



Association of Social Gaming with Well-Being (Escape COVID-19): A Sentiment Analysis

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ABSTRACT

BACKGROUND: During the 2020-2021 coronavirus disease 2019 (COVID-19) lockdown, social activities were limited by the government-recommended social distancing guidelines, leading to an abundance of mental health issues.

METHODS: We hypothesized that Twitter sentiment analysis may shed some light on *Animal Crossing: New Horizons* and its impact on mental health during the COVID-19 pandemic.

RESULTS: We found that social gaming and social media may be used as tools to cope with stress during the COVID-19 pandemic.

CONCLUSIONS: Further research, including randomized study designs and prospective measurements of mental health outcomes related to social gaming behavior are required.

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KEYWORDS: Sentiment analysis; Social gaming; Twitter; Well-Being

INTRODUCTION

During the 2020-2021 coronavirus disease 2019 (COVID-19) lockdown, social activities were limited by the government-recommended social distancing guidelines. The

combination of the pandemic itself and the associated lockdown has caused a tremendous strain on the mental health of the global population, leading to an increase in worldwide anxiety, depression, and post-traumatic stress

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disorder.^{1,2} In comparison to the 1918 influenza pandemic, with technological advancement, social gaming could become a virtual substitute for daily activities during the COVID-19 lockdown.^{3,4} Several studies have shown that video game-related social activity could positively influence prosocial behavior and aspects of social well-being.⁵⁻⁷

Animal Crossing: New Horizons, a life-simulation video game, enables players to build their own virtual world and community that allows for interaction between players around the world. A recent study investigated the relationship between video games, particularly *Animal Crossing: New Horizons* (2756 players) and its impact on mental health.⁸ Well-being was assessed by the validated Scale of Positive and Negative Experiences,⁹ while player satisfaction was assessed by the validated Player Experience and Need Satisfaction Scale.¹⁰ The study found a positive relationship between play time (in units of 10 hours) and increase in the well-being scale. In addition, in *Animal Crossing: New Horizons* both objective (95% confidence interval [CI] = 0.03-0.09) and subjective game time (95% confidence interval = 0.05-0.08) were associated with well-being. For example, 10 hours of game play was associated with a 0.06 standard deviation increase in well-being score. We hypothesized that Twitter sentiment analysis may shed some light on *Animal Crossing: New Horizons* and its impact on mental health during the COVID-19 pandemic.

METHOD AND RESULTS

Using Twitter's application programming interface, we queried and obtained all tweets and hashtags related to *Animal Crossing: New Horizons* using key words or phrases (eg, 'Animal Crossing', 'Animal Crossing New Horizons', 'New Horizons', 'game' and 'gaming' or 'video game'), as well as word combinations within tweets (eg, 'feel', 'I', 'we', 'my', 'us', 'our') between July 1, 2020 and August 1, 2020. Two investigators reviewed tweets samples obtained from the initial query and developed an initial framework (methodology to score tweets) to expand upon. Then, two other investigators reviewed the initial query to further characterize the initial framework. Disagreements were reconciled through discussion among investigators until a consensus was reached. Finally, a definitive coding framework was developed, and all tweets were reviewed. Each tweet was scored specifically to stated effects on depression, anxiety, relaxation, positive or negative experience with the game, or vague/unclear. Then, each tweet was scored whether indicating that the game increased or decreased these attributes. All analyses performed in this study relied on public, anonymized data and adhered to the terms and conditions, terms of use, and privacy policies of Twitter.

Tweets rely on publicly available data and are therefore registered as IRB exempt.

After excluding tweets due to retweeting and subject irrelevance, we analyzed and discovered 3 main findings. First, 16% of tweets suggested that *Animal Crossing: New Horizons* helped with anxiety, though 4.6% reported worsened anxiety due to game content-related stress. Second, 72% of tweets stated that playing *Animal Crossing: New Horizons* can assist with relaxation. Lastly, while the 2.2% self-reported that playing *Animal Crossing: New Horizons* helped with depression, some gamers reported that *Animal Crossing: New Horizons* caused their depression. (Table) The remainder of tweets fell into the vague/unclassified category. Overall, based on sentiment analysis, 80% of tweets reported

positivity related to their experiences with the game.

CLINICAL SIGNIFICANCE

- Social gaming may be used as a tool to cope with stress during the coronavirus disease 2019 (COVID-19) pandemic.
- Social gaming has the potential to improve well-being and mental health, especially during periods of social isolation.

DISCUSSION

To our knowledge, this is the first study using Twitter to identify tweets detailing the user experience on *Animal Crossing: New Horizons* during the COVID-19 pandemic. Scientific studies related to video games have been conducted for decades and have generally classified games as falling into two main categories: video games that improve well-being, cognitive functioning, and physical activities^{8,11} and those associated with aggression and negative traits.^{12,13} Social gaming has the potential to improve well-being and mental health, which may be especially relevant during periods of social isolation. We speculated that this could be perhaps due to the relaxing environment (eg, cheerful community, character customization, interactions with cute animals or other players) encountered within *Animal Crossing: New Horizons*. This may allow gamers to find a healthy escape from the realities of the COVID-19 pandemic. To the extent that such gaming is healthy, it will be important to ascertain the mechanism(s) for its salutary effect. For example, in so far as *Animal Crossing: New Horizons* allows players to create their own world, it can be seen as an example of active coping, a known factor in promoting resilience. But to the extent it reflects escapism, it opposes another evidence-based resilience factor, that of facing rather than avoiding fears.¹⁴

Although playing *Animal Crossing: New Horizons* may have a positive impact on mental health and well-being, we acknowledge that concerns have been raised that excessive play time could promote negative habits such as a sedentary lifestyle and possibly even addiction. Although the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* does not include any psychiatric conditions related to video games, it has recommended Internet Gaming Disorder as a topic for further research,¹⁵ though this is not without

Table Example of Tweets

Positive sentiments	Negative sentiments
I'm fishing on animal crossing to calm down	I almost cried because my sister did not want to play animal crossing with me
Come play, chill and chat. Please cheer me up. So blue today. Need animal crossing to feel like it's a safe space again.	It's OK. I totally get it. I just heard "Animal Crossing", and got excited. I do understand though. Hell, I won't let people I don't know on my island, because I'm afraid they'll steal my blue roses! The paranoia is real.
My daughter and I had this in blue and spent a lot of free time playing animal crossing! We had a lot of fun, building characters, community and their homes etc. overall this system is affordable and has tons of great games!	social anxiety is not logging into animal crossing or Duolingo for months on end because you missed a week and got worried about what the characters would say when you came back so you just didn't go back
"Gonna play some splatoon, im gonna be sad when I can't play it for a month :(Well at least I have animal crossing"	Nothing left to do might as well restart Animal Crossing (current island gives me anxiety) and draw in my sketchbook until I start my next education
Animal Crossing is literally my only Switch game that doesn't give me motion sickness, it's so sad	At this point I have too much social anxiety to deal with my Animal Crossing situation
We went out to pho for the first time since the pandemic started and I am so full and sleepy. We were the only ones there which was sad, but nice for me (noise overload). Now to play Animal Crossing	my social anxiety knows no bounds, I am so afraid to play animal crossing cuz i dont want my villagers to be mad at me
Sometimes i get sad when people forget my birthday but then i remember that my villagers in animal crossing never will and that makes me feel better	oh my god yeah animal crossing has the same issue. at least its events are seasonal but having your villagers leave/weeds grow/hypothetical profits drop because you missed a day is MUCH more anxiety than i would ever want from a video game Bro why I got anxiety playing animal crossing??
"Hello, I'm sad and in pain and want to quit my job and play animal crossing all day while eating ice cream.	sometimes I think about my abandoned animal crossing island and get anxiety
this is why we play animal crossing. no sad vibes	animal crossing is a great depression game Animal Crossing is depression simulator
I think I need to play Animal Crossing, I am feeling very sad. gonna go back to playing animal crossing when im sad to cope I am so sad I missed that month during the pandemic when everyone was playing animal crossing	
Got heated about war and capitalism today so now I am having a sit down with my old animal crossing island so I calm down	
i think our neighbor needs to play some Animal Crossing. He is mowing the lawn EVERY DAY [I assume to calm himself down and I am not making fun of anxiety here folks!]	

controversy. For example, one study suggested the *International Classification of Diseases (ICD-11)* proposal for Gaming Disorder should be removed, as formal diagnoses and categories remain premature at this time. The effect of gaming may differ based on age, gaming content, and length of time spent in game. The American Academy of Pediatrics recommends limiting screen time for children to two hours per day. While noting that some gaming can be prosocial, the American Academy of Pediatrics advises against exposure to games that promote violence.¹⁶ In June 2020, the US Food and Drug Administration (FDA) recently approved the use of a 'video game' for treatment of children with attention deficit hyperactivity disorder.¹⁷ Overall, video games have several phenotypes, which likely vary in their relation to mental health and should not be broadly characterized as having the same impact on mental health. Therefore, further studies using social gaming as a

surrogate virtual community and psychosocial intervention are needed.

Limitations

The observations of this study should be interpreted with caution given several limitations. First, the tweets that we analyzed are sentiment-based and self-reported, which could lead to recall bias as we did not measure behavior directly. Those who reported anxiety or depression on Twitter may not be depressed or anxious in real life, and it is also possible that individuals who are truly depressed or anxious in real life may not use or express these feelings through Twitter. Second, we are unable to compare participants' mental health both before and during the pandemic because this data was unavailable to us. Third, we cannot claim a causal effect of *Animal Crossing* on well-being. For

example, players who are happier at baseline may play *Animal Crossing: New Horizons* and use Twitter more than individuals suffering from depression, psychological stress, or anxiety. Finally, we could not identify whether there was a difference in tweets between professional and amateur gamers.

CONCLUSION

In conclusion, this study suggests that social gaming, like *Animal Crossing: New Horizons*, may be a useful tool to cope with stress during the COVID-19 pandemic. Further research, including randomized study designs and prospective measurements of mental health outcomes related to social gaming behavior are indicated, as are additional studies to determine the pathways through which social gaming impacts mental health and well-being.

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