



When and How Video Games Can Be Good: A Review of the Positive Effects of Video Games on Well-Being

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Abstract

Video games are a source of entertainment to a wide population and have varied effects on well-being. The purpose of this paper is to comprehensively examine gameplay research to identify the factors that contribute to these disparate well-being outcomes and to highlight the potential positive effects. Based on existing literature, we argue that effects of gaming on well-being are moderated by other variables, such as motivations for gaming and video game characteristics. Specifically, the inclusion of social activity can benefit prosocial behaviors and impact the relationship between violent video games and aggression that some studies demonstrate. Moreover, the research on relationship between violent video games and aggression depends greatly on individual and socio-contextual variables outside of gameplay. The inclusion of physical activity in games can provide an improvement in physical health with high levels of enjoyment, potentially increasing adherence rates. Overall, our review has determined that the effects of gaming on well-being are moderated by and depend on the motivation for gaming, outside variables, and the presence of violence, social interaction, and physical activity. Thus, we argue that there is potential for an ‘optimal gaming profile’ that can be used in the future for both academic and industry related research.

Keywords: *Video games, well-being, aggression, health*

The video game industry has grown exponentially since the initial development of *Tennis for Two* in 1958 (Nyitray, 2011). As evidence of this continual growth, the total consumer spend has increased from 5.6 billion US dollars in 2000 to 30.4 billion in 2016, with 95% of homes with children aged under 18 owning some form of video game platform (Brand, 2012; Entertainment Software Association, 2017). Moreover, the number of types and platforms of video games have increased dramatically (Entertainment Software Association, 2017), enabling video games to reach a much wider population than might be assumed. Along these lines, although there has been much interest in the gaming habits of adolescent boys (e.g. Bijvank, Konijn, & Bushman, 2012; Konijn, Nije Bijvank, & Bushman, 2007; Mazurek & Engelhardt, 2013) and the notion that this population are the most affected by gaming is prevalent, the average age of a gamer is actually 35 years, with 41% of the gaming population being women (Entertainment Software Association, 2017). Given the diverse population implicated and the continual rise in gameplay numbers, as well as increasing consumer spend, researchers have become extremely interested in the overall impact of gaming on people's behavior and their sense of well-being (e.g. Granic, Lobel, & Engels, 2014; Greitemeyer & Mügge, 2014; Jones, Scholes, Johnson, Katsikitis, & Carras, 2014).

Research has been concerned mostly with negative influences, particularly the impact of violent video games (in which violent activity is represented) on aggression (see meta-analysis by Prescott, Sargent, & Hull, 2018). Another question that has been examined is whether excessive gaming can be thought of as an addiction, with consequential effects on aspects of well-being, such as depression and anxiety (e.g. Mentzoni et al., 2011; Schou Andreassen et al., 2016). There is, however, much debate on whether 'gaming addiction' should be included as a disorder at all due to lack of empirical support (Aarseth et al., 2017). Further, there are critiques that video games are being singled out as an addiction rather than

being classified under behavioral addictions that include excessive food, shopping, or exercise ("An Official Division 46 Statement on the WHO Proposal to Include Gaming Related Disorders in ICD-11," 2018). In spite of this research around negative effects, including this much debated presence of a gaming addiction disorder, there is a growing body of research that demonstrates video games can also have positive impacts. Those who engage in moderate gameplay have been shown to have lower psychological symptoms than individuals who play video games excessively or not at all (Durkin & Barber, 2002; Jones et al., 2014). Additionally, the motivations behind gameplay are an important factor in the effects of gaming on well-being such as playing for enjoyment purposes rather than playing for achievement or obsession (Carras et al., 2017; Lafrenière, Vallerand, Donahue, & Lavigne, 2009). As video games thus far have been mostly perceived as negative, it is important to shed light on the positive impacts video games can have on well-being, furthering our knowledge and demonstrating that video games are not solely 'good' or 'bad.'

Although previous reviews have examined particular types of video games on specific definitions of well-being, their focus has been more narrowly focused than the current review. For instance, Granic et al. (2014) demonstrated the positive effects of video games on four particular types of well-being: cognitive, motivational, emotional, and social; Greitemeyer and Mügge (2014) examined social outcomes only; Jones et al. (2014) looked at flourishing mental health; and Pallavicini, Ferrari, and Mantovani (2018) analyzed the effects of games used as training tools, all reviews on specific types of video games or well-being. The purpose of this paper, therefore, is to present research findings that move away from the largely negative profile video games have had in the past and instead present evidence of the positive impacts of video games while including several types of video games and various definitions of well-being. We thus aim to demonstrate the 'optimal gameplay profile' where games benefit health.

Scopes and definitions

There are many ways to define and measure health and well-being (Dodge, Daly, Huyton, & Sanders, 2012), and here we have chosen to employ the following definition: “health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, n.d.). Expanding upon this definition, we consider high levels of well-being to include few psychological symptoms, positive social relationships (particularly in relation to prosocial behavior), and good physical health. In addition, given this broad definition and the focus in previous literature on violence and aggression, high well-being should also be associated with low levels of aggression (Hamama & Arazi, 2012). Consistent with this approach, here we will highlight three specific aspects of gameplay as they have been identified in the psychological literature as potentially having beneficial effects on well-being. These include: (i) games that include social aspects, such as Massively Multiplayer Online Role-playing Games (MMORPGs), (ii) video games in which there are violent scenarios (violent video games or VVGs), and (iii) games that include physical activities or exercise (exergames). These three facets of video games should theoretically impact well-being, and we therefore synthesize relevant research to argue that certain specific aspects of video gaming can be systematically associated with positive outcomes, rather than findings being uniformly negative. Using a narrative review format, we present and analyze the various nuanced and positive effects of video games on well-being, ultimately arguing that there is a potential ‘optimal gaming profile’ for well-being. As the purpose of this review is to demonstrate when and how video games have positive impacts on well-being, the selection process of the literature was quite specific and therefore included only a small amount of literature on the negative impacts. Directions are given in which future research should be conducted in a more systematic manner that addresses both sides of the argument equally.

We use the term ‘video game’ here to refer to an electronic or digital game that can be played across a wide variety of platforms, including personal computers (PCs); handheld devices such as mobile phones, tablets, or the Nintendo™ 3DS; as well as game consoles like an XBOX™ that are used with a television (Jones et al., 2014). Video games across these platforms and genres can include varied aspects of the different game types identified above, including social, physical, and/or violent components. For example, VVGs are difficult to be specifically defined as they do not represent a dichotomous category as some research suggests and can contain other aspects such as social activity in which gamers play in cooperation or competition with other players. We therefore aim to explore the interactions between the social, physical, and violent components of games in order to accurately understand their relation to well-being. As such, this paper will first explore the positive effects of social activity in video games as this has been previously demonstrated to benefit well-being, in particular social well-being (Trepte, Reinecke, & Juechems, 2012). Next, VVGs will be discussed, both in terms of playing alone and playing socially, as VVGs with a social aspect have shown to have a positive effect (Velez, Mahood, Ewoldsen, & Moyer-Guse, 2014). This could perhaps allow researchers to move away from the general term of VVGs and refer to them more specifically including their additional elements, such as social or cooperative VVGs. Finally, we will consider video games with physical activity, which have shown to positively affect factors of well-being, particularly aspects of physical health (Howe, Barr, Winner, Kimble, & White, 2015; Martoncik & Loksa, 2016).

Findings

Social activity

Social gaming involves playing a video game with others, and these game types can be categorized as either cooperative or competitive. In cooperative games, two or more

players engage in a video game on the same team with the same or similar goals, whereas in competitive games, two or more gamers play against each other in a competitive manner (Entertainment Software Association, 2017). The social activity can involve interacting with characters controlled by a real person or a non-player character (NPC), which is a programmed virtual character in the game. Video games that include these social components have shown to have positive benefits on psychological aspects of well-being (e.g. Herodotou, Kambouri, & Winters, 2014; Jin & Li, 2017), though cooperative games more so, as they encourage a higher level of positive interaction that leads to higher levels of enjoyment and lower levels of aggression than competitive games (Ewoldsen et al., 2012; Schmierbach, Xu, Oeldorf-Hirsch, & Dardis, 2012). This is only the case, however, if cooperative games are played in moderation and when the motivation is socially driven, rather than for obsession, escapism, or a desire for achievement (Carras et al., 2017; Hagström & Kaldo, 2014; Lafrenière et al., 2009). For instance, an online survey study indicated that individuals who play MMORPGs, both for moderate periods of time and for social purposes, had significantly lower levels of psychological symptoms including depression, stress, and anxiety, than those who played for excessive periods of time or who played for achievement purposes (Longman, Connor, & Obst, 2009). These negative psychological symptoms were further reduced if the player had both strong online and offline social support. This demonstrates that not only is the inclusion of social activity beneficial to well-being, but these effects greatly depend on the motivation for gameplay.

While video games with social activity can be beneficial to psychological well-being, they can also positively affect prosocial behavior, which we have defined here as a proxy for social well-being. For example, a study involving school children concluded that prosocial video games were significantly related to the ability to cooperate, share, and maintain positive relationships with each other outside of the game (Harrington & O'Connell, 2016).

These online social games might thus be a possible alternative social outlet serving a similar function to in-person contact for players. This is potentially positive, as this video game social interaction might promote enjoyable social contact for those with remote locations, psychological difficulties, or other factors that can inhibit in-person interaction (Odrowska & Massar, 2014). Moreover, this is further supported by a study which indicated that individuals high in attachment avoidance can gain secure attachment functions from participating in social online video game interaction as they can use these social video games to seek social interaction that suits their particular attachment needs (Kowert & Oldmeadow, 2015). The prosocial aspects in MMORPGs have also been demonstrated to encourage cooperation, communication, and friendship; all aspects of prosocial behavior (Martoncik & Loksa, 2016). Other research, on the other hand, concludes that involvement in MMORPGs does not lead to any effects on perceived social support (Domahidi, Breuer, Kowert, Festl, & Quandt, 2018; Dupuis & Ramsey, 2011). However, aside from the studies examining cooperative behavior (Ewoldsen et al., 2012; Harrington & O'Connell, 2016; Schmierbach et al., 2012), the majority of the research utilizes survey study methods; therefore, further experimental research is required in order to demonstrate causal effects that support these correlational findings as well as to understand the inconsistencies in the literature. .

Violent video games

Violent video games are among the most researched, particularly in relation to their impact on aggression. In this literature, there are many controversies, even between meta-analyses, whether VVGs impact aggression. Some meta-analyses conclude that VVGs may negatively impact aggression (Anderson et al., 2010; Greitemeyer & Mugge, 2014; Prescott et al., 2018) whereas others have not come to such a definitive conclusion (Ferguson, 2015; Furuya-Kanamori & Doi, 2016; Sherry, 2007). There are also continuing concerns about publication bias, particularly in experimental studies (Hilgard et al., 2017). Further, the

American Psychological Association has concluded that video games influence aggression, but not violence (Calvert et al., 2017), although this report has itself come under critical scrutiny by outside scholars (Elson et al., 2019). Prescott et al., (2018) and Anderson et al., (2010) do find correlations between self-reports of aggressive behavior and VVGs over time, although the magnitude of such correlations are very small. As such, additional research needs to be conducted, ideally with preregistered hypotheses, in order to fully explicate the relationship between VVGs and aggression. Conducting such research with preregistered hypotheses can help to ensure high-quality research and potentially limit the inconsistencies that have been demonstrated in the literature.

We argue that the full picture of the relationship between VVGs and aggression may be mixed, as confounding variables may have impacted some of these effects. For instance, a 3-year longitudinal study demonstrated that video game violence did not increase aggression over time; rather it was other factors including levels of depression, exposure to family violence, antisocial personality traits, and peer influences that emerged as influencing aggression levels (Ferguson, Miguel, Garza, & Jerabeck, 2012). Thus, it seems that family and social variables and the motivation behind the violence are more significantly related to an increase in aggression than the violence itself (Ferguson et al., 2015; Gao, Weng, Zhou, & Yu, 2017; Sauer, Drummond, & Nova, 2015). Indeed, even the gamer's level of skill plays an important role in how these games affect aggression, such that the higher the levels of gaming skill, the lower the levels of aggression which are evident (Matthews, 2015). The interpretation of the violence in the game itself also plays an important role in the relationship between VVGs and aggression (Shibuya, Sakamoto, Ihori, & Yukawa, 2008). Together, this research suggests that it may not be the violence present in video games per se that influences aggression, but rather the other factors of gameplay, as well as individual and socio-contextual variables that are not related to video games.

VVGs can also be played with a social aspect, and this alters the effect that the game has on well-being. For example, when playing alone, prosocial behavior is relatively similar across participants who play ultra-violent, violent, and non-violent video games (Tear & Nielsen, 2014). Some studies indicate that VVGs themselves have shown to have little to no relationship to prosocial behavior (Ferguson, 2015; Tear & Nielsen, 2013), while others demonstrate that VVGs is associated with lower prosocial behavior (Anderson & Bushman, 2001; Coyne, Warburton, Essig, & Stockdale, 2018). However, research has demonstrated that adding a prosocial aspect to the game, such as protecting another character – either one controlled by another player or an NPC – can increase prosocial and helping behavior (Gitter, Ewell, Guadagno, Stillman, & Baumeister, 2013; Velez, Greitemeyer, Whitaker, Ewoldsen, & Bushman, 2016; Velez et al., 2014). The participants in these studies showed less aggression towards other participants and more prosocial thoughts than those who played VVGs with no prosocial aspect. Additionally, players of both violent and non-violent video games had increased prosocial behaviors with the inclusion of cooperative gameplay when compared to solo gaming, (Jin & Li, 2017) alluding to potential benefits of adding prosocial aspects to any genre of video game.

Exergames

Just as social interaction in video games has positive effects on well-being, physical interaction can be beneficial as well. There is a growing body of research demonstrating the impact of video games that require the player to interact physically with the game in order to control an on-screen character, commonly referred to as exergames. Exergames are most often played on consoles that have a physical sensor to detect movement, such as the Wii™ or XBOX Kinect™ using games such as Wii Fit™ and Just Dance. Given that exergames encourage the user to engage in physical activity, it is unsurprising that research in this area often focuses on their impact on physical health outcomes, such as levels of balance and

cardiovascular health. For example, studies show that engaging in an exergame regime significantly improves balance, flexibility, braking force, lower limb muscle strength, maximal oxygen levels, and heart rate, (Maillot, Perrot, Hartley, & Do, 2014; Nitz, Kuys, Isles, & Fu, 2010; Roopchand-Martin, Nelson, Gordon, & Sing, 2015) although a combination of exergames and traditional exercise has been shown to have the highest benefits on physical well-being (Guimarães, Barbosa, & Meneghini, 2018; Toulotte, Toursel, & Olivier, 2012).

Following on this, additional experimental studies indicate that, when comparing an exergame to traditional exercise, exergames lead to significantly higher levels of enjoyment (Monedero, Lyons, & Gorman, 2015; Strand, Francis, Margrett, Franke, & Peterson, 2014). The novelty of ever-changing video game elements as well as the increased formalized difficulty with continued play, particularly in mobile exergames, are also potential motivations, which may lead to high adherence rates (Morford, Witts, Killingsworth, & Alavosius, 2014). Indeed, patients with multiple sclerosis were more likely to adhere to the exergame based intervention after 6-months (75%) when compared to the conventional exercise (20%) (Kramer, Dettmers, & Gruber, 2014). As demonstrated by these studies, exergames can provide an alternative to traditional exercise methods, particularly due to the unique motivations of new content and increasing difficulty they provide. (Bieryla & Dold, 2013; Lee, Biggan, Taylor, & Ray, 2014). Given that 40 to 65% of participants drop out of a physical activity program within the first 3-6 months, (Dishman & Buckworth, 1996) providing a more enjoyable alternative exercise routine with continuously changing aspects could potentially decrease this dropout rate and encourage individuals to exercise more. There is a need for further longitudinal research, however, examining adherence specifically in order to better determine if exergames indeed have higher maintenance levels than traditional exercise.

Exergames can also help to lessen psychological symptoms, such as depression, indicating that the positive health benefits of exergames may be wider reaching than just physical health (Li, Theng, & Foo, 2016). Additionally, although Keogh, Power, Wooller, Lucas, and Whatman (2014) determined that playing an exergame did not significantly improve one particular health measure (i.e. balance), psychological quality of life scores improved. Conversely, a study by Douris, McDonald, Vespi, Kelley, and Herman (2012) suggested that using an active video game can actually decrease psychological well-being when compared to brisk walking on a standard treadmill. The reason for this contrary result is unclear. However, it could be due to the participants' significantly higher maximum heart rate and therefore greater perceived physiological demands of the exergame. This finding is suggestive of a curvilinear relation between exercise and well-being, with the most positive effects seen when the physical demands are the same or similar to traditional exercise. Certainly, further research on the effects of exergames on psychological as well as physical health is required.

Discussion

The purpose of this paper was to review and synthesize existing research on the positive impacts of video gaming on well-being, allowing us to identify the 'optimal gaming' profile whereby video games can lead to positive well-being. Here, we show these effects are nuanced and moderated by personal as well as video game factors. First, in our consideration of the social aspects to video games, we argue and demonstrate that this social activity positively influences prosocial behavior and aspects of social well-being in all types of video games (Gitter et al., 2013; Kowert & Oldmeadow, 2015; Martoncik & Loksa, 2016). Our next area of interest concerned how individual differences and social contextual factors are more influential on levels of aggression than the degree of violence present in a video game (Ferguson et al., 2012). Lastly, we examined exergames and their effects on physical health,

demonstrating that exergames can be as effective as traditional exercise (Maillot et al., 2014; Roopchand-Martin et al., 2015) and indeed, more enjoyable with additional motivations unique to exergames (Monedero et al., 2015; Morford et al., 2014; Strand et al., 2014). It is for these reasons that we argue for the positive effects of video games on well-being, particularly when they are played in the ways discussed below.

Our overarching argument, supported by the review provided here, is that social activity generated by video games is healthy, unless it is overshadowed by a more competitive achievement-focused orientation, or played in excess (Carras et al., 2017; Longman et al., 2009). In other words, the person's own motivation will mitigate any positive outcomes. However, along similar lines, social activity in VVGs can aid in increasing prosocial and helping behavior while also decreasing aggression (Gitter et al., 2013; Tear & Nielsen, 2013; Velez et al., 2016). Thus, we argue that video games themselves should not be considered as either 'good' or 'bad;' rather, the effect on well-being is dependent on the aspects present, motivation behind gameplay, and gaming in moderation. There is the possibility, however, that these positive effects are due to outside factors such as having the money or time to play games for entertainment purposes, particularly in correlational research. Clinical researchers interested in designing games for health should therefore consider developing games that encourage playing in moderation and social, rather than competitive, motivation in all types of video games. Additionally, the continuous inclusion of new elements and increasing difficulty in exergames can help boost adherence rates and benefit both physical and psychological well-being. Encouraging these factors is important in the development of both serious games designed for health as well as video games designed for entertainment purposes. Our findings are unique in that we have demonstrated that there is an optimal game playing profile in which positive effects are possible and that this profile should be taken into consideration when developing new games.

Although we have demonstrated unique and important findings in the field of video game research, this is not without limitations. For instance, the required use of a narrative review means we did not utilize a systematic approach and therefore did not analyze effect sizes. Thus, whilst we have described the positive effects of video games, we cannot say whether these effects are clinically significant based on their size. Additionally, as we did not focus here on the negative effects, it is possible we have missed crucial research in this area that would also explain how video games affect well-being. Therefore, a further review should be conducted with a more systematic approach that considers both positive and negative aspects of video games. Even so, the current paper is able to synthesize this area of research, highlighting in what ways these various aspects of video games can be linked to positive well-being outcomes. In doing so, our narrative review has allowed us to determine in which specific ways each of these aspects of video gameplay influence a broad range of well-being outcomes, and also point to useful future directions for this research field.

Conclusion

Studies have demonstrated the positive impact of many different aspects of video games on various aspects of well-being. However, previously there was no overview of this field that considered, in detail, precisely how the most commonly studied facets of gaming positively relate to well-being. This is the first narrative review to focus on theoretically important facets of video games (social aspects, violence, and physical activity), and how these have been empirically linked to well-being to beneficial effect. Importantly, we have argued and provided evidence for the proposition that video game effects on well-being greatly depend on the presence of moderation, the aspects involved, such as social aspects, violence, or physical activity, and the motivations behind playing the game. By examining these facets individually, we have been able to demonstrate that not only do video games have positive effects, but they also each have their own unique effects that cannot be

examined as a singular phenomenon and, as such, should be studied as multi-faceted phenomena.

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