

# **The Feasibility of a Gaming Therapeutics Community for Diverse Video Gamers**

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Table of Contents

Original Manuscript..... 5

Supplementary Files..... 32

    Multimedia Appendixes..... 33

        Multimedia Appendix 0..... 33

        Multimedia Appendix 2..... 33

        Multimedia Appendix 3..... 33

        Multimedia Appendix 4..... 33

# The Feasibility of a Gaming Therapeutics Community for Diverse Video Gamers

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## Abstract

**Background:** Loneliness is a form of psychological distress that has widespread health impacts across the life cycle, including elevated depression and anxiety (CDC, 2023; Hawkley & Cacioppo, 2010; Marquez et al., 2023). We explore the impact of a subclinical intervention program involving online facilitator-led groups for loneliness in video gamers.

**Objective:** We aim to explore the feasibility of a community-based program incorporating commercial video games, group sessions, and workshops to combat loneliness in video gamers.

**Methods:** We undertook an observational proof-of-concept study to evaluate the feasibility of health-promoting support groups utilizing common platforms (i.e., Discord) and video games available to consumers. Participants were adults from across the US. Using a longitudinal design, outcomes were tracked using the Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder scale (GAD-7), the World Health Organization five time survey (WHO-5), and a measure of psychological flexibility (Psy-Flex). Demographics were gathered, and growth mixture modeling was used to identify outcome trajectories and predictors of outcome.

**Results:** Average PHQ-9 score was 13.37 (SD = 6.04) at baseline, and 10.27 (SD = 5.80, Cohen's  $d = 0.52$ ) by 60 days. Average GAD-7 score at baseline was 11.23 (SD = 5.24) and 8.25 (SD = 4.22, Cohen's  $d = 0.60$ ) at 60 days. Average Psy-Flex baseline score was 11.51 (SD = 4.30) and 12.55 (SD = 4.37, Cohen's  $d = 0.24$ ) at 60 days. The WHO-5 had an average baseline score of 7.86 (SD = 3.82) and 8.08 (SD = 4.44, Cohen's  $d = 0.24$ ) at 60 days. LGMM analyses identified a subpopulation that achieved PHQ-9 remission outcomes (Improvers group, 20.78% of sample), while another never presented with clinically elevated symptoms (Low group, 52.28% of sample). A third subpopulation exhibited no significant change and remained clinically elevated at 60 days (Chronic group, 26.94% of sample). Members of the Chronic group were more likely to identify with a minoritized gender community than members of the Improvers group.

**Conclusions:** This study provides preliminary evidence that a community-based program incorporating commercial video games, group sessions, and skills-focused workshops may support mental health both by reducing elevated symptoms and maintaining low symptom levels in at-risk individuals.

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## Original Manuscript

## **The Feasibility of a Gaming Therapeutics Community for Diverse Video Gamers**

### **Author Note**

## Abstract

**Background:** Loneliness is a form of psychological distress that has widespread health impacts across the life cycle, including elevated depression and anxiety (CDC, 2023; Hawkley & Cacioppo, 2010; Marquez et al., 2023). We explore the impact of a subclinical intervention program involving online facilitator-led groups for loneliness in video gamers.

**Objective:** We aim to explore the feasibility of a community-based program incorporating commercial video games, group sessions, and workshops to combat loneliness in video gamers.

**Methods:** We undertook an observational proof-of-concept study to evaluate the feasibility of health-promoting support groups utilizing common platforms (i.e., Discord) and video games available to consumers. Participants were adults from across the US. Using a longitudinal design, outcomes were tracked using the Patient Health Questionnaire (PHQ-9), Generalized Anxiety Disorder scale (GAD-7), the World Health Organization five time survey (WHO-5), and a measure of psychological flexibility (Psy-Flex). Demographics were gathered, and growth mixture modeling was used to identify outcome trajectories and predictors of outcome.

**Results:** Average PHQ-9 score was 13.37 (SD = 6.04) at baseline, and 10.27 (SD = 5.80, Cohen's  $d = 0.52$ ) by 60 days. Average GAD-7 score at baseline was 11.23 (SD = 5.24) and 8.25 (SD = 4.22, Cohen's  $d = 0.60$ ) at 60 days. Average Psy-Flex baseline score was 11.51 (SD = 4.30) and 12.55 (SD = 4.37, Cohen's  $d = 0.24$ ) at 60 days. The WHO-5 had an average baseline score of 7.86 (SD = 3.82) and 8.08 (SD = 4.44, Cohen's  $d = 0.24$ ) at 60 days.

LGMM analyses identified a subpopulation that achieved PHQ-9 remission outcomes (Improvers group, 20.78% of sample), while another never presented with clinically elevated symptoms (Low group, 52.28% of sample). A third subpopulation exhibited no significant change and remained clinically elevated at 60 days (Chronic group, 26.94% of sample). Members of the Chronic group were more likely to identify with a minoritized gender community than members of the Improvers group.

Conclusions: This study provides preliminary evidence that a community-based program incorporating commercial video games, group sessions, and skills-focused workshops may support mental health both by reducing elevated symptoms and maintaining low symptom levels in at-risk individuals.





Loneliness is a form of psychological distress that has been linked with increased risk of several serious medical conditions like diabetes, stroke, heart disease, dementia, depression, anxiety, suicide and self harm (Brown et al., 2018; CDC, 2023; Hawkey & Cacioppo, 2010; Health (OASH), 2023; Marquez et al., 2023; Prizeman et al., 2023). By the age of 25, almost 80% of individuals will have experienced loneliness at some point in their life, along with the associated health risks like depression, anxiety, suicidal ideation and self-harm, and will likely experience it again as they age (Floyd & Morman, 2022; Matthews et al., 2023; Prizeman et al., 2023). Due to the increased risk of several severe diseases and mental health risks, loneliness is being identified by large health organizations, such as the CDC, WHO, and APA, as a critical point of intervention for increasing health and wellness of individuals (APA, 2023; CDC, 2023; WHO, 2023).

Importantly, while increasing prosocial behavior and interaction with a community is commonly proposed, increased social contact is insufficient to decrease loneliness on its own (Hill & MacGillivray, 2023). Conditions such as social anxiety, social skills, self-esteem, and personal distress can all decrease the likelihood that connection with community improves experiences of loneliness (Cudo et al., 2019; Hu et al., 2023). This is especially true for marginalized populations, including individuals that are neurodivergent, LGBTQIA+, or BIPOC that find it difficult to navigate social situations where connection and welcomeness may be ambiguous (Simms et al., 2023).

Online communal servers and chat services often provide a sense of community and virtual relationships (Prochnow et al., 2023), but these communities are often not designed specifically for connection or mental health. Online video game communities can be hostile or “toxic”, which does not promote meaningful connection that improves mental health (Beres et al., 2021; Maher, 2016; Neto et al., 2017). Additionally, gaming has ambivalent attention within the mental health community, given concerns about addiction and social withdrawal (Bernaldo-de-Quirós et al., 2022; Sussman & Weigle, 2024; Wang et al., 2022). Due to this, many have steered away from the potential of utilizing video games, when appropriately designed and supported, to build social connection,

community and to combat loneliness.

Research on the mental health of video game players reveals that the gaming community is often distressed, with low physical, social, and mental health reported (Finserås et al., 2022; Matias et al., 2023; van der Schyff et al., 2023). A common belief is that problematic video game use is a cause or catalyst to lower well-being, however research suggests that problematic use is a coping strategy for distress rather than the cause (Bernaldo-de-Quirós et al., 2022; Craig et al., 2021; Cudo et al., 2019; García-Gil et al., 2022). Recent research further highlighted the moderating role that meaningful relationships, especially parent-child relationships have on problematic video game usage and aggressive behavior linked to violent video games (Li et al., 2018; Liang et al., 2019; Valeeva & Kalimullin, 2016; Yılmaz & Pamuk, 2023). This perspective suggests utilizing a systemic lens to evaluate the promises and perils of video games for supporting well-being and community cohesion. Furthermore, video games have been associated with a number of cognitive and mental health benefits, both in the absence of and in addition to traditional treatment options (Boldi & Rapp, 2022; Fish et al., 2014; Hemenover & Bowman, 2018; Kowal et al., 2021; Palaus et al., 2017; Russoniello et al., 2013; Suenderhauf et al., 2016; Zayeni et al., 2020).

The interpersonal structure of online communities and the documented benefits of gaming suggest an opportunity to reimagine gaming platforms as accessible digital settings for challenging loneliness and promoting well-being. However, given the complex relationship between gaming, online toxicity, and mental health, there is a critical gap in understanding how gaming environments might serve as therapeutic environments. To fill this gap, in the current study we investigate whether a communal gaming environment intentionally designed to promote mental health is a feasible and acceptable intervention for improving well-being at 30 days and 60 days. This approach was designed to leverage the unique characteristics of gaming communities and of their online environment to expand *individual* capabilities combined with *group and community* interventions that offer new, supportive opportunities to build relationships are essential for breaking self-

sustaining feedback cycles that contribute to ill health.

## **Methods**

### **Virtual Health-Supporting Communities**

#### ***Overview of the Approach***

In the following we give an overview of the theoretical basis, programs, and models we utilize that were developed with both external and internal system perspectives in mind. This includes how we are facilitating peer relationship development, fostering community support and empathy, and teaching emotional regulation and coping skills through several different delivery methods.

#### **Theoretical Basis**

Systems theory is an informative basis for understanding the behavior of couples, families, groups and individuals, and is often utilized in therapy (Adams, 2012; Von Bertalanffy, 1967, 1972; Von Bertalanffy & Sutherland, 1974). This theoretical framework highlights opportunities for ameliorating suffering by addressing systems outside a traditional one-to-one intervention model, yet that works hand-in-hand with such models. For example, individual social, emotional, and behavioral challenges can derive from pathogenic dynamics in social systems (McClean et al., 2021; Sexton & Stanton, 2016; Van Vlierberghe et al., 2023; Von Bertalanffy & Sutherland, 1974), which in turn make it difficult to benefit from new social systems, or to alter old social systems, leading to feedback cycles that self-sustain suffering. As a result, social systems impact systems internal to the self by contributing to internalized beliefs and habits or patterns that then reinforce or perpetuate relational, emotional, and behavioral difficulties within external social systems. This theory has driven the design of both individually-focused skill building, along with providing intentional support systems surrounding each person. To properly implement systems theory, the gaming community was designed to simultaneously intervene at the internal and external, social systems levels.

**Peer Relationship Building - Discord Communities.** Discord is a platform for social networks, primarily used by gamers, to communicate and build community around a specific topic or game. We organized several “servers” or sub-communities around shared gaming interests. Each server is overseen by moderators and staff, and offers text and voice channels, read-only resources, event spaces, and community rules to encourage and preserve supportive interactions.

These online communities are designed to aid in meaningful and health-promoting connections between members (Stavrova & Ren, 2023). Careful, active moderation of this community facilitates the intended purpose of reinforcing social skills and preserving safety of all parties (Deng et al., 2023; Lin & Shorey, 2023). These communities are at the center of and surround all of the other services offered to enact change across internal systems and social systems.

**Journey Sessions.** In addition to Discord communities, weekly group sessions are facilitated by group leaders with counseling or clinical training. Members are matched into groups based on their reported goals, games played, gender, sex, facilitator preferences, age, schedule availability, and other factors. Group settings have long been found to be effective for providing social support to individuals experiencing distress (Dies, 1992; Proudlock & Wellman, 2011; Telfair & Gardner, 2000; Vickery, 2022) and can be a suitable setting for teaching self-care, social and emotion regulation skills (Proudlock & Wellman, 2011).

Commercial video game play (i.e. Minecraft, Animal crossing, etc.) is reported to accelerate group cohesion and bonding through shared interests (Stavrova & Ren, 2023), and provides opportunities to explore individual and group dynamics, as well as practice learned skills (Adachi & Willoughby, 2013). Socio-emotional skills are drawn from well-validated interventions such as Dialectical Behavior Therapy (Chapman, 2006; Linehan, 1987) and Acceptance and Commitment Therapy (Hayes et al., 2013). Group members are connected in a text channel on Discord that is accessible only by that particular group to foster connection and support throughout the week in between sessions. Group meetings provide a context of support (Kroenke et al., 2001, p. 9; Sun et al.,

2020), accountability, and normalization of challenges and setbacks as skills are learned and practiced (Agako et al., 2023; Lee & Arora, 2023; Van Dijk et al., 2013).

**Gaming Therapeutics.** Gaming therapeutics utilize readily available commercial games to further practice skills through pre-constructed situations akin to an interactive worksheet set in the game world. They are especially helpful for emotion regulation, executive functions, problem solving, decision making, and social collaboration (Adachi & Willoughby, 2013; Ellison & Drew, 2020; Finke et al., 2018; Prochnow et al., 2023). Games like Minecraft, Roblox, Skyrim, and D&D have a developer mode that allows designers to create scenarios for specific skill building exercises.

### **Weekly Session Facilitators**

We had a sample of 36 facilitators for these groups. Of these, 11 (31%) reported Social Work training(MSW), 9 (25%) reported Art Therapy training, 1 (3%) reported a PsyD, 8 (22%) reported Marriage and Family Therapy training (MFT), 7 (19%) reported Mental Health Clinician training (MHC). The average age of these facilitators was 32 (sd = 4.56). They collectively represent 25 different geographic states in the United States with the most common states being New York, Florida and Texas. Regarding gender, 28 (78%) facilitators identified as women, 4 (11%) as men, and 4 (11%) non-cis-gendered.

### **Measures**

#### ***Demographic Questions***

Participants completed demographic questions including gender identity, race and ethnicity, and self-reported neurodivergent status. These questions were asked during onboarding.

#### ***PHQ-9***

We administered the PHQ-9 at entrance to the program and again at 30 days and 60 days via survey. The PHQ-9 is a self-report screener of depression symptoms and severity that has been evaluated as a reliable and valid measure for several populations. There are nine questions with answers ranging from 0 - Not at all to 3 - Nearly every day. Symptoms measured include: “Little

interest or pleasure in doing things” or “Trouble concentrating on things, such as reading the newspaper or watching television”. Due to its relatively short length and sensitivity to change over time (Löwe et al., 2004), it is an ideal measure for gauging distress over time.

### ***GAD-7***

We also used the GAD-7 to measure anxiety symptoms and severity (Spitzer et al., 2006). Like the PHQ-9, this was administered via survey at the start of the program, and then again at 30 and 60 days. This was a seven item questionnaire that measured symptoms over the last two weeks. Each item could be answered from 0 - Not at all to 3 - Nearly every day. Items include: “Trouble Relaxing” and “Feeling afraid, as if something awful might happen”. The GAD-7 was also selected for its length, reliability, validity, and sensitivity to change (Toussaint et al., 2020).

### ***WHO-5***

The WHO-5 is a five question psychological well-being index developed by the World Health Organization (Topp et al., 2015). There are six responses for each question scored from 0 to 5. Sum scores range from 0 to 25. We administered this at baselines and again at 30 and 60 days.

### ***Psy-Flex Inventory***

The Psy-Flex was also administered at baseline, 30 days and 60 days (Gloster et al., 2021). This is a six question assessment of psychological flexibility. Statements are measured over the last two weeks and include items such as: “Even if I am somewhere else with my thoughts, I can focus on what's going on in important moments.” and “I can look at hindering thoughts from a distance without letting them control me.” Scores for each question range from 1 to 5 and total scores are summed. This measure was chosen for its short length as well as its connection to the psychological flexibility literature (Gloster et al., 2021).

### **Data Analysis**

Data was pulled from the program in January of 2024. Demographic data was gathered for participants who responded to an invitation to complete measures about their experience in the

program . Only those who had at least two time points were included in the analysis. Participants were then separated into two groups based on their baseline scores for the GAD-7 or PHQ-9.

To model changes in depressive symptoms following enrollment, we conducted Latent Growth Mixture Modeling (LGMM) to identify distinct subgroups characterized by different PHQ-9 symptom trajectories over 60 days in the subclinical service. We focused trajectory modeling on PHQ-9 scores given the higher comorbidity between loneliness and depression (CDC, 2023) as well as sample size considerations. We used an intent-to-treat approach for the LGMM by including all participants and handling missingness through full information maximum likelihood. We modeled nested unconditional LGMMs with increasing numbers of trajectories (1-4). All models included random effects for the intercept and slope parameters and a fixed quadratic growth factor to capture potential non-linear change patterns in depressive symptoms over time. The best fitting model was determined using a combination of fit indices and theoretical considerations (Nylund et al., 2007). Examined criteria included Bayesian Information Criterion (BIC), sample-size adjusted BIC (SABIC), Akaike Information Criterion (AIC), relative entropy, and statistical significance of the Lo-Mendell-Rubin likelihood ratio test (LMR-LRT) and the Bootstrap Likelihood Ratio Test (BLRT). Additionally, we considered parsimony, class interpretability, and clinical relevance when selecting the final model (Nylund et al., 2007). After determining the best fitting LGMM solution, we conducted logistic regression analyses to identify baseline participants' characteristics that distinguished between trajectories with higher baseline symptoms showing non-response versus improving PHQ-9 patterns. Variables included in the analysis consisted of race (identifying as white vs non-white), gender (identifying as woman, man, or other), baseline PHQ-9, WHO-5, and GAD-7 scores, and psychosocial flexibility assessed at baseline (i.e., Psy-Flex score).

## Results

### Participants and Demographics

A total of 438 participants that provided follow-up data at their 30 day mark were included in

this analysis. Of these, 157 (35.61%) also completed the 60 day survey at exactly 60 days. There was a portion who completed the 60 day survey more than 10 days after the 60 day mark ( $n=34$ ) or earlier than 20 days before the 60 day mark ( $n=1$ ). These 35 were dropped from analysis. This left final participants at 403. Of those in the clinically-elevated group, 98 (28.91%) completed the 60 day survey. In the subclinical group, 24 (27.90%) completed the 60 day follow-up.

Community demographics reveal an incredibly diverse population with 29.38% identifying as BIPOC, 48.64% neurodivergent (e.g. autism, ADHD), and 25.27% non-cis-gender gender identities. 45.92% of participants identified as women and 28.83% identified as men (See Table 1.). These counts surpass the latest US census demographics (25% BIPOC, 20% neurodivergent, 12% gender minorities), highlighting the diversity of video game communities. Demographic information by grouping is reported in Table 2.

### **Change in Anxiety and Depression**

Results for Anxiety and Depression at 60 days are reported in Table 2. At baseline, the average PHQ-9 score was 13.37 (6.04), which falls in the high moderate severity range. At the 60 day follow-up, the average score was low moderate at 10.27 (5.80), with a medium Cohen's  $d$  effect size of 0.52. The average baseline GAD-7 score was 11.23 (5.24), in the low moderate range, and 8.25 (4.22), a high mild, subthreshold score at the 60 day follow-up, with a medium Cohen's  $d$  effect size of .60. Psy-flex and WHO-5 results at 60 days are similarly reported in Table 2. Average baseline scores were 11.51 (4.30) for the Psy-flex with an average of 12.55 (4.37) at 60 days. The WHO-5 average baseline was 7.86 (3.82) with an average 60 day score of 8.08 (4.44). Cohen's  $d$  for Psy-flex at 60 days was -0.24 and the WHO-5 Cohen's  $d$  was also -0.24.

Heterogeneous trajectories of depressive symptoms change were estimated using LGMMs. The tree class solution was identified as optimal, with model fit indices reported in the Supplementary Materials. Sensitivity analyses suggested no significant differences in likelihood of trajectory membership between survey completer and non-completers at 30 days [ $X^2(2, n = 438) =$



0.71;  $p = .700$ ] and 60 days [ $X^2(2, n = 438) = 1.53$ ;  $p = .466$ ]. The three identified trajectories showed distinct patterns of depressive symptom change over 60 days of engagement with the subclinical service (Figure 1).

The modal trajectory ("Low";  $n = 229$ , 52.28%) was characterized by baseline mild- to moderate symptoms (baseline PHQ-9 score:  $M = 8.8$ ;  $SD = 3.67$ ) with a slight decreasing slope over 60 days (60 days PHQ-9 score:  $M = 7.64$ ;  $SD = 3.87$ ). The second largest heterogeneous subgroup ("Chronic";  $n = 118$ , 26.94%) was characterized by moderate to severe baseline symptoms (Baseline PHQ-9 score:  $M = 18.3$ ;  $SD = 4.03$ ) with no significant change over time (60 days PHQ-9 score:  $M = 16.78$ ;  $SD = 4.10$ ). The third largest trajectory ("Improvers";  $n = 91$ , 20.78%) was characterized by initial moderate to severe PHQ-9 scores (baseline PHQ-9 score:  $M = 18.52$ ;  $SD = 3.13$ ), which improved to moderate depression levels at 30 days (30 days PHQ-9 score:  $M = 10.17$ ,  $SD = 4.01$ ) and below the clinical cutoff following 60 days (60 days PHQ-9 score:  $M = 7.42$ ,  $SD = 4.27$ ).

To identify baseline characteristics that distinguished between participants with moderate to severe baseline depression ( $n = 209$ ) and who exhibited non-response versus those who showed symptom improvement, we conducted a logistic regression examining predictors of trajectory membership in the Chronic versus Improvers groups. Results from the analysis indicated that a gender identity other than man or woman was more likely associated with non-improvement in PHQ-9 scores ( $OR = 0.42$ ; 95%  $CI: 0.19-0.94$ ;  $p = .036$ ). No other baseline factors significantly distinguished between Chronic and Improvers trajectories. Results are reported in Table 3.

### Sensitivity Analysis

Sensitivity analyses indicated no significant differences in terms of baseline characteristics between participants who completed all surveys or showed survey non-adherence at 30 and 60 days. Results are reported in the supplementary materials.

### Discussion

Loneliness is a rising epidemic in the United States (Floyd & Morman, 2022; Matthews et al.,

2023; Prizeman et al., 2023) that has far reaching impacts on physical and mental health (Brown et al., 2018; CDC, 2023; Hawkey & Cacioppo, 2010; Health (OASH), 2023; Marquez et al., 2023; Prizeman et al., 2023). Health-supporting communities are designed to alleviate loneliness and the ill health effects associated with loneliness by cultivating individual skill development related to fostering more enduring social connections. These communities are not a replacement for clinical treatment, but work hand-in-hand with existing mental health care, and appear to deliver clinically meaningful results over 60 days. The 30 day and 60 day findings for anxiety, depression, and overall wellness show a positive change in participants' reported functioning.

Importantly, health-supporting communities appear to be acceptable to a diverse set of populations that tend to under-utilize traditional mental healthcare. These are all populations that have found it difficult to find meaningful community connection and tend to under-utilize mental healthcare (Casanova-Perez et al., 2022, 2022; Criss et al., 2023; Klittmark et al., 2019; Quinn et al., 2015; Stein Duker & Goodman, 2022). 28.83% of participants in our program identify as men and 45.92% identify as women. Typical demographics rates of mental healthcare reported ~70% female, ~15% male, and 30% report as non-white (Bugatti, Owen, Reese, Richardson, Rasmussen, & Newton, 2023; Bugatti, Owen, Reese, Richardson, Rasmussen, Beck, et al., 2023; Çitak et al., 2021; Garrote-Caparrós et al., 2022; Kimber et al., 2022). Demographics beyond these are rarely reported (Kimber et al., 2022). When compared to typical attendance demographics for psychotherapy, this health-supporting communities for gamers seem to attract a more diverse population.

Video games have historically carried a stigma of harming mental and physical health. Recent research has begun highlighting the potentially health-reinforcing opportunities of video games. This includes physical health as well as for mental health support, such as combating loneliness and the accompanying symptoms of anxiety and depression. Furthermore, some clinicians have demonstrated that using commercial video games as part of treatment can be impactful for clients (Kowal et al., 2021; Zayeni et al., 2020). By incorporating video games as a central part of

community and supportive settings, there is potential to assist populations that have often felt uninterested in mental healthcare services.

LGMM results also reported change over 60 days for three distinct groups. While all groups showed improvement over the 60 days, the Improvers group (about 20% of the population) showed significant improvement moving from well above clinical cut off to below clinical cutoff. The only significant difference between the two groups that had elevated PHQ scores was gender identity other than male or female. This could be linked to the higher levels of loneliness and depression experienced in these demographics (Heylens et al., 2014).

Importantly, the largest group of participants identified by the LGMM reported near threshold depression that was maintained at subthreshold levels for 60 days. The prevention of depression is identified as a longstanding major global concern (Cuijpers et al., 2012) with psychological and social intervention identified as promising mechanisms of prevention (Cuijpers & Reynolds, 2022). Social prescribing is likewise a growing area of research for ameliorating and preventing depression episodes (Morse et al., 2022), though it is still in its infancy and suffers from lack of robust designs (Cooper et al., 2022). In person communities and services are often hard to access for some individuals, and a remote option that involves an area of strong interest for some, like video games, could offer an accessible and attractive option for accomplishing the aims of depression prevention.

This data represents a proof-of-concept evaluation of a novel intervention type and is therefore limited in several ways. First, many participants were lost to follow-up from 30 to 60 days. This limits the ability to fully evaluate longitudinal change. Our LGMM method attempts to estimate for and correct this missingness, but may still over- or under-estimate the effects of the intervention. Furthermore, future research should include direct measures of loneliness such as the UCLA Loneliness Scale (D. Russell et al., 1980; D. W. Russell, 1996). Similarly, our statistical findings were restricted to essential clinical metrics of change over time. Latent structure, clustering and linear models analyses may be warranted in future research with larger samples to better characterize

for whom this kind of supportive community is most beneficial. Randomized controlled and decomposition studies would further isolate the relative contribution of program features to promote further program development and efficacy. Finally, there are also opportunities to leverage platform usage data and other rich sources of passive data to understand engagement with the services and community and the impact of that engagement on outcomes that were prevented by privacy concerns related to the platforms being used and limitations on anonymization of platform data, but that could be corrected in future studies.

### **Conclusion**

Health-supporting communities utilizing video games to support individuals at both the social system level and the internal system level shows promise for improving functioning in a large segment of the population with elevated symptoms, as well as keeping individuals with low levels of symptoms from deteriorating. This program includes group sessions that utilize commercial video games as a core process of intervention, along with workshops known as “campaigns” that build emotional regulation and social skills, and specific events that further utilize commercial video games to encourage specific skill building. These results are promising, while acknowledging the inability to draw strong conclusions given the limitation of the data. Nevertheless, these results suggest the importance of further research. If ongoing research supports the effectiveness of an approach like this, the potential is great for providing cost effective, subclinical programs that would aid many individuals in their struggles with loneliness, depression, anxiety, and other mental health issues.

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## Supplementary Files



## Multimedia Appendixes

Table 1.

URL: <http://asset.jmir.pub/assets/708cf125bfc02fa155101eec010ab06a.docx>

Table 2.

URL: <http://asset.jmir.pub/assets/2a06fc0767f14bdb52ef963223c357b.docx>

Table 3.

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Graph 1.

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