Understanding Individual Differences in Mental Health and Video Games

Abstract

With mental health diagnoses ever increasing in today's world and the services set out to provide help and care for them coming under ever increasing pressure from overuse, it is clear that a new approach is needed to help the numerous amounts of patients waiting for care. This research was setup to investigate the potential of video games and their benefits on mental health. This correlational design took survey responses from 200 participants and their responses to common mental health inventories and personality factors when asked in conjunction with their favourite video game. The data was used to build an understanding of what types of games might be associated with high or low scores across a variety of mental health, including anxiety and depression. Results showed that there were significant findings for games categorised as adventure and role playing, and that these showed associations with lower levels of anxiety, depression, and neuroticism scores, suggesting some ability to control for individual differences with more study. Future studies could aim to understand causal influences in the relationship between games and mental health, to allow for more access to care for patients.

Introduction

Mental health is as under-resourced as it has ever been, with costs also continuing to rise [1]. Although care and provisions exist for patients, they are often overstretched or underfunded. As such, new and innovative approaches are needed to support current health systems. Previous research suggests that video games could offer ways to offer more care to at risks patients by offering a short-term intervention for those with ongoing mental health issues [2]. This would allow patients to take ownership and autonomy of their mental health bridging the gap between symptoms and clinical help. However, this also raises question about the nature of diagnosing mental health symptoms and suggests that the area should not follow strict diagnoses, but a hierarchy of symptomatology to address [3], [4]. The process by which video games might provide help would be very different to the traditional therapeutic route such as Cognitive Behavioural Therapy (CBT) [5]. Instead, video games have the potential to address symptoms directly, rather than treat undiagnosed conditions, as suggested by the Hierarchical Taxonomy of Psychopathology (HiTOP) [6]–[8].

Hierarchical Taxonomy of Psychopathology

Traditionally, mental health is diagnosed by a healthcare professional, according to a diagnostic manual and after meeting a set of criteria outlined for each diagnosis [9]. The HiTOP model of mental health suggests that rather than looking at specific categorical diagnoses, practitioners should instead look to focus on common symptomology across multiple diagnoses [10], [11]. This is known as the transdiagnostic approach to mental health, as the focus is on dealing with multiple symptoms that are common across diagnoses. When considering the number of mental health diagnoses that are often co-morbid with each other, this approach makes sense as they often struggle with similar underlying symptoms [11]. While no two patients are ever identical, with mental health being more accepted as symptoms with spectrums of severity, this approach could tackle the gap in preliminary care patients need before having access to overworked, understaffed healthcare professionals [5], [6], [12].

To consider options for pre-clinical care, looking at mental health as a hierarchical structure makes sense. For example, the most common diagnoses in today's world and anxiety and depression [13].

For anxiety alone, there are many different subcategories, with their own set of diagnostic criteria [14]–[18]. Likewise, depression is not a simple descriptor that fits all sufferers equally [14], [19]. However, both diagnoses, and their symptoms, share common facets that can be seen in a vast majority of patients. To help understand this transdiagnostically, the HiTOP model classifies these two sets of conditions as part of the internalising spectra of mental health, with subfactors of fear and distress [10], [11]. By looking at these diagnoses from their symptoms, we can use a pre-clinical intervention to help a larger number of people tackle a broad set of common symptoms, without the need or a specific diagnosis, and still be confident that there will be some benefit for the sufferer [20], [21]. For example, if a patient was to present with symptoms of nervousness, fear of new places or people, and concern over change, there might well be a diagnosis in their future of anxiety disorders, or potentially even obsessive-compulsive disorders. Importantly, those symptoms also occur in generalised anxiety disorder, social anxiety disorders, and any number of other anxieties that one can be diagnosed for [22]–[24]. In this light, a pre-clinical intervention that can help people with symptom management for their own quality of life makes sense and could act as a lifeline for those waiting for overprescribed clinical time.

Depression is another example of a commonly diagnosed mental health conditions, with striking overlap in its symptoms with other disorders [25]. The HiTOP model suggests that there is overlap to the extent that depression itself does not have a simple trait to the model, but is made up of several spectrums, such as agitation, anhedonia, dysphoria, insomnia, and low well-being [10]. By using the HiTOP in this manner, interventions would be able to reach a wider range of people suffering before their clinical diagnosis. This would bring much needed scope and openness to mental health in general and would allow people to be treated beyond just their label they are assigned through manuals such as the diagnostic and statistical manual of mental disorders (DSM-5) [10], [20], [26]. If we look to understand how mental health can be treated in a much broader spectrum, addressing symptoms rather than diagnoses would be a crucial step forward in streamlining the approach to mental health.

The strength of this approach is that by not necessarily treating any specific diagnosed condition but offering the patient support for a wide range of spectrum-based symptoms, the possibility exists for them to firstly reach clinical care, and secondly be more receptive to it [5], [27]–[29]. CBT uptake is traditionally quite low, especially among younger adults, and if future patients have experience of an evidence-based practice that is effective in symptom management, then they will be more accepting of an evidence based clinical practice that is designed to actively treat their condition [30]–[33]. This is how video games can be promoted to the younger generation, as they are much more likely have access to, and play video games.

Video Games and Mental Health

Video game research has already suggested they can be used to support mental health and well-being [2], [34], [35]. Studies have shown that time spent playing video games can be beneficial for cognitive, social, and metal well-being and growth [34], [36], [37]. This has been furthered recently, showing that an hour a day playing video games can be beneficial and should be considered for most [38]. Recent research from the authors supports this as well, where a mixed methods study showed that not only can games be useful for those with mental health symptoms and diagnoses, but they are actively looked towards and used for symptom and emotional management [39]. While this paper focused on social anxiety, the research helped highlight how mental health does crossover in symptoms. The work suggested that there are types of games that can be useful to those with mental health, highlighting common themes that were found in people who felt like games had helped with their mental health. These included features such as being able to play for roughly 30 –

60 minutes. Furthermore, games that were fundamentally built on the idea of escapism from real life and being immersed in another world and feeling a new sense of self. Games that had good characters that could related to were also deemed important by participants. Role playing games or simulation games were highlighted throughout, encapsulating experiences that typically embody solo gameplay time. These types of games were shown as being able to help with mental health for the select number of participants that were invited back to interview, and as such should provide a good basis to start selection criteria for an early intervention model. In the context of why these types of video games should work, based on previous research, this does make sense as this fits within the theoretical scope of Self-Determination Theory (SDT) [40].

Self Determination Theory

This is where SDT can help to shed light on how to tackle these symptoms through a non-clinical based approach. Conceived originally by work from Deci and Ryan [40], this theory suggests that everyone wants to better themselves. To do this, there are three main innate and universal psychological needs that can be used in self-determination which are, autonomy, relatedness, and competency. Autonomy is the want of a person to feel as though they are in control of their future and direction [41]. This can be applied to mental health, by helping and enabling suffers to feel like they are taking control of their own circumstances, which often arises as a complaint by those suffering, that their mental health is all encompassing, and they are not able to act on it by themselves. Secondly, relatedness is where people desire to feel like they belong to other people, through attachment and understanding of others [42]. With the advancement in storytelling and gameplay mechanics in modern games, the opportunity to help sufferers here is apparent. Mental health sufferers often report that they feel inadvertently disconnected or have specifically shied away from real social engagement and relation because of their own situation. In these instances, video games can give them the ability to engage in basic social interaction again and relate to both human and player characters [43], [44]. Lastly, competency is the understanding that people want to gain mastery in a skill that they are doing, and this speaks to the very heart of video games [45]. Most video games offer progression system, either through character development, story progression, or in a lot of cases, a combination of these two and more besides. Importantly, players often need a good understanding, and competency in the games systems to be able to progress and see through the story of the game, and this is where video games can help mental health. By understanding and gaining competency in a video game, the sense of accomplishment and achievement can potentially bleed in a sufferers real life, and give them confidence in their own ability to succeed where once they might have thought they could not [34], [43]. By applying the principles of SDT to video games, and approaching mental health through this lens, there exists a clear opportunity to further the work originally started by Copeman and Freeman [39] to develop a pre-clinical intervention for mental health using video games. Games that enable this type of learning through play to tackle common symptoms of mental health should then allow players to tackle their own mental health, and act in a way that will enable to get clinical treatment, eventually, through the overworked national health service.

Personality Traits and Game Choice

Another key factor of mental health is individual differences and understanding that no to patients is the same [46]. To this end, there have been several studies that have looked at personality as a top-level individual difference that could affect people's mental health and their outcomes from treatment [21], [47], [48]. This is important, as from video games sales and research, we know that not everyone wants to play the same type of game [46], [49], [50]. Showing that some games are useful for some types of people, is at the heart of the individual approach, and this is another

important factor for this research to consider. In the past, studies have shown that more neurotic individuals tender to suffer more with mental health problems, and this could be as these types of people are typically classified as neurotic because they show emotional instability, anger, and irritability, all of which are common symptoms of anxiety and depression [47], [48]. Contrary to this, people who are high in openness to experience tend to not display such a level of mental ill health, and are typically classified as imaginative, and potentially creative people. As we have highlighted, mental health is not the same for any two individuals, so understanding that certain games might be better suited to different types of people is key, and this is where the approach on personality can help to shed light on this. If people who display higher scores on neuroticism were to show an affinity with a certain type of game, it would be reasonable to suggest that those with high openness to experience scores might not. As such, this is something to be considered for the application of game choice and is something that will be of interest in the current study.

Aims of the Current Study

As such, the aims of the current study are to build on work from Copeman and Freeman [39] to understand what type of game might be related to each of the most common diagnoses. By understanding this, and working through common traits that each share, the research will add further evidence to suggest a video game to be used as an early-stage intervention. As such, we hypothesise that games such as adventure and role-playing, with a strong story and character focus that allows players to escape their world and be immersed somewhere else, will show better relationships with mental health symptoms. We also hypothesise that games with a simulation element to them, such as colony managers or sports games, that put the player in the heart of the action and immerse them in the world they are engaged in, will also have a positive relationship with mental health. Lastly, we also hypothesise that openness will be positively associated with mental health outcomes, and neuroticism will be negatively associated with mental health outcomes.

Method

Participants

In total, 197 participants were recruited. Participants ranged in age from 18 to 73 years (M = 30.83, SD = 8.67) Of these, 88(54%) were female, 71 (43%) male, four others, and one who preferred not to say. Participants were recruited randomly and opportunistically through social media advertisements, and various university campuses. Of these, 62% of participants had completed a bachelor's degree or higher.

Design

A cross-sectional correlational design was employed for this study. Participants were asked to complete a variety of questionnaires about their favourite game, which the questionnaire then referred to at all points when specific games were required. Ethical approval was achieved prior to commencement of data collection.

Materials

Participants were asked about their gameplay habits via a slider tabbed from 0 – 60 minutes and had an opportunity to state their favourite game and will be highlighted as <game> where this was inserted into questionnaires, which allowed participants to think about specific situations in specific games.

The Ubisoft Perceived Experience Questionnaire (UPEQ) was used [51] to measure competence, relatedness, and autonomy within games, consisting of 21 questions scored on a Likert scale from strongly disagree (1) to strongly agree (5), with the choice of choosing not applicable (0).

Questions included were “I was free to decide how I wanted to play” and “I could approach <game> in my own way”.

The Patient Health Questionnaire Nine (PHQ-9) was used [52] to measure anxiety and depression symptoms. This consisted of nine questions scored on a Likert scale of Not at all (0) to Nearly Every Day (3). Questions asked about feelings over the last two weeks and included items such as “Little interest or pleasure in doing things” and “Poor appetite or eating”.

The Generalized Anxiety Disorder Seven (GAD-7) was also used to measure anxiety ratings [17]. This was structured with seven questions on a Likert scale from Not at all (0) to Nearly Every Day (3). Questions were asked about the participants last two weeks and included items such as “Feeling anxious, nervous or on edge” and “trouble relaxing”.

The Improving Access to Psychological Therapies (IAPT, National Collaborating Centre for Mental Health, 2018) phobia scale was used to measure social phobias in participants and was scored on a Likert scale of Would not avoid at all (1) to Always avoid it (5) and asked about three situations that a participant might be in, for example “social situations due to a fear of being embarrassed or making a fool myself”

The IAPT Obsessive-Compulsive Inventory (OCI, National Collaborating Centre for Mental Health, 2018) was used to measure severity of obsessive-compulsive disorder. This 42-item inventory used Likert scale scoring of distress in various situations scoring from Not at all (0) to Extremely (4). Participants were asked to state their own distress when faced with experiences such as “I was and clean obsessively” and “I feel that there are good and bad numbers”.

The IAPT Panic Disorder Severity Scale [53] was used to measure participants tendency for, and extent of, panic attacks in a variety of situations. Participants were told the symptoms for panic attacks and asked to rate on a Likert scale from zero to five, a variety of situations in which they felt any of the symptoms listed. The scale was not always the same for each question, but it included an increasing scale of severity for symptom onset and severity, with situations for participants to consider such as “felt anxious about when your panic attack would occur…”

Participants were lastly asked to fill out the Big-Five Personality inventory 44-item (BFI-44)[54]. This inventory measures the five constructs of personality which are openness, conscientiousness, extraversion, agreeableness, and neuroticism, using a Likert scale of Strongly Disagree (1) to Strongly Agree (5). It includes questions such as “I am someone who is talkative” and “I am someone who worries a lot.”

Procedure

Participants were recruited and data obtained through random distributions of an online survey via Qualtrics. After reading an information sheet and consenting to participate, participants filled in their average weekly playtime of video games in minutes and gave the name of their favourite video game. Following this, they completed each of the listed questionnaires: UPEQ, PHQ-9, GAD-7, IAPT Phobia, IAPT OCI, IAPT Panic and the BFI-44. Participants were thanked and debriefed about the aims of the study.

Results

To understand what types of games were being played, games were categorised into genres based off the most popular assigned genre on the site igdb.com. This was due to its popularity and exhaustive list of games through the years, that met the demand of the high number of different games reported by participants. In total, 96 different games were reported, so grouping by genre

was necessary to understand any potential relationships. Based on information from igdb.com, games were grouped as either Adventure, Role-Playing Game (RPG), Sport, Strategy or Shooter. After incomplete data had been filtered out, 133 responses showed that Adventure was the most played game from our sample with 65 game entries and sport with the least common played with nine entries.

To further understand how each genre might be useful for mental health, we ran a series of correlations with the mental health scales collected from each participant. While there is no way to discern cause and effect, this information can be useful for informing decision making about what types of games are related to lower or higher scores in certain areas of mental health. To do this, we split the sample by genre and ran a series of correlations with each of the main scales we were interested in: UPEQ, PHQ-9, GAD-7, OCI, Panic Disorder Severity and the BFI-44. Since the groups were so vastly different in size, and did not always meet parametric assumptions, a series of Spearman's Rho correlations were carried out across the different genres. To understand the potential relationship, we looked at how different genres of games reported correlations between SDT elements and mental health elements.

For Adventure games, there were some interesting insights gleaned. Some of the main findings were that competence was significantly correlated with openness, $r(38) = .43$, $p = .005$. Neuroticism and conscientiousness were inversely correlated with the PHQ-9, suggesting that those who are higher in neuroticism playing adventure games, showed higher levels of anxiety and depression, $r(38) = .47$, $p = .002$. This extended to our obsessive-compulsions measure and neuroticism suggesting similar findings, $r(37) = .50$, $p = .001$.

For RPGs, there were similarly interesting stories. Competence was negatively related to anxiety and depression through the PHQ-9, $r(21) = -.47$, $p = .025$. Conscientiousness ($r(14) = -.44$, $p = .002$) and openness ($r(15) = -.52$, $p = .034$) also showed negative relationships with anxiety and depression through the PHQ-9. Interestingly for this type of game, Neuroticism showed a positive relationship with both GAD-7 scores, $r(14) = .59$, $p = .016$, and OCD scores $r(12) = .57$, $p = .033$.

For sport, even though there less respondents who played sports games, there were still some interesting findings. Autonomy showed relationships with both anxiety through the GAD-9, $r(7) = .70$, $p = .035$, and agreeableness, $r(5) = -.77$, $p = .041$.

For games classified as strategy, there were no important significant correlations that concerned this study. The only interesting finding for shooter games was that openness was significantly correlated with competence, $r(6) = .72$, $p = .043$. These last ones are tenuous at best, as they were the smallest samples, but it is interesting that personality types were still matched with factors of SDT.

The reason for this splitting is to understand the potential for each game to have on specific types of people, as if we look across the whole data set, we can see that certain aspects of SDT have relationships with mental health symptoms, and these could be the basis for use in an intervention. For example, across the whole sample, competence was negatively associated with anxiety and depression from the PHQ-9, $r(105) = -.22$, $p = .024$. This could suggest that finding games that allow people to gain and grow competency could be an important factor in interventions around anxiety. Since in the overall sample, competence and autonomy were correlated, $r(112) = .2$, $p = .031$, and autonomy and relatedness were correlated, $r(113) = .34$, $p < .001$, there is strong evidence that finding a game that people can relate to, gain competency in and feel autonomous in their actions could have beneficial effects on anxiety and depression symptoms, as measured by the PHQ-9. Lastly, to understand what type of game might be useful for such an intervention, we ran a series of

correlations with game time and genre assigned, and found that there was a significant, positive correlation between the two, r(130) = .22, *p* = .010. The full list of correlations that were significant can be seen in Table 1, ranked by importance of factor and correlations across game genre. As the table shows, there is a lot to unpack with regards to how different games could impact mental health.

TABLE 1: TABLE OF SIGNIFICANT CORRELATIONS FOR GAME TYPES WITH FACTORS OF SELF-DETERMINATION, PERSONALITY AND MENTAL HEALTH

Correlation Pair	Adventure	RPG	Sport	Strategy	All Genres
Neuroticism / OCD	0.5	0.57			0.49
Conscientiousness / PHQ	-0.47	-0.7			-0.22
Neuroticism / PHQ	0.47				0.39
Neuroticism / GAD		0.59			0.46
Relatedness / Autonomy	0.42				-0.45
Openness / Competency	0.43				0.36
Competency / PHQ		-0.47			
Extraversion / PHQ			-0.81		-0.29
Agreeableness / OCD				-0.71	-0.28
Openness / PHQ		-0.52		0.62	
Conscientiousness / OCD			-0.86		-0.32
Conscientiousness / GAD			-0.79		-0.27
Autonomy / GAD			0.7		
Agreeableness / Autonomy			-0.77		
Openness / Autonomy					0.24

Note: All figures are Spearman Correlations coefficients significant at p < .05 or lower. Importance of correlation based on colour.

Discussion

Overall, the purpose of this study was to investigate how video games, using the principles of SDT, could impact and intervene into mental health problems, by tackling their symptoms. This exploratory study had two main hypotheses: games with a strong story focus will show better relationships with mental health symptoms, specifically that story lead, character focused featuring escapism and immersion will be strongly related to mental health symptoms. Secondly, that games such as management or simulation games would also show positive relationships with mental health symptoms. The second hypotheses here was shown to not be true, as there were no significant results from any of the various spectrums measured in relation to strategy or simulation games. This is somewhat founded in evidence, especially when considering the effects that have been looked for in mental health, the ability to escape, and be immersed in a game [55]. While previous research did suggest that this type of game could be something to look at, traditionally strategy games are not best known for their ability to make a player feel immersed in another world, as one of the key features of these games is usually grand management of an entire culture or civilization. This would somewhat indicate lower levels of relatedness and connectedness on an individual level as there would be no key player character to interact as, but a large group of people that the player is trying to channel their identity through [42], [43].

The first hypothesis was somewhat supported, given the data and the relationships that we can claim. There was a strong relationship shown between the key traits of SDT, and importantly this linked in with our findings from adventure games. Competence showed to have a positive correlation with openness, and typically we think of this personality trait as being less anxious in general terms. This also further linked into our findings that suggested people who were higher in neuroticism would tend to score higher in anxiety symptoms and would thus potentially play this type of game more [21], [47], [48]. This was extended to RPGs where we saw a negative relationship between competence and anxiety symptoms, a strong suggestion that those who play this game might be less anxious because they feel more competent at the game. As we saw from our final round of tests, competence, relatedness, and autonomy were all significantly correlated with each other, and this could be evidence that type of game could be useful for mental health interventions. Further to this, we looked to investigate the play time of games, and from our previous research we understand that shorter sessions of play seem to be beneficial [38], and from the current research, this would suggest that adventure games are typically played for less time throughout the week, but based on all the analyses we have conducted here, there suggests the chance that adventure and RPG games could be best suited to offer these shorter chances at gameplay opportunities, with overall more significant important correlations, but overall less hours played in a week.

Lastly, we saw somewhat expected results across all game genres regarding personality. Neuroticism was highly positively associated with mental health scores, with both tending to rise together. Openness was also shown to be negatively associated with mental health scores, in line with our prediction, and this makes sense when understanding how the two traits are classified in the personality inventory. It could be indicative that games can show us what type of people they might affect best, but it could also speak to a problematic case where those high in neuroticism might not be as approachable or open to a solution around their mental health that involves either directly tackling their mental health themselves, or not having support from a clinical professional [21]. This area is still in need of further research, but the inclusion of an individual difference factor does help to understand the impact that games could potentially have as a pre-clinical intervention.

However, this is not to say that this research is complete or proves that video games can be used in this way. And this research itself is limited by what it can conclude by not setting up and showing any casual relationships between these variables [56]. It does set the scene to understand what type of video game can be used for this type of intervention, however, the lack of any experimental study here speaks to how much can be implied with cause and effect. The study itself was flawed simply because the type of question used to understand the game that participants choose is not an easy question to ask. We understood from the start that asking participants to choose a single game, at a current time point would firstly have many issues around a game that is present to them now, or one from the past that might not have been played before. Also, the time that we asked them to think about, their favourite game could be implied to understand that this is their favourite game right now, but it is possible that participants chose a game that was many ears old, that they had not played in a long time, and might not have remembered all the effects that would come with such a choice. This is, at its heart, a problem with this type of research in general, and something that quantitative research will struggle to understand or grasp, and the next research project in this line should look to focus on understanding the choices behind games chosen, and the reason why these types of games might speak so well to an individual's mental health [57], [58].

Future research in this area could look to further understand the effect that specific games had on individuals. Qualitative interviews, utilising a deeper level of analyses into participants feelings and thought processes into how the games they played affected them could look to bridge the gap that

the current research cannot [58]. This should help tie the research together and provide the basis for an experimental study to understand how these various effects work together to hopefully act as intervention. Research suggests that games that can elicit escapism, immersion, and feelings of control autonomy and relatedness should be at the forefront of the research [55]. This would suggest games with a narrative element to them, such as adventure or RPG games, as suggested by this study and the previous work of the authors. However, individual differences must still be accounted for, and it is not reasonable to expect one solution to work for everyone, so there will surely be some other options that present themselves, which can be explored in later steps of the research. However, the outcomes of these research pieces do look promising, and with the potential to suggest a strong model of video games helping mental health symptoms through user directed action.

Overall, the research project was beneficial in highlighting how games could potentially be useful as an early intervention tool for mental health symptoms. By utilising the framework of SDT, we have shown how games can potentially be used to address symptomology of common anxiety and depression diagnoses, by addressing them through the framework of transdiagnostic mental health and the HiTOP model. While the research itself is only correlational in nature, it does provide insight into what type of games are being played by those with common symptomology and provides groundwork for the research to move on and assess individual games, through more in-depth qualitative pieces and through the eventual setup of an experimental piece of research to monitor and assess impacts on mental health. Though this research is still in its early fledgling stage, with experience and more research, there is the distinct possibility that video games could be used in some form of early intervention, as another weapon against mental health and the lack of resources we face as a species.

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