Preliminary Results from a Systematic Review of Narrative Game-based Interventions for Mental Health

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ABSTRACT

Video games have increasingly been used to support mental health through various game-based interventions (GBIs), including exergames, virtual reality therapy, and cognitive behavioral therapy-based games. While these approaches often emphasize novel game mechanics and gamification, such features may undermine intrinsic motivation, which is critical for meaningful internalization of mental health messaging. Narrative, a well-studied mechanism in communication theory for fostering engagement and persuasion, remains underexplored in GBIs for mental health. This systematic review investigates narrative GBIs (NGBIs) using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. Seventeen studies met the inclusion criteria. The majority addressed depression and anxiety, and CBT was common as an evidence-based grounding. However, few of the studies investigated the narrative factorially, and the disparate measures used to evaluate success made it difficult to determine the overall efficacy of NGBIs for mental health. We suggest future directions for research and design of NGBIs.

Keywords

Narrative games, mental health, game-based interventions, systematic review

BACKGROUND

Video games have been explored extensively as a means for supporting individuals' mental and physical health (Boldi and Rapp 2022). These investigations have been

Proceedings of DiGRA 2025

conducted through several types of serious games (Fleming et al. 2017), such as exergames (Zhou et al. 2020), cognitive behavioral therapy based games (Merry et al. 2012), or biofeedback games (Amon and Campbell 2008). However, many of these game-based interventions (GBIs) rely heavily on novel mechanics, modalities, and gamification. In certain contexts, gamification can act as an extrinsic motivator rather than an intrinsic motivator (Mekler et al. 2017). External regulation can have negative consequences on an individual's autonomy and competence (Mitchell, Schuster, and Jin 2020), key elements of intrinsic motivation (Ryan and Deci 2017). For mental health interventions, where meaningful internalization of the game messaging is crucial, a focus on gamification may not be conducive to the necessary cognitive processing (DeSmet et al. 2014).

An underexplored mechanism in GBIs is narrative as a means of engagement. Communications scholars have modeled how narrative facilitates processing of persuasive messaging (Slater and Rouner 2002; Busselle and Bilandzic 2008; Moyer-Gusé 2008) through transportation into the storyworld (Green and Brock 2000) and identification with characters (Cohen 2017). Existing reviews investigate how GBIs can elicit mental health outcomes (Fleming et al. 2017; Shah et al. 2018; Eichenberg and Schott 2017), and how narrative GBIs can promote healthy behaviors (Zhou et al. 2020; Baranowski et al. 2008); however, the potential effects of narrative GBIs for mental health have not been extensively investigated (Lu et al. 2012). This systematic literature review aimed to compile a list of NGBIs and understand the methods used to design and evaluate such games.

To this end, we conducted a systematic review of narrative GBIs for mental health in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, requiring that identified studies satisfy the following criteria:

1. The intervention had to include a game. Simulations and other interactive experiences not referred to as games were excluded.
2. The game had to have a narrative that satisfied the heuristic defined by (Jackson et al. 2018), i.e., games containing events, character(s), setting(s), structure, point of view, and time.
3. The intervention had to explicitly address an aspect of mental health listed in the DSM-5 (e.g., depression, anxiety) and stated this in their design goals. We excluded games addressing disorders classified in the DSM-5 as neurocognitive or neurodevelopmental, as treatment tends to take the form of cognitive rehabilitation (CR). Similar to (Shah et al. 2018), we were more interested in studying games targeting emotion management as opposed to cognitive processes.
4. The paper included a study related to the practicality of the app for target users (e.g., usability, feasibility, pilot study, or randomized controlled trial).
5. The publication was a peer-reviewed journal paper or conference paper.

METHODS

To locate relevant studies for the review, we first conducted a database search using the following keywords: (narrative OR story OR stories) AND (game OR gamifi* OR gaming) AND (“mental health” OR psych* OR cogniti*). We searched for studies in

ERIC, Pubmed, Inspec, Compendex, and PsycInfo. The data collection process was conducted between June and August 2024. We also conducted backward search by examining the reference lists of the studies included in this review as well as those from previous systematic reviews focusing on games for mental health (Fleming et al. 2017; Shah et al. 2018). We excluded studies not published in English, published prior to the year 2000, scoping or other systematic review papers, and preprints. After excluding duplicates and systematic reviews, a total of 1643 potentially relevant studies were retrieved.

ANALYSIS

Two independent coders applied the inclusion criteria and coded around 10% (n = 164) of the retrieved studies to establish inter-coder reliability. Coding categories included (1) whether the study should be included or excluded, and (2) the reason for inclusion. After initial coding, intercoder reliability for inclusion was not adequately satisfying (Cohen's kappa = 0.665), so the coders discussed the criteria to consensus and performed the coding process again with the next 10% of retrieved studies. In this round, intercoder reliability was satisfying (Cohen's kappa = 0.868), and coders proceeded to code half of the remaining papers each.

In the final stage of analysis, we chose to exclude games that address tangential mental health factors, such as stigma (Cangas et al. 2017; Ferchaud et al. 2020) and a sense of belonging (Mittmann et al. 2022). In the case of multiple evaluations for a single game, the highest powered randomized controlled trial was chosen for inclusion. A total of 17 games and studies were included in the final analysis (Chan et al. 2021; Báldy et al. 2021; Nicolaidou et al. 2019; Nicolaidou et al. 2021; Heng et al. 2023; Tuijnman et al. 2022; Li et al. 2022; Olivet et al. 2019; Carrasco 2016; Merry et al. 2012; Lucassen et al. 2015; Perry et al. 2017; Schoneveld et al. 2016; Zielhorst et al. 2015; Verduin et al. 2013; Stasiak et al. 2014; Shandley et al. 2010).

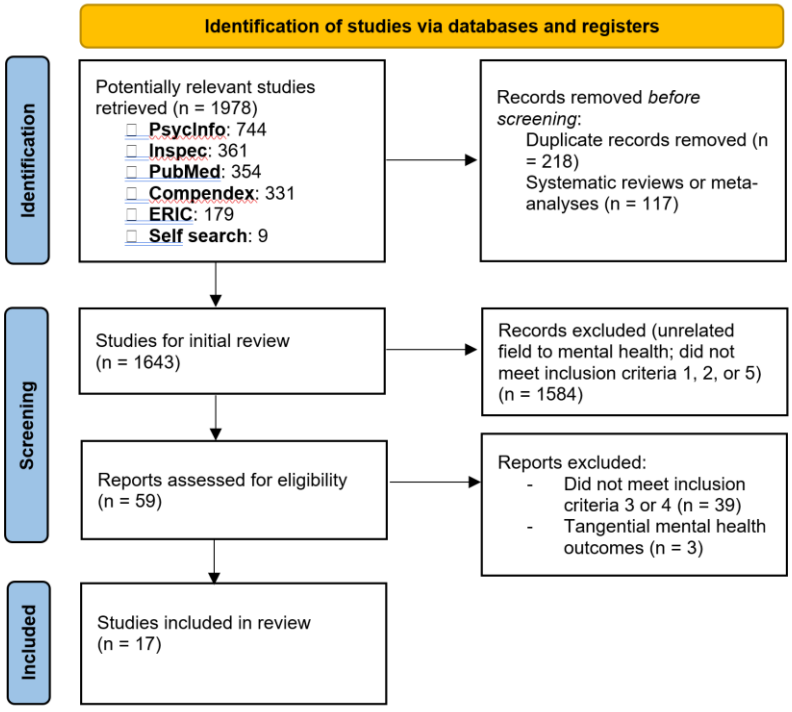

Figure 1: PRISMA diagram of the study selection process.

FINDINGS

Studies had a mean of n = 120.1 and a median of 40.5 participants. Eight studies targeted adults (5 specifically targeting young adults approx. 18-30 years old), three targeted children (<13), and six targeted adolescents (13-18). Seven of the studies were conducted as user evaluations, six as RCTs, and four with quasi-experimental or between-subjects design. Eight of the games addressed depression and related disorders, four address anxiety-related disorders, two address anger disorders, two address alcohol abuse, and one addresses first episode psychosis. Nine of the games used principles from cognitive behavioral therapy (CBT), but other evidence-based practices (EBP) included coordinated specialty care, relapse prevention therapy, mindfulness, and neurofeedback/attention bias modification training. Four papers were not based on an EBP.

The fictionality of the game narrative influences the transportation that players feel (Bal and Veltkamp 2013). Eleven of the games used realistic narratives, while six used fantasy narratives. Likewise, the role the player takes within the game affects their identification (Happ et al. 2013). In fourteen of the games, the player character experiences symptoms of the mental health disorder themselves, while in three games, the player character is helping NPCs who display symptoms of the target disorders. However, despite the fact that narrative has been theorized in the GBI space as a mechanism for increasing engagement and retention (DeSmet et al. 2014), this was rarely measured in any of the studies analyzed.

FUTURE WORK

To answer the question of whether NGBIs are effective in eliciting positive mental health outcomes, some basic questions need to be answered about whether narrative engagement positively impacts psychoeducation and behavioral uptake. Factorial study designs may help elucidate how the intersection of narrative with other game mechanics used to engage patients may help or harm outcomes.

In future discussion, we intend to suggest design guidelines for further cross-collaboration between communication studies, mental health, and human-computer interaction.

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