

Case Report

Game Transfer Phenomena in a Clinical Case with Psychosis and Gaming Disorder

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Abstract: Little is known about the interplay of Gaming Disorder (GD) with psychotic processes in schizophrenia. Only a few clinical cases involving video game playing and psychotic symptoms have been previously reported in literature. This case report describes a 24-year-old male diagnosed with paranoid schizophrenia and GD. Our case, Patient G, had premorbid excessive video game playing and Game Transfer Phenomena (GTP) prior to the onset of his schizophrenia illness. GTP are common among gamers and are characterised by abnormal perceptions, intrusive thoughts, and temporal change on behaviours related to the content of video games. However, GTP are not necessarily of delusional intensity for meeting the threshold of psychosis. The relapse in Patient G's paranoid schizophrenia was associated with recent cannabis use, social withdrawal, and excessive video game playing. Patient G's psychotic symptoms were influenced by video game themes and the movie "Matrix", including the delusion that he was in a video game and that people around him were "non-playable characters". Awareness of GTP can help clinicians to demarcate GTP from psychotic features and identify their interactions, given the ensuing treatment implications. Our case report highlights the importance of GTP, which in some cases may be an early sign of developing mental illness and could have implications for early intervention and prevention of illness onset and complications.

Keywords: schizophrenia; psychosis; hallucinations; delusions; Gaming Disorder; Game Transfer Phenomena; video game playing



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1. Introduction

This case report describes a 24-year-old male diagnosed with paranoid schizophrenia with a history of intensive video game playing, diagnosed with Gaming Disorder (GD).

The impact of GD has been extensively investigated [1,2], giving place to the recognition of GD in the 11th revision of the International Classification of Diseases (ICD-11) [3] and its inclusion in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in the section of conditions for further study labelled as "Internet Gaming Disorder" (IGD) [4]. Excessive video game playing has been associated with dissociative phenomena such as depersonalisation experiences, escapism, and psychotic-like experiences [5–7]. However, little is known about the interplay of GD with psychotic processes

in schizophrenia [8,9]. The prevalence or incidence of GD has not been reported among patients with psychosis [10]. Only a few clinical cases involving video game playing and psychotic symptoms have been previously reported in literature. In some cases, the psychosis breakdowns have occurred due to excessive playing, while in others, it has been considered to be a result of withdrawal symptoms of gaming disorder [10–18].

Research examining video game features rather than excessive playing has reported that playing video games can influence players' sensory perception, thought processes, and behaviours in everyday contexts. These phenomena are referred to as "Game Transfer Phenomena" (GTP), first coined by Ortiz de Gortari based on a qualitative research study of non-clinical young video game players [19,20]. More specifically, GTP refer to a cluster of involuntary phenomena related to video game playing, manifesting as sensory and cognitive intrusions, transient changes in perception, and altered self-agency [21], which resemble hallucinations and delusions.

Non-clinical players reporting hallucinatory and psychosis-like experiences are of clinical relevance because GTP can easily be confused with psychotic symptoms. Moreover, the alteration or increase in the dopaminergic transmission are known to be associated with symptoms of psychosis [22] and excessive video game playing [23,24].

GTP have been identified in patients with gaming disorder comorbid with generalised anxiety, depressive disorder, autism, gender dysphoria, substance dependence, and psychotic symptoms [13,25]. Positive schizotypal personality traits [26] and fantasy proneness traits have indicated susceptibility to hallucinatory, dissociation, and paranormal phenomena [27].

GTP have been reported in both adult and minor video game players [28]. The evolution of GTP from youth to adult life is unknown. Concerns are raised about young players that may be more susceptible to interpreting GTP experiences as aversive, experiencing GTP more frequently or automatically acting out actions from the game due to their executive functions in development [19]. Certainly, a comparison between young (15–17 years old) vs. adult players revealed that minors showed higher scores of GTP; however, only significant differences between minors and adults have been observed with regard to GTP manifesting as body sensations (e.g., having a tactile sensation associated with a game) and thought processes (e.g., mixing up video game events with actual real-life events) [29].

Our case report is novel in that it is the first reporting of premorbid GTP from excessive video game playing prior to schizophrenia with delusions, hallucinations, negative symptoms, disorganised speech, and behaviour. This illustrates how excessive video game playing and heightened GTP susceptibility can co-exist and perhaps influence the evolution of the symptomatology of a psychotic illness.

2. Overview of Game Transfer Phenomena

The integration of video games into real life contexts have also been identified under two circumstances which are important to differentiate, especially in clinical contexts: players display (i) voluntary behaviours or actions that are deliberately initiated, such as uttering slang and jargon from video games, and (ii) involuntary actions such as verbal outbursts and impulsive and unpremeditated responses to objects that have been simulated in the video game [19,21].

GTP manifestations include perceiving detailed features of visual or auidial themes of video games, such as seeing game tags above people's heads, seeing maps in the corner of the eye, or hearing music coming from the console when it is turned off. GTP, however, are not limited to altered visual and auditory perceptions, but can also involve tactile and kinaesthetic sensory misperceptions, as well as automatic motor behaviours related to video game content, such as approaching game-related objects with the intention to perform actions as in the game [30–32].

Differentiation can be drawn between the location where the game content is perceived: (i) endogenous (e.g., seeing images with closed eyes, hearing music inside the player's

head) and (ii) exogenous (e.g., seeing objects outside one's body, or hearing sounds coming 'externally' from game-related objects) [19,21].

The prevalence of GTP among video game players is high, between 82% and 96% [21,29,33–36], although most players experience mild levels of GTP [37,38]. Endogenous forms of GTP are more common [21]. Video game players tend to not experience negative consequences due to GTP, and some have tried to induce the phenomena [13,35].

3. Case Context and Method

"Patient G" was referred to the Gaming Disorder Clinic from the adult Mental Health Assessment Unit. This is a new consultation liaison service offered within the tertiary hospital by the Alcohol and Other Drugs (AOD) team. Patient G was interviewed via telehealth with a psychiatrist, which was facilitated in person by a psychiatry registrar. Written informed consent was obtained from Patient G as part of the case report. The World Health Organisation ICD-11 Gaming Disorder Criteria was used to make the diagnosis of GD. Data from the patient's hospital notes were used to collect past history, and corroborative history was obtained from the registrar who assessed him initially in the Emergency Department (ED).

The patient in this case report was admitted to an acute inpatient ward for an acute psychotic episode characterised by delusions, hallucinations, and social withdrawal. He required a brief period of inpatient stabilisation before he disclosed and described a current history consistent with manifestations of GTP overlapping with psychosis. Notably, he experienced GTP as a teenager, prior to his formal diagnosis of schizophrenia at the age of 20, indicating the importance of identifying GTP at an early state in susceptible individuals.

The information reported was collected via various clinical interviews with the patient, including an interview via telehealth. Any further collateral history was obtained.

4. Case Description

Patient G is a 24-year-old Caucasian male with a history of paranoid schizophrenia since he was 20 years old. His schizophrenia has been characterised by delusions of religiosity, persecution, and grandiosity with auditory and visual hallucinations, thought disorder, and behavioural disturbance.

Patient G had limited social connections and experienced increased social withdrawal that is consistent with negative symptoms of schizophrenia, which would supersede a diagnosis of autism. He did not have any developmental social deficits as a child that would warrant an autism assessment or diagnosis.

Before the current acute admission, he was hospitalised and treated on an outpatient basis, but then he was discharged from his community treatment team and managed by his GP, which may have contributed to his relapse of schizophrenia. Due to the comorbid symptomatology of schizophrenia and excessive playing (hence suspected GD), Patient G was referred to the Gaming Disorder Clinic.

Patient G had trialled multiple antipsychotics over the course of his mental illness; however, often with little success. He documented adverse effects to risperidone and aripiprazole at relatively low doses. He was prescribed clozapine but self-ceased this due to intolerable side effects. This medicine was initially prescribed because he had tried at least two different antipsychotic treatments unsuccessfully previously. Before his admission to ED, Patient G was on olanzapine 5mg nocte, which he had been compliant with.

Patient G's first episode of psychosis occurred when he was 16. He experienced distressing command auditory hallucinations instructing him to harm others or himself and believed himself to be possessed by a demon, which led him to research exorcisms using the internet. His family noted a concerning deterioration in his school performance and increasing social withdrawal at the time of his first episode of psychosis and in subsequent relapses. Patient G reported an exacerbation of psychotic phenomena and command hallucinations to harm others within a 6-month period of commencing escitalopram antidepressant therapy. Several psychosocial stressors were noted at the time, including poor

school performance, the ending of a romantic relationship, and not being included on his football team.

More recently, Patient G's mental state started to deteriorate, and he was brought into ED by police following a verbal altercation with his family. His family initially contacted community mental health services regarding his increasingly bizarre behaviour, social withdrawal, perceptual abnormalities, and increased video game playing, since he was discharged from his community psychiatric treatment team several months prior.

Although Patient G conceded that his excessive game playing was sometimes problematic, he felt that he had little else to occupy his time. He was receiving government welfare and worked casually 11 h per week at a local supermarket. He had a limited social circle and had become more withdrawn as his mental state deteriorated. Patient G reported sporadic use of cannabis, which he last smoked several weeks prior to his admission; however, his use appeared to have exacerbated his paranoia, and he became fearful of his friends, believing they had ulterior motives.

On the night of admission, Patient G became acutely distressed, shouting incoherently outside his family home and ran away when his parents tried calling emergency services. He later returned home and was brought to ED by the police.

In ED, Patient G displayed florid psychotic features, characterised by delusional ideas and responding to visual and tactile hallucinations. He displayed delusions of grandeur, persecution, and ideas of reference. He also had a Capgras delusion about his family being replaced by "robot imposters". He had some insight and reported worsening psychotic experiences over a two-week period without any identifiable trigger. He denied suicidal and homicidal ideations.

Patient G primarily played video games on his gaming console, around 6 to 8 h per day. Preceding the time of admission, he had been playing "Monster Hunter", an action role-playing game, for four weeks; and had already accumulated 300 h of gameplay. In this multiplayer game, the player must battle large monsters, exploring its immersive virtual world to meet with other characters and win precious resources to craft improved armour and weapons to aid in their quest. He particularly enjoyed the "intense and realistic graphics". Before this, Patient G had been playing an online first-person shooter (FPS) war game and an online basketball game. He played these games excessively; in particular, he played this basketball game for over 800 h and spent over 500 AUD on microtransactions within the game. Later, after having recovered and regained insight, Patient G disclosed that he was "addicted" to this game and could only stop by substituting it with another game.

The nature of much of Patient G's psychotic experiences were inspired by different entertainment media and seemed to mirror the specific content of video games that he had played.

Patient G believed he was in the film, "The Matrix", or a computer video game simulation. He referred to the "Simulation Theory" (that humans are digital avatars in a virtual simulation, rather than existing as biological entities in reality). He believed in the "Multiverse Theory" of intersecting alternate universes. Furthermore, Patient G experienced the sensation of an insect entering his umbilicus two months previously when he used his computer to listen to music. His narratives embodied multiple parallels with the storyline of "The Matrix", including the robotic probe, a "bug", inserted into the protagonist's abdomen by the villain.

Patient G also had grandiose beliefs that he possessed the power to alter the behaviour of others, causing them to "glitch" or move body parts at his will or telepathic instruction. Patient G was preoccupied with "the power of numbers" and believed his social media passwords and phone PIN code gave him the ability to control the fate of non-playable characters (NPCs), a gaming term used to denote characters programmed by artificial intelligence. He believed he could make others receive certain thoughts, even controlling politicians through the internet and the television during the recent Australian federal election. Patient G believed himself to be the second coming of Jesus Christ and to have a special connection to the Divine.

Patient G described paranoid delusions of being monitored by government institutions and secret societies, such as “The Illuminati”. He became increasingly suspicious of his friends and family, withdrawing from them and becoming more socially isolated. He believed that robots replaced his parents and siblings and began to suspect that he, too, might have become an android.

Overall, Patient G’s increase in psychotic symptoms were related to his internet use and video game playing. Patient G believed somehow to be in a video game world or that the real-world worked based on the rules or mechanics of the game, as he believed that people around him were NPCs since he could not control their actions. His gaming intensified as he became more socially isolated and paranoid about others, including close friends. Then a vicious cycle ensued, as excessive gaming in turn worsened his paranoid ideations, which further exacerbated his isolation.

He agreed to a voluntary psychiatric admission for further assessment and stabilisation, where he expressed numerous previous manifestations of GTP.

4.1. Treatment Progress and Outcome

Once Patient G was referred to the Gaming Disorder Clinic, he was commenced on oral antipsychotic therapy as an inpatient, including olanzapine and aripiprazole and went on to receive depot paliperidone. Following roughly two weeks of inpatient stabilisation, Patient G admitted he had a problem with excessive video game playing. He described a period of at least 12 months of loss of control over his gaming time, priority for gaming over other important activities (such as maintaining social connections), and continued gaming despite negative consequences, fulfilling the criteria for GD. He also described cognitive dissonance regarding the basketball video game he had been playing, which he “hated”, having spent excessive time and money on multiple virtual teams. Upon discharge, he was referred back to his community treating team for ongoing maintenance.

Psychoeducation on the effects of excessive gaming were provided, which was well received. However, Patient G declined any further follow up with the AOD team. The clinical formulation in the context of his gaming and psychotic illness were presented to his community treatment team. Patient G was offered to be re-referred to the Gaming Disorder Clinic if he wished to receive any further support for his GD.

4.2. Gaming History and Game Transfer Phenomena

The team noticed that prior to his first psychotic episode, Patient G experienced several manifestations of GTP, including visual and cognitive intrusions related to video games he had played as a child.

Despite his psychotic relapse, Patient G maintained an acceptable level of insight that these GTP occurrences may not be real. He agreed with his diagnosis of schizophrenia and acknowledged that GTP were potentially secondary to it.

4.2.1. Teleport Home

At the age of 12, several years prior to his schizophrenia diagnosis, Patient G described a belief that he was able to teleport himself by using a game element, like in “World of Warcraft”, his favourite game at the time, a “massively multiplayer role-playing game” (MMORPG). At that time, he used to play 4–8 h daily on his computer. He would play for about 4 h upon returning home from school and play it whenever he was allowed on weekends. He denied ever having experienced any psychotic symptoms nor used any substances or alcohol at that time. Patient G had been playing the MMORPG for several hours one morning. Later that day, he walked to his friend’s house to visit them; on the walk home, Patient G thought to himself, “Why don’t I just use my ‘Hearthstone’ to teleport home?”. He subsequently reached to grab this item from a backpack, as he would do whilst playing this MMORPG to activate a Hearthstone. After a couple of seconds, Patient G realised that he was not wearing a backpack and that a Hearthstone was a virtual item that could not be used in reality. Patient G described this impulsive action as a positive

experience overall; he thought it was amusing at the time, but he also felt somewhat confused and disappointed when he realised that a Hearthstone could not be used in reality. Patient G reported that this incident was “very real”, stating, “I honestly thought I could teleport home”. He described a Hearthstone as a “white stone with a blue swirl on it” and explained that you set a “home” on the game, where the Hearthstone will take you whenever you activate it. He recognised that his impatient desire to get home soon (a feeling he would often also have whilst playing the game) had triggered his resolve to use the Hearthstone to fulfil that need. This was a false belief, clearly not a delusion nor psychotically driven as this was not a fixed false belief.

4.2.2. Running Away from the Villain

Later in his teens, after playing a horror-themed video game, Patient G experienced some paranoia when he was in the street with some friends. He shouted to his friends that they needed to escape the villain from the game, prompting him to run away. He reported that this felt real; however, he was under the influence of cannabis at the time. Patient G also reported feeling paranoid that people or snipers could be watching him while playing a First Person shooter video game; however, he denied feeling this paranoia outside of playing the game.

4.2.3. Intrusive Images from a Game

At the age of 23, Patient G was frequently playing “Yu-Gi-Oh!”, a collectable trading card game, on his console. He was aiming to get 100% completion of challenges as quick as possible to achieve a platinum trophy, so he played for at least 8 h daily for two weeks straight. He explained that he found the game very “boring and depressing” and, despite not enjoying it at all, he forced himself to keep playing until he reached the platinum trophy. Patient G obtained this after two weeks of play and therefore planned to take a break from the game upon completion. Once he completed the game, he went to visit his parents. He described how this was the first time he had “seen the sun”, as he had not been outside for two weeks. Later that day, when he went to lie down, he closed his eyes, and all he could see were virtual Yu-Gi-Oh! cards. The visuals lasted for an hour, and within that time, he also began to see the trading cards with his eyes open. He explained that these were static images of the cards and that he could consciously choose which specific ones were in his vision; however, he was unable to stop these involuntary visual imageries—despite wanting to. The imageries only ceased when he got up from bed and began to walk around about an hour after it had begun. Patient G described this experience as “scary”, explaining that he was just trying to rest, did not want to keep seeing the cards, and was hoping that it would end as soon as possible. He reported that this was a one-off event that he had not previously experienced whilst playing the game. He explained that, even when he had been playing for 8 h right up until he went to sleep, he did not have visions of the cards, nor did it affect his sleep. However, on this occasion, the visions were very prominent, despite having not played the game for a couple of hours prior.

4.2.4. Pleasurable Visions from a Game

More recently, prior to his admission to ED, Patient G had been playing an action role playing game, “Monster Hunter”, for up to 8 h daily; this often extended into the early morning straight up until he went to sleep. He reported that, when he had a shower or closed his eyes to try to sleep, he could see some of the graphics from the game. Notably, he reported visions of “green blurs” flying around. This imagery tended to only last for seconds. He explained that the graphics in this game are “the most beautiful of any game”, so he enjoyed experiencing these visions because they were “cool to look at”.

4.2.5. Responding to Game Elements as They Were Real

Also, whilst playing this action role playing game, Patient G reported that he could become incredibly hungry when characters from in the game cooked food. He reported

that seeing the “delicious food”, such as cheese platters and soup, caused him to become so hungry that it prompted him to go and eat food.

5. Discussion and Limitations

This report showed a case of paranoid schizophrenia comorbid with Gaming Disorder, with antecedents of GTP before the onset of psychotic disorder, as well as the reoccurrence of GTP in the progressive course of his psychotic and GD.

When admitted to ED by the police, Patient G displayed several psychotic features, characterised by delusional ideas and visual and tactile hallucinations, many of which appeared to be influenced by video game themes and the movie, “The Matrix”.

Patient G reported an antecedent of cannabis use in his teens. He also engaged in intensive gaming showing symptomatology of GD, including being unable to control his gaming habits, functional impairments, and continuing to play without enjoying it.

Having a mental health disorder appears to increase the susceptibility to experiencing GTP [37,39], although most who experience GTP do not have a clinical diagnosis [21,40].

Many of the phenomena described by Patient G after his intense video game playing are recognised among players’ experiences of reported GTP without diagnosis of mental disorders [20,21,30–32].

In the literature, excessive video game playing has been associated to pre-psychotic states [10], and some patients with schizophrenia have included media content in their delusional ideation [17]. In a previous case study on GTP, a 10-year-old patient experienced confusion between fantasy and reality with auditory hallucinations and a delusion that he was a vampire character from a video game [13]. In our case, Patient G described experiencing GTP in his teenage years, ranging from positive to intrusive and distressful experiences, prior to his schizophrenia diagnosis at the age of 20.

While Gaming Disorder is associated with GTP [27,39], not all gamers with GTP present with symptoms of GD and most do not have negative consequences due to their GTP [35,38]. However, GTP have been associated with distress and dysfunction when they manifest recurrently, with aversive content, endogenous phenomena (e.g., hearing voices coming from somewhere, seeing images overlaying objects), or involving dissociations and corporal sensations (e.g., feeling as if they are still in the game) [21,37]. In the case of Patient G, it is clear he experienced distress and negative consequences due to his GTP, which seems to have exacerbated his psychotic symptoms. Pathological hallucinations can be differentiated from GTP by the abnormal level of delusional intensity, and lacking insight, transient nature, and reality testing; the presence of these features indexes greater likelihood of psychosis. Features of GTP in psychosis, in contrast, tend to be more distressing and cause impairment to one’s reality testing and function [13,25].

The GTP experiences reported by Patient G were associated with excessive playing, although not exclusively, but also in combination with, his psychotic symptoms and under the influence of cannabis intoxication when he was a teenager.

Patient G’s GTP experiences included intrusive thoughts and automatic actions trying to use an in-game item to teleport home. This is a typical example of GTP, when players experience episodic confusion when trying to use video game elements in a real life context to resolve some situation and then they realise this is not possible [32]. It is important to note that Patient G not only thought about using a virtual item to resolve a situation in real life, but he actually attempted to reach for the virtual item from his non-existent backpack. This GTP was triggered by an internal need, specifically to get home quickly, rather than by similarities in his immediate environment to the video game. Both cases have been reported in studies on GTP [26]. Mix-ups of in-game and off-game realities have been recurrently reported in studies on GTP. For instance, players have reported wanting to use grappling hooks, pistols, save buttons, search bars, maps, telekinesis, or menus to organise information in offline real world [30–32].

Another GTP experience of Patient G included visualisation from a game when he closed his eyes and while taking a shower, as well as seeing images with open eyes and

engaging with the images by consciously selecting what cards to see, but not being able to control the images from continuing to appear. Patient G's visual imagery resembles reports of players who have not only seen game images passively, but have exercised some degree of control on the imagery, either by continuing to play the game in the mind or actually interacting with the imagery [30]. Players have also reported seeing static images, in movement, in the back of their eyelids and in the corner of the eyes, overlaying physical objects such as seeing menus or maps in the corner of the eye or power bars or tags hovering above people's heads [30].

Re-experiencing imagery from a game has been induced experimentally at sleep onset, considered as hypnagogic imagery [20,41]. Parallels have been drawn between sensorial intrusions in GTP and Hallucinogen Persistent Perceptual Disorder [21,42,43] manifesting as long-lasting perceptual distortion and anomalies experienced during the psychedelic trips [44]. Moreover, Ortiz de Gortari and colleagues [21,25] have argued that some manifestations of GTP seem to be the result of craving processes or withdrawal symptoms of GD. Interestingly, Patient G reported imagery from a collectable trading card video game he was playing for two weeks straight for at least 8 h a day, but GTP occurred only after he completed the game and finally went outside his home. Our case report resembles the case of another patient who started to take multiple showers to induce the visuals from a game while he started to cut down his gaming as part of his intervention treatment [13].

There are limitations of this case report that should be acknowledged. This is the first time that clinicians have asked about GTP in this Gaming Disorder Clinic. Questions related to GTP were only triggered by the notes in his file where he volunteered his delusions about believing people were NPCs as he could not control others as in the game. The lead author has read about the GTP colloquially known as the "Tetris Effect" and used direct questioning to probe GTP in a single 1-h session. Greater effort could be made to offer the patient a follow-up session with the use of validated screening tools; however, he declined any further follow-up. Another potential weakness was that the interviewing clinician was virtually conducting the interview via telehealth, which may also affect the therapeutic alliance, or the richness of information elicited. Lastly, the experiences reported on GTP are limited to patient recall bias and reliability.

6. Conclusions

Our case shows how excessive gaming and GTP can be present in adolescence and precede the diagnosis of schizophrenia later in adulthood. The causal significance of such antecedents for his psychosis remains at present unknown. As such, our case highlights the importance of routinely screening for both Gaming Disorder [45] and GTP in general clinical settings for psychotic and non-psychotic cases, especially because video game playing is very popular and GTP are very common.

Assessing GTP in clinical practice has been beneficial when establishing an empathic dialogue with the patients, contextualising the patient behaviours into gaming that at first glance appear irrational, and educating the patient about the impact of gaming on their life [13].

Awareness of GTP can help clinicians to demarcate GTP from psychotic features and identify their interactions, given the ensuing treatment implications. If GTP are identified, a more meticulous assessment of GTP can take place via validated screening tools for GTP (i.e., the GTP Scale; the multidimensional GTP scale) [21,36]. An early intervention can be followed based on the GD model for reducing excessive or addictive gaming behaviours, in conjunction with providing cognitive restructuring techniques targeting GTP [25].

It is important to recognise the benefits of recent digital innovations on therapeutic approaches in the treatment of auditory and verbal hallucinations in psychosis such as "the avatar therapy" by materialising and interacting with a virtual entity as the source of patient voices [46,47], and the potential benefits of utilising the GTP framework as a

psychopedagogic tool for normalising hallucinations among clinical patients [48]. However, the role of GTP as a potential precipitator factor of mental illness remains unresearched.

In some cases, GTP may be an early sign of developing mental illness and could have implications for early intervention and prevention of illness onset and complications. More research is needed surrounding the role of excessive video game playing and the early identification of GTP in prodromal and psychotic illnesses.

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