

# Manifestations of psychotic symptomatology during excessive internet use

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**Abstract:** The use, let alone the excessive use, of the internet is an expanding new social phenomenon. There is a growing reference to a problematic attitude called “internet addiction” as a candidate for a new psychiatric entity. Up to now, various psychiatric symptoms and disorders have been described which are related to the internet pathologic use: impulse control disorder, compulsive behavior, withdrawal symptoms, depressive mood, social phobia, attention deficit hyperactivity disorder, social isolation, functional decline. In this study, we report on three cases of first psychotic episodes following a period of aggravating internet overuse and we indicate a possible cycling relationship between this behavioral pattern and the emerging of a psychotic syndrome.

**Keywords:** Excessive Internet Use, Internet Addiction, First Psychotic Episodes, Psychosocial Factor

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## 1. Introduction

Pathological use of the internet, also referred to as “in-ternet addiction”, is a newcoming growing field of psy-chiatric research. These terms refer to an internet usage through which the user experiences distress and psychoso-cial impairment on a regular basis.

Well-established, primarily epidemiological studies have shown that mental distress or psychopathology may relate to problematic internet use [1]. For example depression [2, 3], bipolar disorder and anxiety disorders [4] all have been associated with pathological internet use. Co-morbidity with other psychiatric disorders also includes attention deficit hyperactivity disorder (ADHD), borderline personality dis-order, dissociative symptoms [5, 6] and a case of a mul-tiple personality disorder [7]. Repetitive internet use has been described as an “obsessive compulsive spectrum” disorder [8] while the nature and frequency of certain symptoms has led to the idea that problematic internet use may signify a distinct psychiatric (probably an impulse control) disorder [9].

There are important studies about the possible impact of this attitude on children’s and adolescents’ development [10]. ADHD, depression, social phobia and hostility [11] or a distinctive personality profile [12] have been correlated with

internet addiction in adolescents. Schizotypal personality disorder has been indicated as a risk factor [13] and the rate of psychiatric co-morbidity is compared to that of substance use in this age group [14] in which the prevalence of ex-ces-sive internet use has been estimated as high [15].

It is mentioned that virtual reality games, where a pro-longed online presence is often imposed, may represent the greatest risk for internet addiction [16]. Virtual reality has been used to investigate persecutory ideation or ideas of reference in individuals [17, 18] or its impact on patients with persecutory delusions [19] as well as in the study and treatment of schizophrenia [20]. These experimental studies are useful for the investigation of psychological reactions in virtual reality environment.

Treatment is proposed for internet addicted people, using psychiatric medication [21] or psychotherapy like cognitive behavioral therapy [22], while the pathophysiological me-chanisms remain unclear [23] and it is not yet defined if these cases consist of symptoms of an existing psychiatric disorder or a distinct entity, as mentioned above [4]. It is supported that psychosocial traits, such as loneliness, predict the outcome of excessive internet use [24]. The examination of causal relationships and the differentiation of antecedents and consequences of this attitude could be more informative [25]. The relation between Web misuse and psychopathol-ogy could be bi-directional: As symptoms of the Internet use

worsen, they intensify existing psychopathologies that reinforce a vicious dysfunctional cycle [26].

This study aims to reveal, by presenting clinical data, specific aspects of an internet overuse dysfunctional behavior and its possible underlying link with psychosis onset, in the context of this bidirectional relation.

## 2. Main Body

### 2.1. Patients and Methods

In this case report we present three cases of patients with psychotic symptomatology highly correlated to excessive internet use associated with functional impairment. Informed consent for the data we present was provided by all participants:

I. A 41-year-old woman of high educational level used to spend most of her daytime “surfing” on the internet to accomplish her job duties and various activities such as communication, information, shopping, and entertainment. One day she started experiencing auditory hallucinations, as if she was hearing the voices of the people who were participating in an online conversation (chat) forum, following a period of time that she became fully attached to it. The day she was admitted to our department she was found wandering and being abused under the influence of these hallucinations. She was then hospitalized and treated with a diagnosis of brief psychotic disorder.

II. A 19-year-old young man of high school educational level was transferred to the emergency department in our hospital in a state of psychomotor agitation with logorrhea, flight of ideas, distractibility, transient delusional ideas, lack of inhibition and irritability. This man had been trapped in an extensive internet use involving poker gambling etc. He was hospitalized and treated in our department with a diagnosis of probable bipolar disorder, current manic episode with psychotic symptoms.

III. A 28-year-old male was admitted to our clinic after a suicide attempt. Because six months earlier he had resigned from his work, he was keeping himself occupied with the internet, listening to songs in a repetitive way and browsing pornographic material. A few days before his attempt, he had manifested persecutory delusion and probable auditory hallucinations accompanied by disturbed behavior. In fact, he destroyed his computer because of “low internet speed”. He was finally treated under the diagnosis of schizophrenia of paranoid type.

### 2.2. First Case

We describe more extensively this case as we believe that it is of particular psychiatric interest.

The case concerns a 41-year-old female, single who lives alone in her own apartment. She is a university graduate of economics (department of applied computer science). She wanted to study fine arts, as she likes painting, but she claims that this was not permitted by her father.

She was employed by a drug-addiction therapeutic

community for a short period of time and afterwards by a private advertising company doing technical English-Greek translations. She has been working as freelancer for companies doing translations through the internet for the last ten years. She is satisfied with her job. She describes herself as a rather lonely person without many social contacts. She was not in any long intimate relationships the last few years. She used to keep her own diary and she describes herself as interested in social matters.

Her father, a policeman, died four years ago from lung cancer and she refers to his death as an expected one. Her mother and her brother live together. She describes her relationship with her mother as neutral while she has a conflictual relationship with her brother who is “trying to interfere in her own affairs”.

She had a past Psychiatric history: She mentions symptoms of anxiety with two panic attacks during her studies. Those became more often during the last years. She was counseling a psychiatrist and was treated for a year and a half before her hospitalization with sertraline in high doses. Under this regimen it is probable that she exhibited hypomanic symptoms for a period of time: elevation of mood and acceleration of speech. However, there was no evidence by her, her ex-psychiatrist or familiar persons that she manifested any psychotic symptoms until the present episode.

She was admitted to our department after the manifestation of an acute psychotic episode. After recovery, she describes her experience with an impressive, detailed recall and in a dramatic way. “During the last ten years I have been using internet daily... I have been participating in a forum of social conversation about human relationships.

The biggest challenge is that participation is free and the people who participate are unfamiliar...At this point I estimate the dangers that exist in these public conversations...Possibly, there lies the explanation of my unpleasant experience, which I describe in the next few lines:

Suddenly one day, as I was involved in my ordinary routine, I began to feel in a strange way. My head was heavy, I had an unusual dizziness and I couldn't stand well on my feet. I felt sleepiness in a way that I was not able to do anything more than sit in front of my computer looking at the forum page and reading the news of the day. Later the situation was deteriorating but I was feeling an unusual indifference, I had memory gaps, I forgot to pay the bills, I was totally absent-minded and unable to do any work apart from staying totally attached to the internet almost the whole day.

I couldn't explain my behavior as I have been participating in the forum for many years and I had no particular interest in it at present. As the symptoms remained the same during the next 1-2 days, I became concerned and thought about the panic attacks I had in the past. But till that happened I was feeling totally fine and had no anxiety or fear.

My anxiety was culminated when I understood that I hadn't a similar experience in the past. The pressure in my head became intolerable and I began for the first time in my life to hear the thoughts of people I knew from the forum.

Their voices were aggressive as they were talking in a pressing way with anger or complaint. Other people were sending me their thoughts without aggression but uncontrollably.

It was impossible for me to do any personal thoughts. Sometimes the experience was pleasant but soon I lost any pleasure as any reaction on behalf of me was impossible. I was absorbed 100% in that communication against my will...I couldn't even ignore them...and the electric devices at home stopped working...I became to feel frightened, the voices were mocking me."

She constantly describes in detail how these voices controlled her behavior: throwing away her watch or trying to find a new apartment. After a small interval of calm a woman's voice (from a familiar person who had recently an intense disagreement through internet) "appeared" and began pressing her to abandon her apartment.

Finally, the voice ordered her to go and visit a drug-addiction therapeutic community named "Exodus" in a 350 Km distance from her home, in order to meet her psychiatrist and become a psychotherapist herself. This was a delusional belief as her psychiatrist didn't have any relation with this community. "My doctor knows my history. I could tell him what is happening without thinking that I'm crazy and I could trust him". The voices insisted talking about "symbolic processes and thresholds that I was surpassing, going away from the paternal authority..."

The patient decided to take a taxi during the night and go to "Exodus". She continues the description about her trip, the voices and her delusional ideas and then how she was physically abused in a desert area outside a village. Her adventure continued for a while till she was transferred to our department for hospitalization.

"In the university psychiatric department everything came in order, I felt at least safe and I had the care I needed. So, today, since I have been here for a month, I'm able at least to take care of the events and look for responsibilities". She was admitted in a state of psychological shock and her body was full of injuries. She was examined by a forensic doctor. She gave a rapport to the police referring robbery and violence.

She reported transient auditory hallucinations during the hospitalization until these disappeared finally. Laboratory tests were negative. The EEG and the brain MRI were normal. She was tested by MMPI test after recovery and the result was negative in all the psychopathological indexes. No stressful events were recorded during the time before the crisis except a recent unsuccessful attempt of removal to the countryside. She was treated with antipsychotic in medial doses.

This woman, passing to the fifth decade of her life, manifested a psychotic episode for the first time which is not so common in clinical practice. The episode is reminiscent to a dissociative fugue with twilling consciousness. However, it seems, by her description, that she preserved a somewhat confused but detailed memory capacity of the events. As the hallucinations and delusional ideas she

re-reported were prominent during the episode, she met the criteria of a brief psychotic episode (according to DSM-IV). Her psychiatric history including the panic attacks and mainly the hypomanic symptoms, induced probably by the treatment, reveals a psychiatric vulnerability. According to her reports, she was totally stuck in front of her computer, in a state of unwillingness, during a short period of time. This period coincided with the gradually emergence of her symptomatology till she became totally "immersed" in a hallucinatory communication with the chat forum. The auditory hallucinations' content involves her chronic habitude, the "surfing". A habitude that was occupying most of her daylife, reflecting loneliness and poor sociability that she had substituted with the online communication.

Soon after she was discharged she asked for a second shorter hospitalization because of agitation. Now, about two years later, she is adapted to her ordinary life in a satisfactory level, free of symptoms, trying to acquire the sociability she missed.

### 2.3. Second Case

This is the case of a 19-year-old male, who migrated from Albania to Greece with his parents at the age of three. He finished High school last year, but failed his final exams. He found a job in the private sector but was fired three days later because of low consistency in attendance.

He was described by his father as a quiet and diligent young student. He was engaged in several social and sporting activities and has been a chess champion. For a while he used to earn money by teaching chess to other children.

According to his personal history he seems to have been exhibiting dysfunctional behavior over the last 5 years. He gave up chess when his chess teacher died. He also showed a decline at school and at the same time he began the frequent use of cannabis (and occasionally other psychotropic substances such as cocaine). Then, he bought a computer and he gradually became absorbed with games of virtual reality, gambling and communication. During the last year he limited his social activities significantly and spent his time on internet, especially during the whole night showing indifference to other aspects of his life. One month before his hospitalization he became agitated, showed behavioral derangement and had bursts of anger. Sometimes he was caught by his parents talking or laughing alone in front of his computer. He complained about headaches. The situation gradually worsened. The day before his hospitalization he attacked his father with the chess-board. Finally, he was forced to visit the emergency room in his home town and then was transferred to our department.

He says that he feels closer to his mother. His father exhibits a "low profile". His grandfather was treated with psychotropic medication. He has a younger brother with a probable antisocial personality disorder with whom he had conflicts in the past. He has a few friends mainly of the same nationality. He says that he has had no sexual relationships to present.

During the first days of his hospitalization he was irritated with thought and speech disturbances. He said that “my thoughts can be listened by others”, “I see blood in my hands”, “I’m Archangel Michael”. He didn’t mention any auditory hallucinations. Sometimes he spoke in English using phrases from films and songs.

His behavior was provocative to the female staff, whom he harassed with improper and sexual moves. He preserved, however, a remarkable capacity of observation even in time of disorganization and a satisfactory level of insight after his improvement.

The laboratory tests as well as the neuroimaging screening were negative. Urine testing for drug abuse was also negative which was consistent with his claims for not having used cannabis or other substances during the period before his hospitalization. The psychiatric assessment resulted in the diagnosis of probable bipolar disorder, current manic episode with psychiatric symptoms. He was treated with mood stabilizers and antipsychotics in high doses.

Examining his personal history, it was obvious that he had confronted social adherence difficulties due to his immigration. He described with sadness a sense of rejection in the school environment, which probably contributed to the decline of his school performance. It seems that he looked for a recourse in marginal or lonely activities such as cannabis use and “surfing”. As we mentioned, during the last year before the manic episode, he was forced to stay home in order to study and pass the exams. As a result, he had limited his social activities (including cannabis use) and had been finally trapped in a gradually worsening absorption on his computer. He described himself as “a boulimic near the refrigerator”. The disturbance with a subsequent insomnia was culminated during the last weeks before his hospitalization.

Two years later he frequently visits our outpatient clinic free of symptoms. Recently, he was counseled to stop medication. He has a global functional improvement and he is trying to develop his skills. He has become more sociable, he even participates in activities like chess and sports and uses cannabis rarely. His mood is stable, his speech and his thought are well organized. Initially, he had tried to become a computer scientist but at present he is studying nursing.

#### **2.4. Third Case**

Our third patient is a 30-year-old single male, who lives with his mother. His father died many years ago. He has had only few close relationships but he was actively involved in a political party. He was underachieved during senior high school and he didn’t manage to fulfill any college or graduate school, even though he tried several times. However, he had worked in a factory for five years until he resigned claiming that his job was monotonous. Six months later he was admitted to our clinic after he had committed an impulsive suicide attempt by aspirin overdose. He had already exhibited disorganized behavior during the previous days: he started walking away from home, talking alone and demonstrated ideas of persecution. He also stated various

elementary auditory hallucinations (e.g.: steps on grass). During the last months he was continually occupied with the internet listening to songs in a repetitive way and browsing pornographic material. At the same time, he increased his daily habit of drinking alcohol. A few days before his suicide attempt he destroyed his computer because of low internet speed.

Throughout his short stay in the department he was pre-sented in psychomotor retardation with poor eye contact and speech, lack of motivation and ambivalence. The clinical evaluation and the laboratory testing did not reveal any “organic” etiology. Finally, he left on his own on the fifth day of hospitalization.

At present, three and half years later, he attends the out-patient clinic taking antipsychotic medications under the diagnosis of schizophrenia of paranoid type. He has been hospitalized involuntarily twice more and during the course of the disease a cycle of symptoms was repeated: outburst of positive symptoms during the relapse following by a longer period when the negative symptomatology predominated. His insight as well as his compliance was often insufficient.

In this case we observe a premorbid period of functional decline following his resignation and we can consider the concomitant increase of alcohol and internet abuse as significant preclinical symptoms. His act of computer destruction, could reflect his morbid dependence from this occupation.

### **3. Discussion**

The pathological use of the internet could be described as a behavioral disturbance accompanied by negligence of other activities, sleep deprivation, sensory monotony, social isolation or, to use an arbitrary term, “virtual sociability” and functional withdrawal. Significant interest could be cast towards the fact that problematic internet use may be related to psychotic symptomatology. In some studies, there have been references to current or life time diagnosis of psychotic disorders in subjects with problematic use of the internet [4, 27] and references to delusional ideas inspired by the internet content [28, 29]. We noticed two recent case reports, closer to our evidences, the first concerning a young man with stalking behavior caused by his participation in social media networks [30] and another where an emergence of psychosis, in an adolescent subject, was described within the stressful context of “internet withdrawal” [31]. However, there is a lack of studies, to our knowledge, linking the internet misuse, as a contributing factor, to the psychotic diversion.

A research conducted by the Clalit Health Maintenance Organization reported three cases of women aged 30 to 50 years who experienced first psychotic episodes following an intensive, extended internet use. In all cases the surfing included the development of a close online relationship with another person. The three women required psychiatric care and treatment with anti-psychotic medication [32]. Cabrera-Abreu and Milev [33] reported the cases of three other

women who had experienced psychotic or dissociative symptoms into a similar context, of computer mediated communication. The researchers proposed the term “Web fugue” as a candidate for a new transient mental disorder.

Psychosis is a mental syndrome so, if we suppose that there is a relationship between the internet use and the evolution of psychotic symptoms, we have to investigate the possible impact of internet use on mental functions.

In several studies these effects are described as beneficial or, in contrast, as harmful. MRI studies showed that the brain activity of the internet users is more extensive particularly in the prefrontal cortex [34]. Moreover, the internet “surfing” has been suggested as a tool to enhance the brain activity of old age people or of mild dementia patients [35].

On the other hand it has been reported that internet could harm the ability to learn and lead to lower attention span and the vast availability of stimuli leads to a very large cognitive load that influences long-term memory [36]. Other scientists support that internet and video games use develops some cognitive skills at the expense of others as mindful knowledge acquisition, inductive analysis, critical thinking, imagination and reflection [37].

In fact, despite the opposite arguments, all these researchers accept that an impact of internet (positive or negative) on mental functions does exist. Interestingly, neuroimaging, neurophysiologic and neuropsychological findings are shown in excessive internet users (EIU) through labor studies. According to these studies, EIU adolescents present brain gray [38] and white matter abnormalities correlated with the duration of internet addiction [39]. EIU also, exhibit deficits in early-stage face perception [40], in decision making [41] and lower impulse control [42]. Moreover, a significant decrease in the P300 amplitude and a significant increase in the P300 latency of the event-related potentials were measured in these individuals [43]. The gamma oscillation intensity was found weakened in young EIU and the researchers claim that the reported data imply affected, memory, information coding and integration in the brain of EIU [43].

Similar findings to the above - without being considered as the hallmarks of a psychiatric disorder - have been related to cognitive control deficit [44, 45, 46] and recorded in various psychiatric patients as those suffering from substance abuse [47, 48, 49, 50, 51], depression [52], social phobia [53], ADHD [54], bipolar disorder [55], psychotic symptomatology [56, 57] and schizophrenia [58, 59, 60, 61, 62, 63], an illness associated with obvious disturbances in cognitive control [64], as well as in electrophysiological human ketamine models of schizophrenia [65].

Nevertheless, we have to interpret cautiously these similarities of pathological markers taking into account the relative small sample sizes of EIU studies and the heterogeneity of the findings. Moreover, an opposite report of a large study, regarding the decision making deficit of EIU [66] should also be considered.

Finally, it must be noticed that the EIU neuroimaging studies concern adolescent users who are characterized by

brain maturation processes [67], an issue that could complicate the appraisal of these results. However, the above remark could be associated to the vulnerability of this age group [68].

## 4. Conclusion

We referred to a broad range of the literature concerning the pathological aspects of a new attitude, the internet excessive use, the high comorbidity with mental disorders, the prevalence of the term “internet addiction”, corresponding to other forms of addiction, as a candidate for a new mental disorder and laboratory studies recording neurobiological, neuroimaging and neuropsychological abnormalities of internet excessive users. The above consist the main core in this research field.

In this case study, we are presenting our data based on the clinical features and a careful record of the personal history of our patients. Each case represents a different diagnostic entity with individual specificities but with the common point of the psychotic diversion following a period of an increasing engagement in web use. We suggest that this point could reveal a further dimension: the possible relation of internet overuse behavioral patterns with the emergence, manifestation and progress of psychotic disorders. The three patients exhibit a pathological internet use spending many hours daily in front of the PC in an uncontrollable way, accompanied by abstention from other activities. This behavior was actually exacerbated the time before their hospitalization. In all cases, there is a remarkable timing synchronization between internet excessive use and the manifestation (for the first time) of psychotic symptoms. While it has not been established if this reveals a causal link or it is a simple coincidence we underlie the following remarks.

A hypothetical relation could be assumed in two directions. Firstly, a progressive immersion in internet use accompanied by other related behavioral changes could represent a prodromal sign, a remark with potential early intervention benefits. Additionally, the excessive “surfing” could, in some way, burden the mental health contributing to or, at least, accelerating the outburst of severe symptomatology. Psychoticism, among other psychopathological indexes, has been found to worsen as a consequence of this attitude [69]. A kind of an “internet abuse intoxication” could therefore be estimated as a mediator in “a continuous process till the disconnection from the reality” [70, p.417]. Although our data cannot be generalized, there is evidence in favor of a cycling relationship where the excessive internet use represents, as a psychosocial factor, both a warning premorbid sign as well as a potential trigger mechanism that precedes the evolution of major psychopathology in vulnerable people.

Case studies, *de jure*, are not sufficient to support any theoretical claims or generalizations. Despite this basic limitation we believe that our study, presenting a descriptive analysis of real clinical data, could provide a stimulus for further useful investigation. Large surveys fo-

cusing on the retrospective evaluation of internet addiction-related behavior patterns as antecedents of major psychiatric dis-orders as well as prospective clinical studies monitoring the psychiatric outcome of these behavior patterns, would be more enlightening.

The possible link between internet excessive use and psychopathology could be under consideration in clinical practice, the psychiatric assessment of patients and the appropriate psychosocial interventions after the treatment. Furthermore, this topic poses, nowadays, an obvious so-cio-cultural dimension with implications on prevention policy.

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