Games for Psychotherapeutic Change: A Systematic Review of the Positive, Long-Term Impact of Video Game Play on Anxiety and Depression

Abstract
This paper presents the findings of a systematic review of the positive long-term impact of video game play on symptoms related to anxiety and depression. Results and future directions are then briefly outlined.

Author Keywords
Depression; anxiety; interventions; video games; behavioral health.

ACM Classification Keywords

Introduction
Anxiety and depression represent a great burden to society and most who experience these psychological disorders will never receive professional aid or intervention [1]. Video games represent a widely accessible, low cost avenue to bridge this gap. Consequently, video game play has received increased attention in the literature as a potential avenue to treat a wide range of mental health problems. One factor behind this added attention is a growing body of evidence highlighting the cognitive, behavioral social and emotional benefits of videogame play [2]. However, the

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positive long-term impact of video game play, the mechanisms through which they enact change, and the psychotherapeutic benefits of video game play remain understudied. The present paper outlines a systematic review that was conducted in order to better understand the positive long-term impact of video game play on depression and anxiety. The aim of the paper is to summarize the research in this area to date and outline possible future directions.

**Literature Search Procedures**
A systematic search of the following databases was conducted in March, 2017: ProQuest Research Library (which includes PsychINFO and PsychARTICLE databases), PubMED, Elsevier, Cochrane Library, and the Association for Computer Machinery. Search was broken into three components: for "Interactivity" the search terms were "computer game", "computerized game", "console game", "digital game", "gaming", "interactive game", "internet game", "media-based game", "mobile game", "portable game", "serious game", "gamified", "gamification", "video game", "videogame", "virtual game", and "web* game" were used. For interventions for anxiety and depression, the search terms were "treatment", "therapy", "psychotherapy", "intervention", "depress*", "anx*", "mental health", "mental illness", "well-being", "mood", and "emotion". Finally, to ensure each study included a comparison group of some kind the search term, "randomized" was used.

**Results**
A grand total of 1,098 studies were produced by the search terms among the various databases, and given high overlap of results among the databases the number of unique studies reviewed was approximately 500. The titles, abstracts, and indexes of all studies that were identified by the search terms were reviewed to see if they fit the inclusion criteria of the study. Common reasons for exclusion of studies was that outcome results were not related to anxiety and/or depression, measures were not given at multiple time points, the intervention was "computerized" but not a "game", and many were review/theory papers on the topic. Of the studies reviewed, nine met the full inclusion/exclusion criteria for the study [3-11]. The nine studies were then evaluated according to five areas: (1) Participant characteristics (2) characteristics of the video games used in the studies and how they were played (3) study design characteristics (4) change in outcome measures over time and (5) the therapeutic theory or orientation guiding each intervention as well as the strategies or mechanisms of change that the study measured or identified. A summary of these five areas will now be reviewed.

1. **Participant Characteristics - Studies targeted all age ranges. Female participants were disproportionately represented. No studies required a formal diagnosis of anxiety or depression, but focus was on elevated symptoms. Finally, these studies were located in countries all over the planet. The wide target of age ranges and diverse geographic locations of these studies seems to underscore the broad appeal of video game interventions.**

2. **Characteristics of Video Games and Video Game Play - These studies predominately had players use computer games at home for the intervention. There was a wide range of video game genres represented, but most of the games were “serious”**
in nature and developed to be tested in a laboratory setting. Finally, all of the video games were played alone. Casual and entertainment video games appear to be nearly absent in this literature.

3. Study Design Characteristics - The sample sizes of these studies were generally not large, and no participants were blinded to treatment conditions. Most of the interventions were brief, usually lasting no more than one month. The decision as to what type of comparison group to use varied, with some trials preferring a non-inferiority comparison, and some trials preferring a waitlist control or attention placebo comparison. Only one study included a non-inferiority as well as a waitlist control group [10].

4. Change in Depression and Anxiety Outcomes - Almost every measure used in every study showed a reduction in symptoms from baseline to study closeout. These changes were statistically significant when reported, and often showed equivalent performance to non-inferiority groups. Finally, only three studies followed participants after the active intervention had been completed, and of those only one [10] followed up participants for longer than three months. Thus, the evidence provided from these studies suggests video games can treat psychological disorders, but how long these gains last is still unclear.

Discussion
This systematic review of video game-based interventions for anxiety and depression showed that such interventions almost uniformly reduced symptoms related to these disorders. The review adds to a growing body of evidence that long-term video game play may in fact have a positive impact on those who play them. However, the review also highlights a lack of research investigating how or why such changes occurred. Thus, it is difficult to draw conclusions about what is truly responsible for these promising results.

Future Directions
Once clear need moving forward is to conduct more research on the mechanisms or underlying agents of change within video game-based interventions. This is imperative because without such a fine-grained analysis of agents of change it is impossible to rule out the possibility that an unknown or unmeasured variable may better explain the observed changes. Additionally, a better understanding of mechanisms of therapeutic...
change allows for future interventions to be modified in ways that make them more effective.

References


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