The Link Between Playing Video Games and Positive Youth Outcomes

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ABSTRACT—*Playing video games continues to be popular among youth. Although many studies have examined the impact of video games on negative outcomes, such as aggression and addiction, fewer studies have investigated potential positive outcomes. However, recent studies are addressing this imbalance. In this article, we review some of this research, specifically studies indicating a link between playing video games and enhanced well-being, problem-solving skills, intergroup relations, and physical activity. In addition, we discuss how self-determination theory may provide an underlying theoretical framework linking these domains of positive effects. We also address implications for ongoing research that furthers our knowledge of how video games affect youth development, including longitudinal studies that examine video game play and adjustment from childhood to young adulthood.*

KEYWORDS—*video game play; positive youth development*

Video games continue to be very popular among youth, with 97% of U.S. boys and girls playing these games (1), and many youth, especially boys, playing them daily (2, 3). Over the past few decades, the pervasiveness of video games not only has sparked concern regarding their potential negative effects on youth (e.g., see 4, 5 for meta-analyses and discussions), but also has led researchers to inquire about potential positive outcomes (6–8).

In an earlier review, we identified an imbalance in the psychological literature on video games designed for entertainment purposes (not including serious games designed for purposes other than entertainment, such as those for education): Research on entertainment video games has focused primarily on negative outcomes (e.g., aggression, addiction) at the expense of positive outcomes (6). We encouraged researchers to take a more balanced approach to studying this topic and proposed ideas for studies on potential positive youth outcomes. Recently, researchers have examined several of these and other ideas.

In this article, we review some of this research. We start by highlighting how a focus on a prominent theory of human motivation, self-determination theory (SDT), can offer a conceptual framework for why playing video games might lead to positive outcomes in different domains. We also discuss how associations between playing video games and positive outcomes might differ among age groups (children, adolescents, young adults)—although researchers tend to study only adolescents or young adults, and attention to developmental differences in the impact of playing video games is rare.

PLAYING VIDEO GAMES AND POSITIVE YOUTH OUTCOMES FROM THE LENS OF SELF-DETERMINATION THEORY

Research that focuses only on the negative outcomes of playing video games supports a deficit or problem-oriented model of youth development, and neglects the equally important question of how engagement in video games might enhance positive outcomes for youth. To investigate positive effects of playing video games on outcomes such as well-being and intrinsic motivation, researchers have applied the well-known theory of human motivation, SDT (9–11). According to SDT, contexts that support the satisfaction of the three basic psychological needs of competence (sense of efficacy), autonomy (personal agency), and relatedness (social connectedness) facilitate positive outcomes, such as enhancing intrinsic motivation, optimal functioning, learning, well-being, and healthy relationships. Several studies (8) suggest that playing video games can satisfy psychological needs, which, in turn, can enhance

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intrinsic motivation and well-being. Indeed, we hypothesize that SDT may provide an overarching theoretical framework for understanding the effects of playing video games on positive youth outcomes in different domains (e.g., improving problem-solving skills, intergroup relations, and physical activity). Next, we elaborate on these hypotheses.

The Link Among Playing Video Games, Well-Being, and Intrinsic Motivation

SDT was first applied to playing video games in four studies with young adults (8; see also 12, 13) to examine the degree to which such play satisfied the three basic psychological needs (autonomy, competence, relatedness). The studies also considered how satisfying these needs during play might be related to enjoying the game and youth's well-being (see also 14 for effects of playing video games on enhanced well-being by managing mood). The studies supported the hypotheses that video game players may experience enhanced autonomy while playing if they feel free to choose and carry out activities that interest them, competence if they feel capable and effective at overcoming the game's challenges, and relatedness if when playing games with others, they feel close and connected to the other players. Thus, playing video games afforded players the opportunity to satisfy needs for autonomy, competence, and relatedness, and these perceived satisfactions were associated with greater enjoyment of the game and short-term well-being (also see 15 for a study showing that impeding competence, but not violent content, elevated aggression).

Researchers have also used SDT to examine how playing video games relates to young adults' self-exploration (16). During video game play, individuals can virtually try on different ideal selves (i.e., selves that have characteristics they would like to have), thereby potentially satisfying psychological needs (e.g., competence; 8) that might be difficult for them to experience. In one study (16), players experienced more intrinsic motivation and well-being if the game fostered congruence between their ideal self and their game self (i.e., the characteristics they experienced when playing the video game). Although these findings appear promising, the study's authors caution that more research is needed to examine whether these results are "compensatory or constructive, and what lasting effects they might have" (16, p. 75). Nonetheless, SDT offers a way to study the impact of playing video games on enhancing players' well-being and intrinsic motivation.

Given that SDT suggests that basic psychological needs are innate and universal (11), satisfying these needs while playing video games may be associated with motivation and well-being similarly across age groups. However, how needs are satisfied while playing video games might change with development. For example, given that intimacy typically is more pertinent to friendships in adolescence than in childhood (17), adolescents, but not children, may need to engage in meaningful conversations with other players to experience relatedness.

The Link Between Playing Video Games and Problem-Solving Skills

Researchers investigating the association between playing video games and positive outcomes also have focused on how such play promotes cognitive skills. For example, playing video games has been associated with enhanced visual–spatial abilities, executive control, memory, and attentional control (18–23). However, few studies have examined the association between playing video games and problem-solving skills.

Some video games may enhance problem solving by encouraging players to stop, examine their situation, and consider different strategies before continuing, rather than simply moving toward their goal as fast as possible (24). In addition, video games often feature more challenging problem-solving tasks as players proceed through the game. Researchers (25) speculate that this continual exposure to challenges might lead players to develop greater persistence over time. In support of this hypothesis, in a study of young adults (25), frequent video game players spent more time than infrequent players trying to solve anagrams and riddles in a task involving a nonvideo game.

Only certain types of video games (e.g., strategy and role-playing games) may promote problem-solving skills because they typically encourage players to gather information, weigh options, and formulate a strategy before acting (6). To examine the link between strategy/role-playing games and problem-solving skills, we conducted a longitudinal study in which adolescents reported on their video game play, problem-solving skills, and academic grades over their 4 years in high school (26). Youth who played strategic and role-playing video games more frequently reported greater problem-solving skills over time than youth who played these games less frequently. In addition, playing strategic video games indirectly predicted academic grades through problem-solving skills. Specifically, playing strategic video games predicted greater self-reported problem-solving skills over time and these, in turn, predicted higher academic grades over time (27).

Moreover, the longitudinal link between playing video games and problem-solving skills did not hold for fast-paced video games, such as those featuring fighting and action, or for racing games. For example, although players formulate strategies while playing fast-paced games, the strategies often are spontaneous and based on trial and error because players typically have little opportunity to stop, gather information, and strategize before a battle or a race.

From the lens of SDT, we hypothesize that autonomy and competence underlie the link between strategic video game play and problem-solving skills. Specifically, strategic video games that allow players to choose which problem-solving strategies they use may enhance feelings of autonomy and boost competence as players advance through the game. These experiences, in turn, may facilitate the internalization of problem-solving skills used during play.

In our study, the associations were significant across the 4 years of high school; however, it is unclear whether findings

might differ among children or young adults. For example, given that metacognition, or self-awareness of cognitive strategies, typically is more developed in adolescence than in childhood (28), adolescents may be more likely than children to retain the problem-solving strategies used when playing video games strategically.

The Link Between Video Game Play and Intergroup Relations

Today, millions of youth play online video games cooperatively with people from different social groups (e.g., youth from different countries play cooperatively via the Internet), working together to achieve a common goal. Online video games might afford a unique opportunity for intergroup cooperation, which may positively affect intergroup relations, consistent with Allport's (29) contact hypothesis (6).

We tested this hypothesis in an experiment with young Canadian adults (30). Participants played a violent first-person shooter game online cooperatively with an outgroup member (i.e., a person described as being from a university in the United States) versus an ingroup member (i.e., a person from the same university as the participant), working together to shoot and kill attacking zombie-like enemies. Intergroup cooperation boosted favorable attitudes toward the target outgroup from before the game to after the game.

Then, we replicated this effect in both a violent video game (the same shooter game) and a nonviolent video game (a basketball video game; 31). In this study, playing cooperatively with an outgroup member (versus playing alone) led participants to feel that they and the outgroup member were a team which, in turn, boosted favorable intergroup attitudes and behavior. Taken together (see also 32), these findings suggest that video games, when played cooperatively, can be engaging and pragmatic tools to improve relations between groups.

Taking an SDT-based approach, we hypothesize that autonomy and relatedness may help explain the benefit of intergroup cooperation in video games on intergroup relations. For example, cooperating willingly with individuals from other groups may enhance feelings of autonomy as well as closeness and interdependence (relatedness) with the outgroup partner. These in-game need-related experiences, in turn, may boost favorable attitudes toward the partner's social group.

Although most research on playing video games and intergroup relations has been conducted with young adults, the effects of play may differ developmentally. For example, the effect of intergroup cooperation in video games on boosting favorable outgroup attitudes may be stronger among children than young adults, given that intergroup attitudes may be less entrenched and more malleable during this earlier period (33). Thus, intergroup cooperation in video games may be an effective preintervention tool for precluding intergroup bias among children.

The Link Between Video Game Play and Physical Activity

Playing video games is thought of as a sedentary activity that may be related to physical inactivity and obesity (34). However, in several meta-analyses, playing active video games or *exergames* that involve physical activity (e.g., Wii boxing) may be associated positively with outcomes such as expending more energy, consuming more oxygen, and increased heart rate among youth when compared to being at rest (35, 36).

In a study of young adults (37), although physical exertion was similar whether individuals were playing active video games alone or with another person in a separate space, playing with another person was considered more enjoyable and motivating than playing alone. (Playing an active video game with another person in the same physical space was associated with less physical exertion, likely because of limited space for movement.) This motivational advantage for multiplayer games may be critical to whether youth maintain the benefits of playing video games actively over time, something that has yet to be tested.

The recent global popularity of an augmented reality game called *Pokémon Go*, released in July 2016, points to the benefits of such games in promoting physical activity. Players play the game by going to places of interest in their neighborhood to capture Pokémon, and many players have anecdotally reported increases in physical activity. However, because these types of games are so new, research has not yet tested whether levels of physical activity related to these games persist over time.

Moreover, researchers have not identified consistently positive effects of active video games on physical activity. For example, in a study of 9- to 12-year-olds in families without a Wii console, children randomly assigned active video games and given a Wii did not differ in physical activity over 12 weeks from their counterparts who received inactive video games (38). More research on this issue is needed.

In a study (39) of traditional video game play (i.e., games played with traditional hand-held controllers or keyboards), playing sports video games was linked to vigorous physical activity, suggesting that participants who played these games more frequently may be more intrinsically interested in being physically active than those who played them less frequently. Expanding on this work, we investigated the long-term association for adolescents and young adults between playing sports video games and playing sports in the traditional sense (40, 41). Youth who reported higher frequency of playing sports video games were more likely to play traditional sports over time than youth who reported lower frequency of playing sports video games.

Playing sports video games also indirectly predicted youth's involvement in traditional sports through self-esteem. We suggest that when playing sports video games, players may experience the thrill of victory, gain knowledge or strategies related to sports, and have fun, which, in turn, may enhance in self-esteem. Furthermore, youth who play sports video games and

have higher self-esteem may feel more optimistic and confident about approaching new challenges (42), and thus may be more likely to get involved in traditional sports.

From an SDT perspective, we hypothesize that all three psychological needs may explain these associations. For example, experiencing success and victory in sport matches may lead to feelings of competence, and voluntarily engaging in cooperative teamwork may lead to feelings of autonomy and relatedness. Consistent with evidence that satisfying needs by playing video games can elevate self-esteem (8), these game-related experiences may boost self-esteem and encourage youth to get involved with traditional sports.

Finding similar results among adolescents and young adults suggests that the longitudinal association between playing sports video games and engaging in traditional sports is comparable during these developmental periods. Yet, attrition from sports increases in adolescence compared to childhood (43), so researchers need to examine whether sports video games might help children enhance their sport-related confidence early in life, which may help set them on active trajectories that continue into adolescence.

CONCLUSIONS

Although many studies have examined the impact on youth of playing video games on negative outcomes, such as aggression and addiction, few studies have investigated potential positive outcomes (6). This imbalance is being addressed, as evidenced by the studies we have highlighted (see also 7).

SDT may provide a framework to explain the positive effects of playing video games on youth across the domains highlighted in this article. Researchers should test these hypotheses by assessing whether satisfying psychological needs while playing video games mediates these associations. Furthermore, considering the ubiquitous nature of video game play among youth and young adults, many players think playing these games offers substantial benefits, so attention to how these games positively affect youth development is important.

However, a barrier to gathering information on how video games affect youth development is that many studies have been conducted only with young adults. This imbalance needs to be rectified. The impact of video games may differ developmentally in ways that cannot be seen in studies of young adults. For example, playing sports video games might be beneficial during childhood if it can help youth build enough confidence to engage in traditional sports in high school, thus avoiding the typical decline in sports involvement typically seen during adolescence. Moreover, because executive function skills (e.g., impulse control, self-monitoring) differ from childhood to young adulthood, it is unclear whether video games will benefit children in the same way they benefit young adults. Studies that compare the effects of playing video games on positive outcomes among different age groups are needed to test these hypotheses.

In addition, most of the research on playing video games has focused on short-term effects. More longitudinal studies are needed, particularly studies that last from childhood to adulthood. Moreover, longitudinal studies will allow researchers to assess the direction of effects, as well as to identify students who experience distinct patterns of video game play and outcomes over time.

Overall, research on the benefits of playing video games suggests that the games may be a tool for interventions that promote problem solving, intergroup relations, physical activity, and well-being. Of course, attention to potential negative outcomes of playing video games also is important, but a balanced approach to studying video game play will enhance our ability to understand and promote positive youth development.

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