]. Additionally, principal component analysis revealed that AICA-C consists of one single factor explaining approx. 68% of the variance that can be labelled as "Addictive Internet Use".

To further test content validity of AICA-C, its six components, craving, tolerance, withdrawal, loss of control, preoccupation and negative consequences were correlated with the same separate criteria included in the Scale for the Assessment of Internet and Computer game Addiction (AICA-S), a self-report measure with proven psychometric properties and construct validity [25]. The single correlational coefficients were within satisfying boundaries. So it was demonstrated that AICA-C has close relationships to the diagnostic core criteria experienced by subjects affected by Internet addiction.

After this initial evaluation of basic test theoretical principles, a clinical cut-off of AICA-C was calculated. As an external reference, diagnoses of Internet addiction made by therapists at the Outpatient Clinic for Behavioural Addictions were taken into account. Afterwards, a ROC-analysis was conducted to identify the cut-off with the highest diagnostic accuracy. This cut-off yielded proper matching rates with diagnostic judgement of the therapists. The identified sensitivity amounted to 85.1% and the specificity to 87.5%. So, according to AICA-C a total of 85% suffering from Internet addiction were identified as such correctly and in 88% of the regular users Internet addiction was excluded accurately.

Several clinical markers indicating psychopathological distress in patients suffering from Internet addiction were taken into account additionally to further evaluate clinical judgements based on AICA-C. Implemented clinical markers consisted of both, external ratings of psychosocial functioning and self-report data based on experienced psychopathological symptoms. Results show that AICA-C correlates significantly with every respected marker, external and self-report-based ones. Patients classified as internet addicted on the basis of AICA-C reported increased hours being online, were rated lower concerning psychic, social and occupational level of functioning and showed increased physical, psychological and social impairment. Moreover, Global Severity Index of SCL-90R was significantly elevated in patients classified as internet addicted.

Up to now, there are few other studies investigating detection rates for IA according to diagnostic approaches. In Asia, Ko et al. [35] tested assessment of IA according to DC-IA-C (Distinguishing characteristics of Internet addiction) consisting of a mixture of criteria of substance dependency and pathological gambling. In their pilot investigation they found that criteria like craving, tolerance, preoccupation, impairment of control along with items related to functional impairment were appropriate to operationalize IA. Detection rates in their investigation was higher than reported here, possibly due to the fact that DC-IA-C is of higher complexity and contains more diagnostic questions than used in AICA-C. Furthermore the sample investigated by Ko et al. consisted of a natural sample of (healthy) college students aged 18 to 27 years. Poorer detection rates of AICA-S could be explained with the circumstance that a clinical population was screened that might differ slightly in terms of self-consciousness. However, similarities between both studies emphasize that IA can be appropriately classified by administering the adopted criteria of substance dependence and pathological gambling.

This pilot study has a number of limitations that need to be discussed briefly. First of all, the sample size is comparably small and not representative for the collective of treatment seekers. Although calculated measures indicated that the sample size was sufficient, especially the number of non-addicted subjects that is essential for the determination of specificity of AICA-C was quite small. Moreover, both groups - addicted and non-addicted showed some significant differences regarding age and level of education and so were not fully homogenous and comparable. In addition, no separate analyses were conducted regarding changes of accuracy of AICA-C respecting further co-morbidity of the patients. So there is certainly a need for further investigations of classificatory accuracy of AICA-C in future research projects. It would also be beneficial if also treatment seekers of different institutions as well as inpatient clinics would be examined the same way to make sure that there have been no confounding effects due to selectivity of included subjects.

A further limitation concerns the defined reference ("gold standard") of Internet addiction that here consisted of clinical judgements made by
therapists and psychologists. As AICA-C was rated by the same person that conducted clinical exploration no independent discrimination between prediction criteria (judgement on Internet addiction) and predicting tool (AICA-C) was realized. Although scoring of AICA-C was conducted by an independent co-worker, a proper blinded design was not applied. In further studies there should be two independent persons involved, one for the initial clinical exploration concerning presence of Internet addiction and one administering AICA-C afterwards to confirm that diagnosis in a fully blinded study design. Finally, no data was acquired concerning inter-rater reliability. As this is one utterly important measure for the objective applicability of AICA-C, future analyses should address this question with priority.

Despite these limitations, this pilot study focusing on applicability of AICA-C as a standardized semi-structured clinical interview for Internet addiction revealed first promising findings. AICA-C turned out to be a psychometrically consistent instrument whose implementation as a part of clinical exploration can be considered as economically sound. On the average, time spent rating the six criteria of AICA-C took about 10 to 20 minutes on average. Since the first values concerning sensitivity and specificity were satisfying when relying on AICA-C took about 10 to 20 minutes on average. Since the first values concerning sensitivity and specificity were satisfying when relying on AICA-C can be considered as a useful supplement with proven diagnostic accuracy.

References


This article was originally published in a special issue, Substance and Behavioral Addictions handled by Editor(s): Dr. Daria J. Kuss, Nottingham Trent University, UK.