# Internet Addiction: The Making of a New Addiction

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## Abstract

The body of Internet addiction research articles has grown rapidly during the last years. Critics claim that the bulk of this research is more confirmatory than scrutinizing, in spite of weak evidence for the label of addiction. A study on excessive Internet use in Sweden has been cited repeatedly in Internet addiction studies. The present study takes a closer look at these citations and combines the presentation with a systematic review of methods and theoretical approaches in Internet addiction studies, published between January 2000 and July 2013. 174 articles were analysed with Multiple Correspondence Analysis. Only 17% of the included studies were found to have an acceptable evaluative approach. Using these two empirical materials as our backdrop, we discuss how new concepts, such as Internet addiction, develop and the risks involved in scientific processes where critical reflections are overlooked and we conclude that the discussion and research on "Internet addiction" still is mainly indiscriminating when it comes to how the concept is defined, measured and judged.

## Introduction

In anticipation of the possible classification of Internet Addiction as a mental disorder, the body of Internet addiction research articles has grown rapidly during the last five years. Among these is Bergmark et al.'s [1] study on excessive Internet use in the Swedish population, where evidence was found pointing to the conclusion that the use of non-representative samples has exaggerated its prevalence in other studies [1]. Importantly, the study also included a critical discussion concerning the Internet addiction concept itself and its classification as an "addiction-like" behavioral disorder for potential inclusion as a mental disorder in a future edition of the Diagnostic and Statistical Manual of Mental Disorders [2].

Concurrently, we initiated a systematic review over Internet addiction studies as a whole in order to investigate the methods and theoretical approaches used in studies that would serve as a basis for such an inclusion [3]. Using these two studies as our backdrop, we discuss how new concepts, such as Internet addiction, develop in contemporary addiction studies and the risks involved in scientific processes where critical reflections are overlooked.

## The addiction concept

The conceptual history of addiction is multilayered and can trace its roots as far back as Thomas Trotter's [4] description of the evil genius of the habit of drunkenness, which he denoted as "… a disease; produced by a remote cause, and giving birth to actions and movements in the living body, that disorders the living functions of health" (Ibid, 1804 p. 8). From Trotter's evil genius of the habit of drunkenness, to inebriety and then on to addiction in the early 20th century [5], which was replaced by dependence - which was to cover a broader set of substances such as cannabis, nicotine and cocaine later on [6].

In 2001, a news focus piece in Science stated that"… a reward's a reward, regardless of whether it comes from a chemical or an experience. And where there's a reward, there's the risk of the vulnerable brain getting trapped in a compulsion" [7]. Ten years later focus was still on the hijacked reward systems of the brain and now the problem area is stretched to include not only substances but also actions and behavior. Coupled with a return of loss of control, behavioral addictions, as other addictions, were now considered as impulse-control disorders implying excessive use, withdrawal, tolerance and negative social repercussions [8].

In 2013, the new edition of DSM - DSM-5 - was launched (APA, op.cit.). In this edition, harmful consequences are focused more at the expense of physical dependence [9] and addiction is again back as the main concept. This type of shift in core elements of the re-introduced addiction concept opens up for consideration of non-substance or behavioral addictions. This can be exemplified by the previous diagnosis for pathological gambling, which used to be classified as an impulse control disorder, but is now described as a behavioral addiction. Although other behavioral addictions were reviewed for the possibility of inclusion in the DSM-5, only gambling met the criteria for full inclusion. Nonetheless, internet gaming disorder (often referred to as gaming or internet addiction, see e.g. [10]) was included in the appendix as a candidate for behavioral addiction in order to encourage further research.

**Internet addiction and its measurement**

Twenty years ago, the psychiatrist Ivan Goldberg, as a hoax, used the DSM-IV diagnostic criteria for pathological gambling [11] to launch the concept of "Internet addiction disorder" on his website, in reaction to the medicalization processes implied by the APA (American Psychiatric Association) and DSM [12,13]. As little as one year later, however, the concept was taken up with greater seriousness by Kimberly Young [14]. Like Goldberg, Young drew from the DSM-IV definition for pathological gambling, which itself emanates from definitions and diagnostic indicators of substance related addictions. Her study group was recruited from a variety of self-selected sources; via newspaper advertisements, flyers on college campuses, Internet addiction support groups (including "the Internet Addiction Support Group" and "Webaholics Support Group"), and posted online for web-searches on "Internet addiction".

Young (Ibid.) used eight indicators to capture salience, mood modification, tolerance, withdrawal, conflict and relapse symptoms of Internet addiction where respondents who fulfilled five or more of Young's above listed criteria were classified as addicted. In addition, she identified six key behavioral variables: (1) Time since first using the Internet; (2) hours per week spent online; (3) most commonly used applications; (4) attractiveness of the respective applications; (5) problems caused by Internet use; (6) severity of problems caused by in-

ternet use [15].

Subsequently, other researchers (e.g. [16]) subsequently elaborated on and revised Young's 1998 criteria, including adaptations of the test in languages other than English. Yen et al. [17] developed the Chen Internet Addiction Scale (CIAS), which assesses five dimensions of Internet addiction in a Chinese context, and Khazaal et al. developed and tested the validity of a version translated into Arabic [18] and French [19]. Nonetheless, although there are several adaptations of these tests, their retained similarities with Young's original indicators entail that they are comparable.

There have also been important criticisms of the concept of behavioral addictions and its sub-concepts, such as Internet addiction. One of the harshest, and perhaps also most unexpected, critics is Allen Frances, chair of the DSM-4 task force, who fiercely has attacked the proposed inclusion of behavioral addictions both because it would place millions of people in unwarranted "sick roles", arguing that "We, all of us, do short term pleasurable things that can be quite foolish in the long run. It is the nature of the beast." [20] and underscoring the reality that what constitutes a mental disorder is oftentimes a product of societies attempting to explain away pressing concerns rather than the result of a rigorous scientific process [21]. Indeed, Frances argues that the inclusion of behavioral addictions in the DSM might even saturate the addiction concept to the point where it potentially includes everything in life that we enjoy doing.

In the case of the Internet addiction concept itself, critics have pointed out that it ignores the specific uses that the Internet mediates, such as gambling, pornography, and social networking [1]. Similarly, Richard A Davis [22] proposes that a study of Internet addiction, or Pathological Internet Use (PIU) as he denotes it, should distinguish between dependencies that are content-specific and those that pertain to the characteristics of the Internet itself. In particular, Davis highlights the social aspects of the Internet as a possible source of Internet-specific dependency (Ibid.).

Indeed, in the western world, we spend increasingly more time online, many are online and use online facilities for most of the day - some even call online the "contemporary default" [23]. The Internet has gone from being primarily a work-related tool towards multi-purpose and integral part of people's day, ranging from gaming and entertainment to shopping, bank transactions and romantic interactions [24]. In addition, many aspects of our social lives and relations have shifted—or expanded- with the upsurge of digital arenas such as Facebook [25], and online games [26]. Thus, the Internet provides many opportunities for interaction between individuals, unrestricted by previous limitations such as geography or social ties.

However, in addition to the many positive impacts of the wide-

spread everyday use of the Internet highlighted in the public debate, there has been public concern of perceived negative impacts of widespread Internet use. The Swedish Media Council [27,28] e.g., reports that parents are increasingly concerned about their children's use of computer games; an activity widely considered to be harmful and addictive. Research in the wake of this concern has shown that some individuals neglect sleep, work, school, personal hygiene or social relationships to spend time online, which may result in problems regarding such as physical and mental health, social isolation and recurring conflicts with significant others and parents [29,30].

Largely because public health authorities have not (yet) addressed Internet addiction (or Internet gaming disorder) as a public health concern, private clinics have proliferated to "meet the market" for advice and treatment [31]. Importantly, these clinics run interventions directed at presumed "Internet addicts" despite the fact that there is little in-depth knowledge about the actual nature of the problems, how they manifest among different individuals and groups, and how they could be "cured".

Instead, research on behavioral addictions seems to follow a largely a-theoretical and pre-notion confirmatory approach. Studies in this area tend to have an a priori perception of the targeted behavior as addictive, and then proceed to construct measurements according to traditional substance addiction criteria [32]. Studies are then conducted to confirm the prevalence of the behavior in the population, rather than to explore its background and unique manifestations [33]. This emphasizes the importance of following and analyzing the empirical efforts to the conceptual cultivation.

## Methods

Since the publication of our study in 2011[1], we have received notifications about citations and now and then we have been contemplating the studies citing ours. As the discussion and research on "Internet addiction" still, according to our way of seeing it, is mainly indiscriminating when it comes to how the concept is defined , measured and judged, we have been surprised by such citations. Up until March 2015, there were 23 citations for the study in Google scholar. Not that many, but still – if indicative of a continued critical discussion on this subject; it would be interesting. The manner in which researchers make use of previous studies in their respective fields - a vital source of knowledge - is fundamental in the world of research. In short, we wanted to explore how other researchers made use of our discussion in the 2011 paper. Two citations were excluded; one emanated from another of our own publications [24], the other [34] from the introductory chapter for the e-book where our study was re-published in 2012.

Our study comprised Swedish survey data from 2009, n=1147

(Internet users) where we searched for predictors of time spent online. We also used five indicators related to "Internet addiction", N.B. we did not have access to a full instrument measuring Internet addiction and we never claimed to measure Internet addiction. The five indicators of Internet related problems (summed) were used for similar analysis as time online. Furthermore, in the discussion section we never referred to our study as one of Internet addiction. Instead we made use of the concepts "extensive Internet use" and "problems related to Internet use".

Next, in July 2013, we conducted a systematic review over published studies in the Web of Science (n=1873) and PsycInfo (n=301) databases between January 2000 and July 2013. Initially, the review included 2174 article abstracts, collected from the databases Web of Science (n=1873) and PsycInfo (n=301), using eight search queries for Internet addiction: *Internet Addiction* (n=695), *Problematic Internet Use* (n=589), *Compulsive Internet Use* (n=154), *Excessive Internet Use* (n=199), *Pathological Internet Use* (n=201), *Information Technology Addiction* (n=120), *Communication Technology Addiction* (n=57), and *Addictive Internet Use* (n=159). After a first phase of deletion based on the article titles and abstracts, 1006 articles remained. We excluded studies that turned out to deal with other themes, lacking any kind of empirical data and analyses, "doubles" i.e. more than one publication from the same study and we decided not to go all the way back to Young's study (67 of the oldest articles were excluded). As the systematic review was intended for a content analysis, there were also some deletions due to missing values, thus leaving a final sum total of 174 articles for full reading, all of which were deemed empirical works on the topic of Internet Addiction and available via the Stockholm University library system. In total, 157 (7%) articles were excluded because they were doubles, 390 (18%) due to a lack of full text access in the Stockholm University library, 67 (3%) due to publishing year before 2000, 1354 (62%) because they did not include an empirical investigation of Internet addiction, and 32 (2%) because they contained missing values.

The full text reading categorized the articles using 31 variables subsumed under five categories: (1) *Publication Details*, (2) *Study Type*, (3) *Sample Traits*, (4) *Measurement*, and (5) *Study Design* (see Table 1). The idea was to capture the constellations of Internet addiction articles through method design, geography, and chronology.

Each article's theoretical underpinnings were categorized as biometric, psychometric or sociological. Next, the articles' various sample traits, such as sample size (*n size*), randomness (*Random*) of the data collection, and target groups foci such as students (*Grade/High School and College Students*) or specific *Psychiatric Disorder*-groups were identified. Subsequently, the data measurement tactics of the articles were coded, such as *Magnetic Resonance Imaging* (MRI) *Scans* and *Remote Surveys*,

followed by their overall study designs, such as *Experiments* with *Control Groups*, *Intervention* evaluations, and *Longitudinal* data collections.

*Multiple Correspondence Analysis* (MCA - at times also referred to as homogeneity analysis, canonical correspondence analysis,

observe it?

Biometric Internet Addiction studies focus on increases and decreases in brain activity, commonly in the reward centers, in order to determine the stimulative effects that Internet use has on people [37].

**Table 1.** The Code Schemata for the Full Text Article Analysis.

| Publication Details | Sample Traits | Study Type | Study Design | Measurement |
|---|---|---|---|---|
| Author(s) | n size | Biometric | Longitudinal | MRI/Brain Scan |
| University | Random | Psychometric | Experimental | Psychological Test (dependent) |
| Year | Quasi Experimental | Sociological | Intervention | Psychological Test (independent) |
| Title | Geographical Location | Prevalence | Control Group | Remote Survey |
| | Online Sample | Prevalence % | Psychotest Evaluation | Interview |
| | Age (+/- s) | | IA Bechmarks | |
| | Age (min/max) | | Consequences | |
| | School Students | | | |
| | College Students | | | |
| | Psychiatric Disorder | | | |

multivariate correspondence analysis, and dual scaling) is a statistical method of transforming nominal and ordinal scale data into ratio scale chi-2 distances, or clouds of data points, that can be factorized using a *Singular Value Decomposition* (SVD) (for additional overviews, [35,36]). Commonly, the resulting eigenvectors and eigenvalues are expressed in the form of two dimensional coordinate systems that reduce the complexity of the data and are illustrated using so called bi-plots, which are scatterplots whose axes correspond to two chosen eigenvalues (usually those that preserve the highest degree of variance of the cloud). The main benefit of this procedure is that it allows us to reduce the complexity of nominal scale data sets, often consisting of dozens or even hundreds of variables, into two dimensional systems of coordinates. The result is a two-dimensional representation of the cloud that preserves as much of the cloud's variance as possible while simultaneously reducing the complexity of the data. In other words, the coordinates in the multidimensional cloud are projected on to a two dimensional plane, whose axes are determined by the amount of variance that each eigenvector covers.

It is in this sense a *Multiple Correspondence Analysis* (MCA) is similar to a *Principal Component Analysis* (PCA).

In addition to the geography and chronology of Internet addiction research we focus on the theoretical approaches, chronology, and methods used by Internet addiction researchers in the field. In short, what do they observe, when, and how do they

The results are then compared between "healthy" and addicted individuals, where Internet addiction is usually diagnosed using psychological tests (see e.g. [38]). An underlying theoretical assumption behind biometric Internet addiction research is the notion that internet addiction belongs to a larger family of impulse control disorders, such as gambling and sex addiction [38]. A common goal is therefore to measure the effect of Internet addiction on an individual's cognitive functioning. The most common measurement instrument used in biometric Internet addiction studies is Magnetic Resonance Imaging (MRI).

Psychological studies, like their MRI counterparts, make the theoretical assumption that the causes of Internet Addiction are rooted in the neurology of the brain. Unlike MRI studies, however, they tend to make use of data gathered via psychometric tests in survey form. Such tests usually include various Internet addiction scales, which they then correlate with other measurement instruments that concern psychological disorders such as depression, social anxiety, and disorders such as Autism (see e.g. [39,40 ]).

Sociological explanations for the possibly addictive character of Internet use tend to view Internet Addictive behavior as a consequence of ideas, morals, and social relationships (e.g. parental variables). These can be tricky to find as they often dress themselves as psychological studies. Nonetheless, they can be identified by their references to relational variables in their explanation of Internet Addiction.

Parental variables, e.g., concern the relationship between parents and their children, consequential variables refer to the reaction that people in the addict's surroundings have to her Internet addiction, and escapism-related variables relate to a need to escape from social relationships (see e.g. [41,42]). One complicating factor in this category is that there are several relational variables included in most Internet addiction tests.

## Results

As noted above, we never claimed to measure Internet addiction in the 2011 publication [1]. We used five indicators of Internet related problems but we referred to the results with the concepts "extensive Internet use" and "problems related to Internet use". All the same, our study is used as a reference for prevalence of Internet addiction in Sweden [43,44], for measurement of Internet addiction [45-48], and in discussions of addiction-like symptoms relating to video games [49].

It is claimed that we in our text identify criteria for the measurement of Internet addiction [43,50]. Reports of adverse consequences from Internet use are put forward as indications of cyberaddiction [51,52] and one author claims that we indicate possibilities of neurobiological background to Internet use addiction [53].

checking the context? Did it matter at all?

Although the systematic review includes articles as far back as the year 2000, the majority of its articles (64%, Figure 1) are part of the rapidly growing body of studies conducted in the wake of the first discussions concerning a possible inclusion of Internet Addiction in the DSM between the years 2011 and July, 2013. In addition, note that because we only have data until July for that year, the number of articles for 2013 should probably be doubled.

The studies emanated from all over the world (Figure 2, Bi-Plot2) with a high prevalence for China (17%), the US (13%) and Turkey ( 9%). 15 studies have no geography, they are called "Internet" as they were global online surveys. The most common sample population was students (75%), roughly equally divided between Grade/High School (35%) and College students (40%). Only six studies specifically targeted populations with psychiatric disorders other than Internet addiction.

Studies were classified (Figure 3, Bi-Plot 3) into three broadly defined, yet mutually exclusive, methodological approaches; MRI (7%), Psychological (40%) and Relational (Sociology related; 53%). In total, 36% of the articles included measures of Internet addiction prevalence.

**Figure 1.** & Bi-Plot 1. Development of Internet Addiction (IA) Research Over Time. Magnification: 1.05*30. Inertias: P1: 16.6%; P2: 10.8%. n = 174. X: P1; Y: P2.
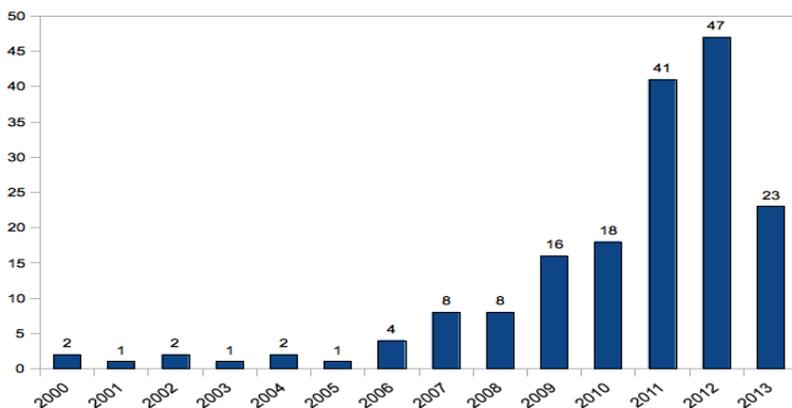


More correctly referred to as a discussion of a research field lacking consensus [12, 33, 51,54,-57], a study of problematic vs. non-problematic Internet or video game use [58](Collins & Freeman, 2013;), in discussions of online as related to good health [59] or more general; of an upsurge of electronic devices [60].
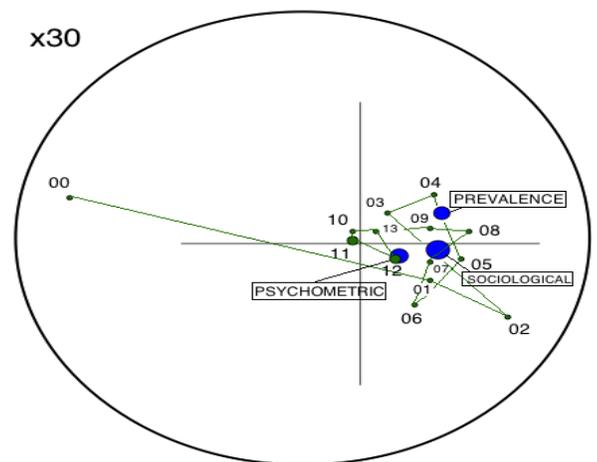
All in all, half of the citations for our study used our study in accordance with our original intentions. But what of the other half; i.e. ten publications? Have the authors read our manuscript or have they just picked a figure or a wording without

The methodological characteristics of the articles were assessed using a series of variables; the far most common methodology was to use a remote survey (86%) and a non random sample (72%). Furthermore, 59% of the studies used a psychological test for their dependent variable, and 31% used it for an independent variable.

More than half (55%) of the studies used benchmarks to distinguish between non-pathological Internet users and addicted users. In addition, many of the studies that did include benchmarks used varying cut-off points and measurement in-

struments of Internet addiction (compare e.g. [19, 40]).

Only 30 (17%) studies were judged to be evaluations of instruments, which is in line with previous research stating that research in this field is confirmatory rather than explorative. This is remarkable considering the controversial character of the Internet addiction concepts theoretical construct. Indeed, a greater share of explorative studies would be expected. Instead we have found that most studies treat Internet addiction test instruments as given truths – critical approaches and reflections concerning the meaning of results are rare.

The analysis includes both active and supplementary variables (Bi-Plot 1-3). In the former case, by "active", we mean that they have had an influence on the dimensionality reduction in the MCA. In other words, these are the variables that have been used to select P1 and P2 in our bi-plot. In the latter case, by "supplementary", we mean that the variables (study type, geography, and time) have been projected in the plot without such an influence.

When observing the Bi-Plots, note that categories close to each other are similar and vice versa. Categories that are common, or which represent the "middle ground" in the cloud will be

**Figure 2.** & Bi-Plot 2. Geographical Location of Internet Addiction (IA) Studies Between 2000 and 2013. Magnification: 1.05*28. Inertias: P1: 16.6%; P2: 10.8%. n = 174. Node Size is Proportional Within the geoLocation Cloud. X: P1; Y: P2
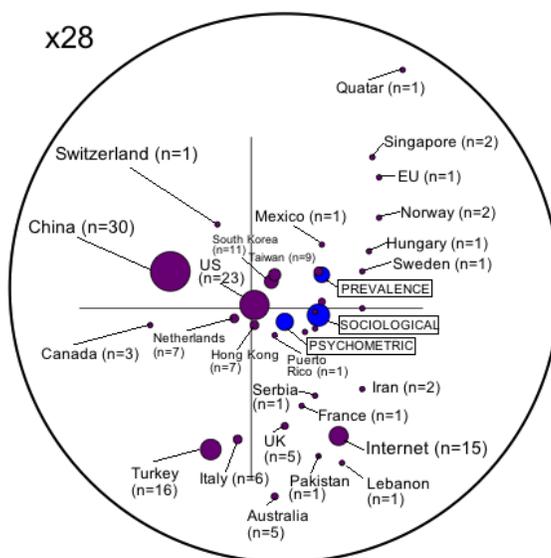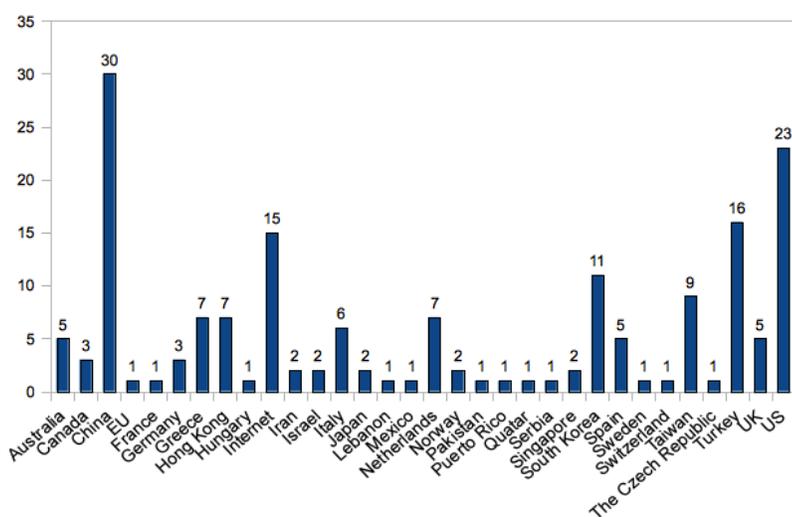


**Figure 3.** & Bi-Plot 3. Active Variables and Study Type Clouds. Magnification: 1.05 * 23 Inertias: P1: 16.6%; P2: 10.8%. n=174. X: P1; Y: P2.
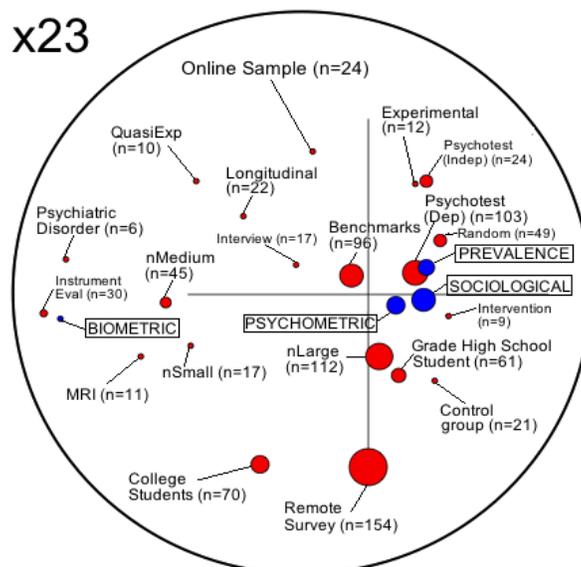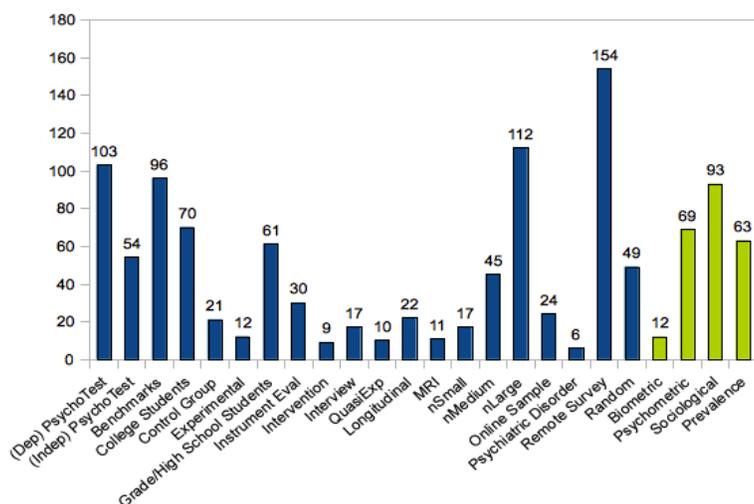
close to the center of the plot while categories that are rare and/or dissimilar from the rest of the categories will be located further out in the periphery.

In Bi-Plots 1-3, we can see both the frequency distribution and coordinates of the active variable and study type clouds included in our study. The most common active variable (Bi-Plot 3) is remote survey (n=154), which is at the opposite end of the plane from online samples (n=24) and experimental (n=12) methods in P2. With respect to the measurement instruments used in Internet addiction articles, psychoTest (Depend) (n=103), which identifies studies that use test instruments as their dependent variable in regression-style analyses, is relatively close to the use of such tests as independent (n=54). In Bi-Plot 1, we can also see the movement of the field of Internet addiction over time, making large jumps in it's early years as studies vary in design followed by a consolidation into more homogenous studies in later years.

Upon examining the study populations used in the Internet addiction articles (Figure 3), we can see that college students (n=70) are the most common, followed by grade/high school students (n=61). Indeed, upon a closer inspection, 72% (125/174) of the Internet addiction articles made use of both or either of these. Interestingly, these greatly surpass the number of studies that use online samples (n=24). In addition, studies that made use of quasi experimental (n=10), longitudinal (n=22), experimental (n=12), intervention (n=9), and interview (n=17) methods and/or control groups (n=21), Magnetic Resonance Imaging (MRI) scans (n=11) were more scarce and gravitated towards the biometric approaches in the field's off-shoot.

Next, when we look at the study type variables, we can see that the most common type of Internet addiction study is sociological (n=93), which denotes studies that depend on social interaction between people. Following the sociological study type, psychometric studies (n=69) are the second largest category, prevalence (n=63) the third, while biometric studies (n=12) are more scarce. Furthermore, while the sociological, psychometric, and prevalence studies are oriented towards the center of the plot, biometric studies stand out in that they are located in the off-shoot of the field. Indeed, the study type cloud thus displays a binary division between, on the one hand, sociological, prevalence, and psychometric studies, and, on the other, biometric studies.

In the off-shoot of Bi-Plot 3 in P1, we can see that biometric study types will tend to implement instrument evaluation, quasi experimental and longitudinal study designs on small or medium sized samples of subjects with psychiatric disorders. Here, the measurement instrument of choice is MRI. Meanwhile, towards the center of the clouds in Bi-Plot 3, we see that sociological, psychometric, and prevalence studies, tend to

implement large n studies using random samples with grade/high school youth. In sum, the most common type of Internet addiction study design is a sociological, psychometric, and/or prevalence oriented large n remote survey investigation on grade/high school and/or college student populations.

## Discussion

The emergence of the concept Internet addiction, or more broadly; behavioral addictions, coincides with a more general process of medicalization, i.e. processes whereby social problems are moved into definitions as medical problems - as illness, disorder or pathology - and processes of promoting the establishment and evaluations of interventions into evidence-based practices. Processes of medicalization were discussed by the mentor in the field; Peter Conrad, already in the 1980's [61,62]. It has been suggested [63] that the movement of evidence-based practice is a "medicalization engine" that establishes a medical conceptualization through its emphasis on standardized assessment and diagnosis.

There are always limitations to consider when drawing conclusions from a study. The concepts at hand – internet addiction, internet gaming disorder, problematic internet use etc - are quite inexplicit and ambiguous. And even though many search terms were used for the review, not all publications in the field were found. The Stockholm University library is well-equipped but there were publications that we did not find. The accuracy of our findings therefore cannot be assessed as 100%. Even so, in accordance with our findings we conclude that the discussion and research on "Internet addiction" still is mainly indiscriminating when it comes to how the concept is defined, measured and judged.

John Ioannidis made some noice with his highly cited "Why Most Published Research Findnings Are False" [64], where he argues that there is a lack of confirmation for many research fields. From this follows much too often a reliance on single p-values for research discoveries. Ioannidis makes a case out of calculating and proving that the trust in research findings is false and argues that this should lead to a much more careful way of handling research results.

Our "case" is similar to Ioannidis', although we start from a completely different angle. Today, almost anything can be measured. In the addiction field, measures and manuals for the detection of excessive drinking are adjusted and transformed (but in essence kept untouched) in order to detect and measure all kinds of ingestions and actions (habits). In fact, anything you do a lot, anything you like doing or consuming and miss when you are not – might be labelled as an addiction. Is this meaningful? Just because we can?

Indeed, whether Internet addiction is a medical, psychiatric,

social, or non-existent phenomenon, it is clear that just like laws determine what forms of behavior are criminal, research largely determines what is an addiction and how it should be treated. The design of individual Internet addiction studies thus depends on the political question of what one views as addictive, problematic, or healthy. Therefore, any understanding of the theoretical underpinnings of the Internet addiction concept must take the role of science, medicine, and their politics into account. Indeed, because the rationale behind much of the contemporary Internet addiction research available is its applicability in interventions, the classic question concerning the role of science in determining what behaviors can be deemed normal and pathological becomes the perennial "elephant in the room" in any discussion concerning the issue.

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## References

1. Bergmark KH. Bergmark A, Findahl O. Extensive Internet involvement - addiction or emerging lifestyle? Int J Environ Res Public Health.2011, 8(12): 4488-4501.

2. APA (American Psychiatric Association, 2013). Diagnostic and statistical manual of mental disorders (5th edition). Washington DC: Author.

3. Stensson, E. Internet Addiction Studies – A Multiple Correspondence Analysis (MCA) of Research Articles Between 2000 and 2013. M.A. thesis, department of Sociology, Stockholm University. 2015.

4. Trotter, T. An Essay. Medical, Philosophical, and Chemical, on Drunkenness, and its Effect on the Human Body, ed, 2, 1804.

5. Edwards G. "The evil genius of the habit": DSM-5 seen in historical context. J Stud Alcohol Drugs. 2012, 73(4): 699-701.

6. WHO. WHO Scientific Group on The Evaluation of Dependence-producing Drugs. WHO technical reports, 1968, Ser. No. 287.

7. Holden C. 'Behavioral' Addictions: Do They Exist? Science. 2001, 294(5544): 980-982.

8. Tao R, Huang X, Wang J, Zhang H, Zhang Y et al. Proposed diagnostic criteria for internet addiction. Addiction. 2010, 105: 556-564.

9. O'Brien C. Addiction and dependence in DSM-V. Addiction. 2011, 106(5): 866-867.

10. Petry NM, O'Brien CP. Internet gaming disorder and the DSM5. Addiction. 2013, 108(7): 1186-1187.

11. APA (American Psychiatric Association, 1994). Diagnostic and statistical manual of mental disorders (4th edition). Washington DC: Author.

12. Kühn S, Gallinat J. Brains online: structural and functional correlates of habitual Internet use. Addict Biol. 2015, 20(2): 415-422.

13. Beato G. Internet Addiction – What once was parody may soon be diagnosis, 2010.

14. Young, K. Internet addiction: The emergence of a new clinical disorder. Cyberpsychol. Behav. 1996 (1):237-244.

15. Young, K. Caught in the Net: How to Recognize the Signs of Internet Addiction and a Winning Strategy for Recovery. John Wiley & Sons, Inc.: New York, NY, USA, 1998.

16. Griffiths MD. Online therapy for addictive behaviors. Cyberpsychol. Behav. 2005, 8(6): 555-561.

17. Yen J-Y, Yen C-F, Chen C-S, Wang P-W, Chang Y-H et al. Social anxiety in online and real-life interaction and their associated factors. Cyberpsychology, Behavior, and Social Networking. 2012, 15(1): 7–12.

18. Khazaal Y, Chatton A, Atwi K, Zullino D, Khan R, Billieux J et al. Arabic validation of the compulsive Internet use scale (CIUS). Substance Abuse Treatment, Prevention, & Policy. 2011, 6:32.

19. Khazaal Y, Chatton A, Horn A, Achab S, Thorens G et al. French validation of the compulsive Internet use scale (CIUS). Psychiatr Q. 2012, 83(4):397-405.

20. Frances A. DSM-5 suggests opening the door to behavioral addictions. March 24, 2010.

21. Frances A, Widiger, T. Psychiatric Diagnosis: Lessons from the DSM-IV Past and Cautions for the DSM-5 Future. Annual Rev Clin Psychol. 2012, 8: 109-130.

22. Davis RA. A cognitive-behavioral model of pathological Internet use. Computers in human behavior. 2001, 17(2):187-195.

23. Snickars P, Strömbäck P. Myten om Internet (the Myth of the Internet). Halmstad: Volante förlag, 2012.

24. Eklund L, Bergmark KH. Parental mediation of digital gaming and internet use. In FDG 2013-The 8th International Conference on the Foundations of Digital Games. 2013, 63-70.

25. Zywica, J, Danowski, J. The Faces of Facebookers: Investigating Social Enhancement and Social Compensation Hypotheses; Predicting FacebookTM and Offline Popularity from Sociability and self-Esteem, and Mapping the Meanings of Popularity with Semantic Networks. The Journal of Computer-mediated Communication. 2008, 14: 1-34.

26. Eklund L. The Sociality of Gaming: A mixed methods approach to understanding digital gaming as a social leisure activity. Diss. Acta Universitatis Stockholmiensis. Stockholm Studies in Sociology New series 56. Stockholm University. 2012.

27. Swedish Media Council. Ungar & Medier 2012/2013, Fakta om barns och ungas användning och uppleveser av medier (Kids & Media 2012/2013, facts about children's and youths' use and experience of media). Stockholm, Swedish Media Council. 2013.

28. Swedish Media Council. Föräldrar & Medier 2012/2013 (Parents and Media 2012/2013). Stockholm, Swedish Media Council. 2013b.

29. Petry NM, Rehbein F, Gentile DA, Lemmens JS, Rumpf HJ et al. An international consensus for assessing internet gaming disorder using the new DSM-5 approach: Internet gaming disorder. Addiction.  2014, 109(9): 1399–1406.

30. Kuss DJ, Griffiths MD. Internet gaming addiction: a systematic review of empirical research. International Journal of Mental Health and Addiction. 2012, 10(2): 278–296.

31. King D, Delfabbro P,  Griffiths M. Cognitive behavioural therapy for problematic video game players: Conceptual considerations and practice issues. Journal of Cybertherapy and Rehabilitation. 2010, 3:261-274.

32. Billieux J, Schimmenti A, Khazaal Y, Maurage P, Heeren A. Are we verpathologizing everyday life? A tenable blueprint for behavioral addiction research. J Behav Addict. 2015, 4(3): 119-123.

33. Kardefelt-Winther D.  Problematizing excessive online gaming and its psychological predictors. Computers in Human Behavior. 2014, 31:118-122.

34. Sussman, S. Substance and Behavioral Addictions: Co-Occurrence and Specificity. Preface. Int. J. Environ. Res. Public Health. 2012, 9: 1-4.

35. Nenadic O, Greenacre, M. Computation of Multiple Correspondence Analysis, with code in R, 2005.

36. Roux B, Rouanet H. Multiple Correspondence Analysis. California: Sage Publications. 2010.

37. Ding WN, Sun JH, Sun YW, Zhou Y, Li L. Altered Default Network resting-State Functional Connectivity in Adolescents with Internet Gaming Addiction. PLoS One. 2013, 8(3) :e59902.

38. Hong SB, Zalesky A, Cocchi L, Fornito A, Choi EJ et al. Decreased Functional Brain Connectivity in Adolescents with Internet Addiction. PLoS ONE. 2013, 8(2): e57831.

39. Romano M, Osborne LA, Truzoli R, Reed P. Differential Psychological Impact of Internet Exposure on Internet Addicts. PLoS ONE. 2013, 8(2): e55162.

40. Kuss DJ, Griffiths MD, Binder JF. Internet Addiction in students: Prevalence and risk factors. Computers in Human Behavior. 2013, 29(3): 959-966.

41. Barke A, Nyenhuis N, Kröner-Herwig B. The German Version of the Internet Addiction Test: A Validation Study. Cyberpsychology, behavior, and Social Networking .2012, 15(10): 534-542.

42. Hawi NS.  Arabic Validation of the Internet Addiction Test Cyberpsychol Behav Soc Netw. 2013, 16(3): 200-204.

43. Kuss, DJ, Griffiths MD, Karila L, Billieux J. Internet addiction: a systematic review of epidemiological research for the last decade. Curr Pharm Des. 2014, 20(25): 4026-4052.

44. Lemos IL, de Abreu CN, Sougey EB. Internet and video game addictions: a cognitive behavioral approach/Dependência de Internet e de jogos eletrônicos: um enfoque cognitivo-comportamental. Revista de Psiquiatria Clínica. 2014, 41(3):82-88.

45. Achab, S. Addictions comportementales, un nouveau défi. Consommations R., Drouges D. Première ligne. Mai Numéro. 2014, 23: 2.

46. Catalina García B, López de Ayala López MC, García Jiménez A. The risks faced by adolescents on the Internet: minors as actors and victims of the dangers of the Internet. Revista Latina de Comunicación Social. 2014, 69:462-485.

47. Ghahremani, L, Nazari M. Internet Addiction and Its Effect on the Academic Achievement Students of Shiraz University of Medical Sciences: Cross-sectional Study on Addiction-driven Behaviors. Magazine of E-learning Distribution in Academy

(MEDIA). 2013, 4(1):44-51.

48. Navarro JN, Marcum CD, Higgins G.E, Ricketts M L.  Addicted to pillaging in cyberspace: Investigating the role of internet addiction in digital piracy. Computers in Human Behavior. 2014, 37:101-106.

49. Collins E, Freeman J. Video game use and cognitive performance: does it vary with the presence of problematic video game use? Cyberpsychol Behav Soc Netw. 2014, 17(3):153-159.

50. Esteves HJ, Quintanilla JM. Identification of medically compromised dental patients in a Portuguese population. Oral Health Prev Dent. 2013, 11(4):315-322.

51. Achab S, Zullino DF, Thorens G. La Cyberaddiction nous entoure. PPM MEDIC- medizinonline.ch. Info Neurologie & Psychiatrie. 2014.

52. Graber MA, Graber A. Internet-based crowdsourcing and research ethics: the case for IRB review. J Med Ethics. 2013, 39 (2):115-118.

53. Joutsa, J.  Neurobiology of pathological gambling. Brain imaging and epidemiological studies. Annales Universitatis Turkuensis D 1026. University of Turku: 2012.

54. Gomes-Franco-Silva F,  Sendín-Gutiérrez JC.  Internet as a Haven and Social Shield. Problematic Uses of the Network by Young Spaniards/Internet como refugio y escudo social: Usos problemáticos de la Red por jóvenes españoles. Comunicar. 2014, 22(43):45-53.

55. Gutierrez JDS, Valladolid GR, de Fonseca FR. La impulsividad: Antesala de las adicciones comportamentales? Health and Addictions Journal/Revista Salud y Drogas. 2013, 13(2):145-155.

56. Turel O, He Q, Xue G., Xiao L, Bechara, A. Examination of Neural Systems sub-serving Facebook "Addiction" 1, 2. Psychological reports. 2014, 115(3), 675-695.

57. Wang C W, Ho R T, Chan C L, Tse S. Exploring personality characteristics of Chinese adolescents with internet-related addictive behaviors: Trait differences for gaming addiction and social networking addiction. Addictive behaviors. 2015, 42: 32-35.

58. Collins E, Freeman J. Do problematic and non-problematic video game players differ in extraversion, trait empathy, social capital and prosocial tendencies? Computers in Human Behavior. 2013, 29(5):1933-1940.

59. Costa Tutusaus, L. Elaboració, validació i aplicació d'un qüestionari puntuable per avaluar l'estil de vida saludable en adolescents a Catalunya. (Diss.) Universitat Ramon Llull, Barcelona, 2014.

60. Hapuarachige C, Fakunle I, Ahmed HI, Sparrow S, Hasan S et al. The Effects of Electronic Device Use on the Sleep Quality of Health Science Students in The United Arab Emirates. Proceedings of the 6th Annual Scientific Meeting of  Gulf Medical University, 2014.

61. Conrad P, Schneider JW.  Deviance and Medicalization: From Badness to Sickness. Philadelphia: Temple University Press, 1992.

62. Conrad P, Waggoner M. Medicalization. Blackwell Encyclopedia of Health and Society. London: Blackwell, 2012.

63. Bergmark A. Om medikaliseringen av svensk missbrukarvård (About the medicalization of Swedish misuse treatment). Socialvetenskaplig tidskrift. 2013, 20:232-242.

64. Ioannidis JP.  Why most published research findings are false. PLoS medicine. 2005, 2(8): e124.