Research Paper

Screen Media and Mental Health: The Effect of Different Types of Video Games

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Abstract
As technology advances, different types of screen medias are taking over our lives. This can bring a lot of benefits but also potentially jeopardize our mental health. In this study, we explore how different types of screen media, particularly different types of video games, can affect mental health. We expected video games that focuses on short-term gratification, which has a similar rewards system as social media, to be correlated to worse mental health as opposed to long-term gratification games. Although we didn't find the correlation we expected, we did find that games focusing on long-term gratification is positively correlated with life satisfaction in younger participants, but negatively correlated with life satisfaction in older people. These findings reveal interest and unconventional results and shows the importance of looking into the nuisances of age, more specific types of games, and other factors.

I.   Introduction

In recent years, technology has revolutionized our lives in unprecedented ways, affecting human life in every way imaginable. While new forms of technology have reformed how we communicate, find entertainment, share information, and so much more, it has also been shown to pose a risk to mental health (cite a couple of studies that you use in this paper that make this link). With the number of hours teenagers spend online doubling between 2006 and 2016 (Twenge et al., 2019), it has become especially important to find the correlation between mental health and the use of screen media.

While numerous studies have found a positive correlation between increasing screen time and prevalence of mental health problems (Babic et al., 2017; Herman et al., 2015), others have yielded inconclusive results (Tang et al., 2021; Wu et al., 2016). This could be because these studies only consider screen time as a whole, without distinguishing between the different types of screen media used. The use of different screen media, such as social media, gaming, or simply watching TV, could affect one's mental health in different ways. One study by Twenge and Farley (2020) found that social media and Internet use were more strongly correlated with mental health problems and depressive symptoms than other screen media such as watching TV. Thus, this study will focus on how different types of screen media, mainly social media and gaming, effect mental health. This study will also dive into the different types of games being played in hopes to find how different games may contribute to mental health.

Social Networking Sites (SNS), more commonly known as social media, refers to internet-based networks that allow its users to interact with others, both verbally and virtually, and receive feedback (Carr & Hayes, 2015; Keles et al., 2020). There are clear benefits to social media: it can allow individuals to express themselves and receive social acknowledgement and support. At the same time, many studies have found social media can have a negative impact on mental health. One major way social media can have a harmful effect is by peer pressure and comparison (Keles et al., 2020). According to the social comparison theory, people tend to compare themselves to others to assess their opinion and abilities (Festinger, 1954). Social media's effects are often delayed, which means that years-old posts can influence viewers' impressions on an individual. Therefore, it demands more carefully curated content in order to create a more ideal impression and character (Wiederhold, 2018). Comparing one's self to the carefully selective aspect on social media can easily lead to anxiety and envy, which could in turn can lead to depression (Appel et al, 2016). For example, social media use has been proved to be correlated to anxiety on weight and appearance (Slater, 2015). These findings are believed to be to result of

users frequently comparing their lives to the carefully curated lives of their real-life peers. These types of comparisons are more relatable and can intensify the pressure experienced when compared to the influence of actors and celebrities typically seen on television (Bandura & Walter, 1977).

Another way in which social media influences mental health is its addictiveness. Most social media sources are designed to enforce a feedback loop related to dopamine feedback signals, similar to that of other addictive activities, such as gambling (Burhan & Moradzadeh, 2020). When users are constantly checking their phones, anxious for the response to their post, they will periodically receive a positive stimuli. This Variable Reward Schedule, which works by providing positive stimuli at random intervals, allows social media to keep their users hooked in a feedback cycle (Burhan & Moradzadeh, 2020). However, the good feelings linked with the dopamine provided with the feedback cycle are only temporary and will die off, causing the user to look for more. Eventually, this could develop into addiction and dependency, which has been shown to add to the risk of anxiety, sleep disturbance, and depression (Primack et al, 2022).

Lastly, although not specific to social media, there are many secondary problems caused by social media that could pose a risk to one's mental health. Many studies have concluded that an individual's lifestyle is closely linked to their mental health status (Walsh, 2011). For example, anxieties from issues like body shaming could lead to unhealthy eating habits. Eating disorder symptoms are not only strongly correlated with serious over or underweight symptoms, but also predicts depression and other mental health issues (Herpertz-Dahlmann et al., 2015). In addition, the use of screen media, including social media, causes sedentary behaviors, defined as waking behaviors with low energy expenditure while in a sitting or reclining position (Asare, 2015). Given that people already spend a significant amount of time sitting, no matter in school or at work, extra sedentary behavior may cause people to not get their necessary level of physical activity (Department of Health and Social Care, 2016; Hallal et al., 2012). This has been shown to have not only negative physical health implications, but also harms one's mental health.

Video games has become a significant part of modern leisure activities and has risen concerns about its impact on mental health. Several studies have observed a positive correlation between video game use and mental health issues like anxiety and depression (Loton et al., 2016; Li et al., 2022). However, different types of video games may impact mental health differently. One distinction in video games is between multiplayer and single player games. Some studies have found mixed impact of multiplayer games on mental health (Raith et al., 2021; Scott & Porter-Armstrong, 2013), but there lacks conclusive results for single player games. Overall, no studies have come to a conclusive result on whether single or multiplayer games will have more of an impact on mental health. Additionally, one under-investigated area is different genres of games being played. One study classified the fundamental elements of all video games into Game Bricks (Djaouti et al., 2007). These elements include: "answer", "manage", "have luck", "shoot", "create", "block", "destroy", "position", "avoid", "move", "time", and "score" (Djaouti et al., 2007). Every game contains a combination of these fundamental elements, with some combination being more common than others. For example, all shooters games (First/ Third Person Shooter) contain the elements of "shoot" and "destroy", known as the MetaBrick "killer". Similarly, most racing games contain "move" and "avoid", know as the MetaBrick "driver", and most sandbox games contain "create" and "manage", known as "God" (Djaouti et al., 2007). Games with different core elements can affect players differently through different reward systems. Those that values immediate satisfaction may pertain more to short-term gratification, where others may focus more on long-term gratification. The short-term gratification system in games may be more harmful as it's about enforcing an addictive dopamine, similar to that of social media (Burhan & Moradzadeh, 2020). Action games with elements like "destroy" and "shoot" offers more instant gratification; player can get an immediate sense of pleasure from their actions. These types of games work by stimulating the limbic system, also known as the instant gratification seeker (Redlich et al., 2017; Hughes, 2020). The limbic system value immediate rewards or payoffs that are closer to the present time than those farther in the future. When video games give direct, satisfying rewards, the limbic system releases dopamine. However, similar to social media, these stimulations are temporary and will lead players to look for more. This cycle can eventually lead to video game addiction, which has been shown to be harmful for mental health. (Primack et al., 2022; Loton et al., 2016). Games with the element of luck also triggers the limbic system. Because the player doesn't know when the stimulation will come, dopamine comes in random intervals. Like with social media, this Variable Reward Schedule hooks the player with its reward cycle, which could easily develop into addiction (Burhan & Moradzadeh, 2020; Primack et al., 2022).

On the other hand, games with core elements such as "manage" and "create" applies the concept of delayed gratification, the act of resisting an impulse to take an immediately available reward in the hope of obtaining a more-valued reward in the future (Conti, 2019). These games often require dedication and patience in the beginning in order to achieve the ideal results. For example, in Minecraft, a sandbox survival game, players have to spend time gathering resources and planning in order to create an impressive build. The pleasure from delayed gratification lasts longer and is less likely to cause addiction in comparison to fast dopamine hits

(Söylemez, 2021). Research has shown that delayed gratification behaviors have also been shown to help with real life decision making (Mohsin & Ayub, 2014).

While video games can certainly have negative impact on mental health, it's also worth noting that some video games have been shown to be helpful for mental health (Kowal et al., 2021). For example, a 2021 study has shown the potential for commercial video games to combat symptoms of anxiety, depression, and stress during the pandemic (Vatansever et al., 2021). One of those games is MindLight: a 3D game that incorporates strategies like relaxation and mindfulness techniques, attention bias modification methods, and neurofeedback mechanics to make an immersive game world that allows children to learn to manage and overcome anxiety symptoms (Kowal et al., 2021). Video games can also evoke emotions of joy, excitement, and fulfillment, which is helpful in combating depression (Hemenover & Bowman, 2018). Their interactive and engaging nature also makes them useful for educational purposes (Mayer, 2019). Many programs, such as Kahoot! and Duolingo uses games to achieve better learning outcomes. Despite the positive effects of some video games, these only make up a small portion of commercial games being played. Overall, we predict that games that focus on delayed gratification rather than instant gratification will have a more positive impact on one's mental health.

II.   Method

Participants

We surveyed 299 participants 18 years old or above through an online questionnaire. For the purpose of data analysis, the participants were split into two groups based on age. 4% were between 18-24 years old , 36% of participants are between the range of 25 - 34 years old, 31% were between 35-44 years old, 15% were between 45-54, 10% were between 55-64 years old, and 3% of participants were older than 65. Of the 299 participants, 54% identify as man and 45% identified as woman. The majority of the sample, 78%, was white, and the rest of the participants are a mix. Around 10% were black or african ameriacn, 7% were asian or pacific islanders, and 3% were hispanic.

Measures
Specific screen media activities

The study closely followed the questioning used in the study by Twenge and Farley (2020), which asked participants four questions about their screen usage. The questions are as follows, "On a normal week day, how many hours do you spend" (1) "watching television programs or films? Please remember to include time spent watching programs or films on a computer or mobile device as well as on a TV, DVD etc." (2) "playing electronic games on a computer or games systems, such as Wii, Nintendo D-S, X-Box, PlayStation, or mobile device?" (3) "using the Internet? Remember to include time spent using the Internet on tablets, smartphones, and other mobile devices as well as computers and laptops. Please do not include time spent using the Internet at work or school", and (4) "on social networking or messaging sites or Apps on the Internet such as Facebook, Twitter, Instagram, and WhatsApp?". Response choices for all four items were "None", "Less than half an hour", "Half an hour to less than 1 hour", "1 hours to less than 2 hours", "2 hours to less than 3 hours", "3 hours to less than 5 hours" , "5 hours to less than 7 hours", and "7 hours or more". During data analysis, the "None" option gets a numeric value of 0, "Less than half an hour" gets 1, and so on, with "7 hours or more" getting 7.

Video game Genre and Types of Gratification.

The second part of the survey asked all participants who reported they played video games at least "less than half an hour" a day to record the percentage of time they spend on each genre of video game, from 0 to 100. Video games are sorted by most of the mainstream genres, with some similar genres being combined to simplify the survey. The genres that are listed in the survey are: Action/Shooter/MOBA/Platformer, Adventure, Role-playing/Visual Novel, Strategy, Simulation, Sport and Racing, Puzzle, Sandbox/Survival, and Music/Rhythm games. All genres are classified as either mainly involving short-term gratification (Action/ Shooter/MOBA/Platformer, Sports/Racing, Music/Rhythm), long-term gratification (Adventure, Role-playing/ Visual Novel, Strategy, Simulation), or a relatively equal mix of both (Puzzle, Sandbox/ Survival). Games that are mainly short-term gratification were scored a numeric value of 1. Those that are long- term gratifications were scored a 3. And those that fall in the middle got scored a 2. A final score will be created for each participant by multiplying the points for each genre by the percentage of time playing that type of game and summing together all genres. The scale used for scoring was set before data was collected and pre-registered (https://osf.io/3e92h/). A table with the exact game type descriptions can be found in the appendix.

Mental health and well‑being

This section included three self-reported mental health and well- being indicators: (1) Depressive symptoms: the short version of the Mood and Feelings Questionnaire (MFQ). The 13 items were summed to create a total score, with a score of 12 or over indicating clinically relevant depressive symptoms (Thabrew et. al., 2018).

(2) Self-esteem (SE): five questions based on the Rosenberg Self-Esteem Scale (Rosenberg, 1989). The items were coded so that higher scores corresponded to higher self-esteem. (3) Life satisfaction (LS): six questions about satisfaction with school/work, appearance, family, friends, school, and life as a whole, based on scales measuring general satisfaction with life (Diener et al., 1985). These scales were the same used in the study by Twenge and Farley (2020) with the exception that we used the adult version of the Mood and Feeling Questionnaire.

III.   Results

Participants reported spending the most amount of time on the internet. Participants reported an average of around 5 hours on the internet. 86 people, or around 29 percent, reported spending 7 hours or more on the internet. Participants spent around the same amount of time on social media, video games, and TV. 25% of participants reported 1-2 hours of social media use. 15 % of participants spend 2-3 hours and 22% spend ½ -1 hour on social media. Similarly, the most amount of people, 28% reported spending 1-2 hours of video games. 21% of participants spend 2-3 hours and 15% spend ½ -1 hour on games. On average, participants spend slightly more time on TV. 28% spend 1-2 hours, 26% spend 2-3 hours, and 19% spend 3-5 hours on TV per day.

There is not a definitive overall conclusion that can be drawn about the correlation between time spent on screen media and mental health, as it varies based on the type of media we are looking at. Across the whole sample, time spent on TV didn't have a significant correlation with any of the three criteria measured (MFQ: $r = .03$; SE: $r = .07$; LS: $r = .05$; ps > .10). Use of the internet has a significant negative correlation with depression ($r = -0.2$, $p < .001$) and life satisfaction ($r = -0.19$, $p < .001$). However, there is a trend towards a positive relationship between internet use and self-esteem ($r = .11$, $p = .06$). Although social media use is not correlated with self-esteem, it is positively correlated with depression ($r = .18$, $p = .002$). While many studies on social media and mental health have found a negative correlation between social media and life satisfaction, including the study by Twenge and Farley (2020), we found a positive correlation between social media use and life satisfaction ($r = .24$, $p < .001$). Video game usage is positively correlated with depression ($r = .12$, $p =.04$) while there is a positive trend with life satisfaction ($r = .11$, $p = .06$). There is no significant correlation between video game and self-esteem ($r = -.05$, $p > .10$).

Table 1. Correlation between screen media, mental health, and game score.

	TV	Game	Internet	SM	MFQ	SE	LS	GS
TV	-	.34***	.31***	.40***	.03	.07	.05	-.13*
Game		-	.18**	.38***	.12*	-.05	.11	-.06
Internet			-	.20***	-.22***	.11	-.19***	-.01
SM				-	.18**	.06	.24***	-.19**
MFQ					-	-.69***	-.11	-.02
SE						-	.48***	-.07
LS							-	-.07
GS								-

Note: SM represents social media, SE represents self-esteem, and LS represents life satisfaction. MFQ is a mood and feeling questionnaire that measures depression. GS is Game Score, which indicate the type of gratification in video games, with higher score meaning more long-term gratification.

We hypothesized that higher game score (more long-term gratification) would be negatively correlated with depression and positively correlated with self-esteem and life satisfaction. However, that is not the case when looking at the entire sample. The game score is not significantly correlated with any of the three criteria measured (MFQ: $r = -0.02$; SE: $r = -0.07$; LS: $r = -0.07$; ps > .10). We further ran a regression model to look for an interaction between time spent playing video games and game score on any mental health measures and did not find any significant effects (ps > .10). However, the patterns of correlation differ when considering the age factor. In younger participants (under 35), there is a positive correlation between game score and life satisfaction ($r = .18$, $p = .004$). This pattern is flipped when looking at participants over 35 ($r = -0.21$, $p = .004$). The correlation between game score and life satisfaction seems to be flipped as age increases. To test this, we ran a linear regression model predicting life satisfaction using game score and age (measured as a continuous variable with a higher value for each age group) and found a significant interaction between game score and age ($b = 2.00$, p= .04). Game score is also negatively correlated with self-esteem in older population ($r = -0.17$, $p = .02$), but no correlation was found in the younger participants ($r=0.11$, $p > .05$). We tested this in a similar manner to life satisfaction and did not find a significant interaction ($p > .10$).

Table 2. Correlation between Game score and mental health, by age.

	MFQ	SE	LS
Under 35	-0.1	0.11	.19*
35 & Over	0.07	-.17*	-.22**

Note: MFQ is a mood and feeling questionnaire that measures depression. SE represents self-esteem, and LS represents life satisfaction. Game Score indicate the type of gratification in video games, with higher score meaning more long-term gratification.

IV.   Conclusion

The goal of this study is to find the impact of using different screen media, especially video games, on mental health. Different screen media uses had significantly different effect on one's mental health. Like similar studies, video game and social media usage raises the level of depression symptoms. However, social media actually boosted one's life satisfaction across all age groups. This was not expected and also the opposite of what other studies have found (Twenge & Farley, 2020; Hawi & Samaha, 2017). This could be because for those not addicted to social media, it provides virtual communities that allows the individual to feel connections with others. The feedback loop from social media could also provide a sense of validation if the user is not addicted to the loop. Another reason could be because participants are all over 18 years old, mostly between 25-44, as opposed to the teenage population of other studies. This age group could potentially be better adjusted to deal with some of the negative aspects of social media and able to reap the benefits of greater connectivity. It would be interesting for future studies to look into whether social media has different effects to mental health in different age groups.

We also found that internet usage is beneficial to depression symptoms, contrary to other studies that found internet usage predicting more depressive symptoms (Selfhout et. al., 2009). However, this result could make sense because internet could provide ample content to help relieve boredom and stress. The 2009 study (Selfhout et. al.) has similarly showed that internet usage helps with depression for those who perceived low friendship quality. Internet use could also offer access to information about mental health and platforms that helps with alleviating depression. While internet is helpful for depression, our data also showed that more internet usage is associated with lower life-satisfaction, which is consistent with the study done by Twenge and Farley (2020).

We hypothesized that games with lower game score (more short-term gratification games) would harm one's mental health compared to games with higher game score (more long-term gratification). This was not the case as game score is not correlated with any of the three mental health measurements (Depression, self-esteem, and life satisfaction). When taking into consideration age, game score does have an impact. In younger participants, more time spend on long-term gratification games helps with life satisfaction. However, this correlation is flipped in older participants; long-term gratification games actual harm older participants' life satisfaction. The different impact of game score on life satisfaction in younger versus older participants could be due to their varying cognitive flexibility and mindset. Younger individuals might be more adaptive to the complicated gameplays in many of the longer games. They might also possess more growth mindset than older people that allows them to enjoy finally accomplishing something. On the other hand, older individuals might not have the mental energy to sit through long-term gameplays, whereas they are able to focus much better on short, immediate gameplays. The quick stimulation in short term gratification games also have the potential to reduce stress and keep the mind active in older people, causing it to be more beneficial. It would be interesting to look into how these two reward systems, short and long term, effect people of different age groups differently.

The main limitation of this study is that it's a correlational study, which means that it doesn't show any cause and effect relationships. We can't determine if screen media use causes poor mental health, or if poor mental health causes screen media use, or if any confounding variables are at play. For example, we don't know whether internet usage caused the user to be more depressive, or if the user's depression caused them to use the internet more. This limitation could be resolved with longitudinal studies, however, that is beyond the reach of this particular study.

Another possible flaw is in the participants population. Because a main focus of this study is how different types of video games affect mental health, the survey was advertised as a survey about video games on Amazon. This could have caused people who doesn't play games to not take the survey, resulting in biased data. In our sample, there are only 20 people that reported they do not play video games, which might have been higher if the survey was not advertised as focusing on video game usage.

Lastly, how the game types and their corresponding types of gratification might not be entirely accurate. Many games contain complicated gameplay, and it would be hard to categorize them into a single genre. At the same time, games in the same genre may have slightly different game play that leans towards different types of gratification. By counting all but two general genre of games as either long-term or short-term, we may be missing the nuances in the game play of specific games.

Overall, this study delved into the complex relationship between varies screen media use, particularly video games, and mental health. Aligning with previous studies, we found the risks tied to video game and social media engagement in relation to depression, as well as internet's harm on life-satisfaction. However, we also unexpectedly found that social media use is beneficial to life satisfaction and that internet use was linked to lower levels of depression, which shows the intricate phycological effect of screen medias and the importance of more in depth research. While video game type didn't yield significant correlation to mental health across the entire age group, it does have contrasting effects on life satisfaction in older versus younger participants. This highlights the need for more studies in order to understand how specific genres of video games can affect the mental well-being of different age groups.

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Appendix

Table 3. Game types and their descriptions

Genre(s)	Description	Examples	Gratification Type
Action/ Shooter/ MOBA/Platformer	Games that offer gameplay with intense battles, strategic decision-making, and team coordination, combining fast-paced action and competitive combat scenarios.	Call of Duty, Grand Theft Auto, Assassin's Creed, League of Legend	Short-Term
Sports/Racing	Games that simulate various sports activities, allowing players to compete individually or in teams.	FIFA, NBA 2K, Forza	Short-Term
Music/Rhythm	Games that focus on rhythm-based gameplay, requiring players to synchronize their actions with music.	Guitar Hero, Dance Dance Revolution, Rock Band	Short-Term
Adventure	Games that focus on exploration, puzzle-solving, and narrative-driven experiences.	The Legend of Zelda, Uncharted, Tomb Raider	Long-Term
Strategy	Games that require strategic thinking, planning, and decision-making to achieve objectives.	Civilization, StarCraft, Age of Empire	Long-Term
Simulation	Games that simulate real-world activities or situations, such as driving, flying, or managing cities.	The Sims, SimCity, Euro Truck Simulator	Long-Term
Role-playing/ Visual Novel	Games that provide immersive storytelling experiences where players assume the roles of characters in a narrative-driven world. Players often engage in quests to level up or to push the narrative forward	Final Fantasy, The Elder Scrolls V: Skyrim, Phoenix Wright: Ace Attorney	Long-Term
Puzzle	Games that challenge players with puzzles or logic-based problems to solve.	Tetris, Portal, Sudoku	Mixed
Sandbox/ survival	Open-ended games that provide players with freedom to explore and interact with the open world to survive and achieve their own goals.	Minecraft, Terraria, No Man's Sky	Mixed