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Does Personality Moderate the Relationship Between Video Gaming and Quality of Life?

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Does Personality Moderate the Relationship Between Video Gaming and Quality of Life?

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DISSERTATION

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DOES PERSONALITY MODERATE THE RELATIONSHIP BETWEEN VIDEO GAMING AND QUALITY OF LIFE?

presented on August 8, 2018

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Table of Contents

List of Tables

List of Figures

Abstract

Video game research has expanded greatly in recent decades, fueled partly by concerns that video game content affects real-word behaviors and experiences. Despite the preponderance of research on the effects of video game content on various outcomes, there are still areas left to be explored. For example, while the American Psychological Association has concluded that violent video game content serves as a risk factor for real-life aggression, the association has also recommended the pursuit of additional research on alternative variables that may influence the relationship between video game content and outcomes (APA Task Force on Violent Media, 2015). The present study was designed to explore whether personality dimensions have a moderating effect on the relationship between video game content and quality of life (QoL). Video game content was measured using content descriptors (i.e., content warnings) assigned to a participant-reported game by the Entertainment Software Rating Board (ESRB). QoL was measured using the World Health Organization's Quality of Life–Brief measure, and personality was assessed using the International Personality Item Pool Representation of the Revised Neuroticism-Extraversion-Openness Personality Inventory. Based on existing research support for four personality dimensions as potential moderator variables, it was hypothesized that conscientiousness, extraversion, agreeableness, and neuroticism would moderate the relationship between video game content and QoL. Moderated multiple regression analyses were conducted to test this hypothesis. Results found significant main effects between personality dimensions and QoL but failed to find significant effects of video game content, including violent content, on QoL scores. In addition, the study's hypothesis, that personality dimensions moderate the relationship between video game content and QoL, was not supported. Study limitations, implications for clinicians, and directions for future research are discussed.

Keywords: video game, computer game, quality of life, personality,

conscientiousness, extraversion, neuroticism, agreeableness, moderator variable

Does Personality Moderate the Relationship Between Video Gaming and Quality of Life?

The popularity of video games has exploded in recent decades, sparking concern among public health officials and society at large. Video game sales in the United States have tripled in the 21st century, increasing from five billion games in 2000 to 15 billion in 2014 (Statista, 2016). Video games are now played in the majority of households; 80% of young adults and 53% of older adults in America play video games (Lenhart, Jones, & Macgill, 2008), with 65% of all American households owning at least one video game platform on which to play (e.g., computer, handheld device, or console) and 48% owning a designated video game console (Entertainment Software Association, 2016). In the United States, 155 million people acknowledge playing video games, and players are diverse in age, ethnicity, and gender (Entertainment Software Association, 2015). The prevalence of video games is cause for consideration, given the potential for video game effects to reach a large percentage of the population, thereby affecting both individual and societal welfare.

Poor Quality of Life is a Public Health Concern

Quality of life (QoL) relates to "physical and emotional health, economic sufficiency, social engagement, opportunity for self-expression and development, and the capacity to make decisions for oneself" (Matsumoto, 2009, pp. 416–417). People who experience low QoL are at higher risk for illness, addiction, violence, and early death (APA Task Force on Violent Media, 2015; Davidson, Mostofsky, & Whang, 2010; Penner-Goeke et al., 2015; Xie et al., 2014, 2016; Xu & Roberts, 2010). Improving QoL helps improve individual and community functioning, making QoL a meaningful focus of the mental health community (Elson & Ferguson, 2014).

QoL Issues in Gamers Incite Moral Panic

The potential for video games to negatively affect QoL has inspired concern among

professionals and the public (Ferguson, 2015). As with many new technologies, video games have been met with public and professional wariness. Some video game researchers assert that this wariness has escalated to "moral panic" (Ferguson, Coulson, & Barnett, 2011b), defined as "public anxiety or alarm in response to a problem regarded as threatening the moral standards of society" ("Moral panic," 2017, p. 1).

Video game research began as video games were increasing in popularity throughout the second half of the 20th century (Dill & Dill, 1998). Early video game research primarily explored the negative effects of playing video games (Granic, Lobel, & Engels, 2013). This research was informed by social learning theory, introduced by Albert Bandura in the 1960s (Bandura & Walters, 1963). Social learning theory posits that learning takes place through observation (Coon, 2003). In his well-known Bo-Bo doll experiments, Bandura found that children tended to copy their parents' behavior and the behavior of virtual characters on television if they observed those behaviors being rewarded (Bandura, 1965; Bandura, Ross, & Ross, 1963). As games have risen in popularity and increasingly included competitive, aggressive, or violent themes, concern arose that players would mimic these themes in their daily behavior in accordance with social learning theory. These concerns escalated to moral panic (Ferguson, 2008).

Moral panic surrounding video games has manifested as concern about connections between (a) violent video game content and mass shootings (Ferguson et al., 2011b), and (b) video game play and addiction (Kowert & Quandt, 2015). A survey of 2000 adults in the U.S., conducted by the Pew Research Center in 2015, found that 40% of respondents believe that violent video games increase a player's propensity for violence (Duggan, 2015). Again seeking a representative sample of the US population, a 2013 Harris poll reported that 58% of Americans

believe teenagers are at risk for becoming violent as a result of playing violent video games (Harris Poll, 2013). In a European sample including the UK, France, Germany, and Italy, 71% of parents expressed concern about video games' content (YouGov, 2009). In the U.K., 66% of adults surveyed were concerned about the content of some video games, and 73% agreed that video games may impact some children's behavior (YouGov, 2009). Concern also exists that video game content can be addictive, with 31% of American parents reporting that they argue with their children over the amount of video games they play (Harris Poll, 2007), 22% of youth reporting feeling addicted to video games (Harris Interactive, 2007), and 21% of adults reporting that they play video games every day (Lenhart et al., 2008). Public concerns are worth addressing due to the prevalence of video games and the importance of QoL.

Video Games Can Be Detrimental *and* Beneficial to QoL

While early video game research focused heavily on the potential negative effects of video game content like aggression, violence, and addiction, modern research also focuses on positive effects such as motivation, cooperation, and problem-solving (Granic et al., 2013). QoL measures assess both positive and negative experiences within multiple domains, providing a broader view of an individual's well-being than measures intended for diagnosis of specific mental health disorders or identification of narrowly-defined issues or symptoms (e.g., aggressive cognitions). The World Health Organization (WHO) defines QoL as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (World Health Organization, 1997, p. 1). The WHO breaks QoL into four domains—physical, psychological, social, and environmental (Harper & Power, 1998). Direct research on the positive and negative effects of gaming on total QoL has been limited, but many studies have provided evidence that

video game play is associated with each QoL domain individually. Relevant literature concerning the effects of video games on each domain is provided here.

Physical QoL: Sedentary and active video games are associated with contrasting effects on physical life quality. Concerns regarding video game effects on physical QoL relate largely to the potential for video games to encourage a sedentary lifestyle by discouraging physical activity. This concern is supported by research on sedentary video games, as those who game the most tend to engage in less physical activity and are more likely to suffer from poor physical health (Carvalhal, Padez, Moreira, & Rosado, 2007; Gopinath, Hardy, Baur, Burlutsky, & Mitchell, 2012; Im, 2001; King & Delfabbro, 2009; Lacy et al., 2012; Papas, Trabulsi, Axe, & Rimmer, 2016; Vandewater, Shim, & Caplovitz, 2004; Weaver et al., 2009). These findings do not apply to *exergames,* games which include an exercise component. Exergames require greater energy expenditure than traditional video games and help improve gamer physical health by increasing physical activity while gaming (Lu, Kharrazi, Gharghabi, & Thompson, 2013; Peng, Crouse, & Lin, 2013; Sween et al., 2014). Overall, the development of games and game systems that promote physical activity are working to promote physical health in video game players, but playing video games to the exclusion of physical activity is associated with health problems.

Psychological QoL: Video games can be associated with depression, but may also help reduce stress. The psychological impact of playing video games has been a primary concern among the public and professionals due to the potential for the emotionally and biologically rewarding nature of video games to promote addiction and mental illness (Boyle, Connolly, Hainey, & Boyle, 2012; Han et al., 2007; Hull, Williams, & Griffiths, 2013; Koepp et al., 1998). Many studies support the existence of video game addiction based on DSM-IV-TR (American Psychiatric Association, 2000) gambling disorder criteria, but inconsistent definitions

of addiction across studies contributed to the exclusion of video gaming disorders from the

DSM-5 (American Psychiatric Association, 2013; Petry & O'Brien, 2013). Inconsistent

thresholds for addiction have also led to a range of estimates for the prevalence of video game

addiction, but the percentage of those who meet addiction criteria is consistently low, ranging

from 0.6% in conservative estimates to 8.5% in less conservative estimates (Gentile, 2009;

Mentzoni et al., 2011; Wittek et al., 2016).

Another concern is that individuals may use video games as a way of escaping their daily

lives and placing themselves into the reality of their game of choice (Yee, 2006). Video games

may serve to isolate them from friends and family, thereby enabling loss of social support and

facilitating the development or exacerbation of depressive symptoms (Ferguson, Coulson, &

Barnett, 2011a). This process raises concerns of loved ones and mental health professionals who

are working to increase their natural supports and reduce anhedonia. While many individuals

with depression lose interest in hobbies and activities they once enjoyed (American Psychiatric

Association, 2013), video games may be the primary activity for some gamers with depressive

symptoms. Some may also fail to seek meaningful activities or gainful employment, opting

instead to play video games, leading to occupational and social dysfunction (Mentzoni et al.,

2011). Since video games are also often a sedentary activity, concern arises that gaming may

lead to psychomotor retardation for individuals with depressive symptoms. These experiences of

some gamers naturally raise questions regarding the possibility that video games facilitate,

exacerbate, or directly cause depressive symptoms and disorders, and researchers have

demonstrated that gamers with tendencies towards escapist behavior and in-game immersion are

more likely to experience problematic video game play and lower psychological well-being than

those without these tendencies (Kardefelt-Winther, 2014; Kirby, Jones, & Copello, 2014; Kuss,

Louws, & Wiers, 2012; Yee, 2006).

On the other hand, those who play a moderate amount of video games tend to experience positive psychological effects (Granic et al., 2013; Sosa, Simon, Sweetman, Rupp, & McConnell, 2016). Thirty-five percent of adults, 41% of adolescents, and 56% of 8- to 12-year-olds play video games to reduce worry and stress (N. Anderson et al., 2010). Research supports playing casual video games to manage stress, as doing so is associated with lower levels of both subjective reports and physiological signs of stress (Russoniello, O'Brien, & Parks, 2009a, 2009b; Sosa et al., 2016). While it is not yet clear whether playing any video game can help players manage stress, playing some casual video games can have positive effects on the psychological dimension of QoL, and additional research has demonstrated that video game play can be beneficial or benign for the vast majority of players (Seay & Kraut, 2007). Overall, playing video games can disrupt psychological QoL in the small percentage of players for whom video games are an addiction or escape, while some games can be used to increase psychological life quality through improved stress management.

Social QoL: Video game play may be part of social withdrawal or social engagement. Concerns regarding the impact of playing video games on social QoL relate primarily to withdrawal from real-world relationships to play games. Video game critics raise concerns that video games have the potential to negatively impact social relationships via avoidant behaviors that lead to social withdrawal and isolation (Kardefelt-Winther, 2014). When video game play becomes a method for avoiding stress-inducing situations, in individuals with or without a mental illness, problematic video game play is more likely (Kardefelt-Winther, 2014; Kuss et al., 2012; Yee, 2006).

To explore the varying effects of gaming on social QoL, increasing attention is being

paid to the effects of cooperative and social gaming on social outcomes compared to competitive and individual gaming. This research has focused primarily on the effects of different styles of gaming on aggressive and prosocial outcomes. In one experiment, Jerabeck and Ferguson (2013) sought to determine whether the effects of violent video game play on aggression were reduced when violent video games were played socially as opposed to individually in a sample of largely Hispanic college students. The investigators randomly assigned students to one of six conditions varying by content (i.e., violent: antisocial, violent: prosocial, and nonviolent) and context (i.e., solitary or social). Researchers used the Hot Sauce Paradigm (Lieberman, Solomon, Greenberg, & McGregor, 1999) to measure participant aggression. Results of 3x2 ANCOVA analyses demonstrated that participants who played games solo were significantly more likely to administer hotter sauces to a fellow gamer than were individuals who gamed socially. This finding applied to participants in both the violent and nonviolent game conditions. These results are supported by other studies finding that prosocial or cooperative games promote positive social behaviors in players (Greitemeyer & Mügge, 2014; Velez, Greitemeyer, Whitaker, Ewoldsen, & Bushman, 2016), increase helpful behaviors in children (Gentile, 2009) and promote civic activities such as volunteering in adolescents (Lenhart et al., 2008). However, much of the research in this area has been limited to undergraduate samples, reducing the ecological validity of findings. Further research is needed to determine the differential effects of individual versus social gaming on social QoL in the general population, but preliminary research indicates that how games are played, in addition to game content, may influence outcomes.

Environmental QoL: Video games can teach prosocial or antisocial behavior.

Concerns related to environmental QoL are primarily regarding the potential for video games to

teach players unhealthy behaviors. Historical and contemporary research provide significant evidence that players can learn antisocial behaviors from virtual characters and video games (APA Task Force on Violent Media, 2015; Bandura et al., 1963). Findings from many studies with varied methodologies support the conclusion made by the APA that violent video game content is a risk factor for both "an increase in negative outcomes such as aggressive behavior, cognitions, and affect and…a decrease in positive outcomes such as prosocial behavior, empathy, and sensitivity to aggression" (APA Task Force on Violent Media, 2015, p. 16). On the other hand, games can also impart healthy skills such as problem-solving (Adachi & Willoughby, 2013; Ventura, Shute, & Zhao, 2013), spatial cognition (Ferguson, 2007; Green & Bavelier, 2012; Spence & Feng, 2010; Uttal et al., 2012), and motivation (Granic et al., 2013; Ventura et al., 2013) and are becoming increasingly integrated into evidence-based therapy practices for psychoeducation, skill-building, and symptom reduction (Ceranoglu, 2010; Merry et al., 2012). In sum, while playing video games with antisocial content may increase risk for aggressive tendencies, video games also have the potential to positively influence players.

Video Game Effects on QoL May Depend on the Player, Not the Game

As discussed above, research has consistently demonstrated the capacity of video game play to exert both positive *and* negative impacts on QoL. The question that arises, then, is how to best understand what factors determine the valence of the outcome. The theory offered here is that the moral panic narrative invests too much importance in the content of the game, and focuses too little attention on the personality profile of the player, in predicting and understanding the impact of video games on player quality of life. The five-factor model (FFM)—the Big Five—is often used to assess an individual's unique personality and refers to the five personality dimensions illuminated through factor analysis: openness, conscientiousness,

extraversion, agreeableness, and neuroticism (Goldberg, 1993). Four of the FFM personality

dimensions have preliminary support as moderator variables between video game content and

QoL: (a) conscientiousness, (b) extraversion, (c) agreeableness, and (d) neuroticism (Markey &

Markey, 2010; Pocnet et al., 2016; Pocnet, Dupuis, Congard, & Jopp, 2017; Soto, 2015; Specht,

Egloff, & Schmukle, 2013; Weber et al., 2015). Conscientiousness determines how structured we

are and how persistently we adhere to our values and strive for success (Matthews, Deary, &

Whiteman, 2003). Extraversion is the extent to which an individual is socially enthusiastic and

outgoing (Matthews et al., 2003). Agreeableness is an individual's style of social engagement. It

includes how engaging we are with others and how critical we are of other viewpoints (Matthews

et al., 2003). Neuroticism determines the constancy of our emotional state and whether that state

is susceptible to influence or generally stable (Matthews et al., 2003).

Specifically, conscientiousness, extraversion, and agreeableness have been found to be

strongly and positively correlated with high QoL, with neuroticism equally predictive in the

opposite direction. In one study of a large, nationally representative Australian sample ($N =$

16,367), researchers measured the relationship between subjective well-being and personality

traits over four years (Soto, 2015). Latent growth and latent autoregressive model analyses

demonstrated a significant, positive relationship between well-being and conscientiousness,

extraversion, and agreeableness, and a strong, negative relationship between well-being and

neuroticism. These findings are consistent across similar, nationwide studies conducted in

Germany (Specht et al., 2013), France (Pocnet et al., 2017), and Switzerland (Pocnet et al., 2016;

Weber et al., 2015). Further research on the relationship between personality and QoL conducted

on a United States sample would be helpful in generalizing results; however, the consistency of

findings across multiple Western populations allows some inferences to be made regarding the

relationship between QoL and personality in this population.

Studying Risk and Protective QoL Factors Will Address Moral Panic

Numerous studies have provided evidence that (a) video game play is associated with both positive and negative effects on each QoL domain—physical, psychological, social, and environmental; and (b) personality dimensions of conscientiousness, extraversion, agreeableness, and neuroticism are related to QoL. This study was designed to answer the call for additional studies on variables that may impact the relationship between video game content and QoL (APA Task Force on Violent Media, 2015) by exploring the nature of the interaction between video game content, personality, and QoL. This study was aimed at more critically examining the moral panic concern about the pernicious effects of video games, and specifically the influence of game content, as represented by content warnings. Moderated multiple regression (MMR) analyses were used to assess the relationship between video game content and QoL, including personality dimensions as possible moderator variables for this relationship.

Time spent gaming was not analyzed in the present study for three reasons. First, the effects of time spent playing video games and prevalence of video game addiction warrant further research to achieve consistent results across studies. Second, research on time spent gaming has predominantly focused on the effects of gaming time on children, making generalizability of findings to adults dubious. Finally, self-report measures may not accurately capture time spent gaming (Scharkow, 2016). For these reasons, this study focused primarily on the effects of video game content on QoL. Determining the effect of video game content on QoL holds the potential to address moral panic, educate the public, and inform future research.

The key research question and hypothesis for this study were:

- Research Question: Do personality dimensions of conscientiousness, extraversion,

agreeableness, and neuroticism have a moderating effect on the relationship between

video game content and QoL?

- Hypothesis: Conscientiousness, extraversion, agreeableness, and neuroticism will

    moderate the relationship between video game content and QoL.

Methods

The primary goal of this study was to determine whether concerning video game content

and personality dimensions of conscientiousness, extraversion, agreeableness, and neuroticism

predicted QoL scores in adult gamers in the United States. Study design, participants, measures,

analyses, study limitations, researcher bias, confidentiality, and consent are discussed below.

For the purposes of this study, a *video game* was defined in accordance with

Merriam-Webster's online dictionary as "an electronic game in which players control images on

a video screen" ("Video game," 2018). *Video game player* or *gamer* referred to the individual

operating the video game, while the *character* or *avatar*, when present, referred to the

representation of the player within the game. Video games are somewhat distinct from computer

games, which describe only games that can be played on a computer. Therefore, the term "video

game" is a broader definition and includes all electronic games on all platforms, including on

desktop or laptop computers, televisions (using video game console systems), tablets, phones,

and other handheld devices (e.g., Nintendo DS). A *video game console* is one type of platform

and is considered "an electronic system that connects to a display (as a television set) and is used

primarily to play video games" ("Console," 2016, p. 1). Popular consoles include the Xbox,

Nintendo, and PlayStation systems. *Content descriptors* or *content warnings* are cautionary

labels applied to video games by the Entertainment Software Rating Board (ESRB); they provide

information on the rationale for a video game's age rating by "indicat[ing] content that may have

triggered a particular rating and/or may be of interest or concern" (Entertainment Software Rating Board, 2016, p. 1). For a list of all content descriptors used by the ESRB and included in this study, see Appendix.

Participants

Participants were adults who had engaged in video game play on any platform for any amount of time within the two weeks prior to completing the survey. Participants from a range of economic, educational, and cultural backgrounds were sought to improve the generalization of study findings. Approximately 400 participants was the estimated sample size necessary to detect a statistically reliable, small effect at the $p = .05$ level, using a MMR model with one continuous predictor variable and four continuous moderators (Shieh, 2010).

Participants were recruited via four methods: (a) mass email sent through email listservs; (b) posted ads in general online bulletin boards (i.e., Craigslist.org, Reddit.com); (c) gaming websites with bulletin boards that allowed posted surveys (i.e., IGN.com and MMORPG.com, Gamefaqs.com, and Origin.com); and (d) the researcher's social media accounts (i.e., Facebook.com, Twitter.com). Internet-based methods for recruiting gamers were used to cater to the tendency of adult gamers to be accessible by internet-enabled devices (Lenhart et al., 2008). Online bulletin boards intended for use by the general population were used to broaden the scope of participant outreach and access a broader participant base than would have been achieved by posting only to gamer-specific boards or online bulletin boards for specific video games. Gamer-specific bulletin boards were used to access participants from areas highly trafficked by gamers. Participants were primarily recruited through Reddit (44%) and Facebook (44%). All of these methods were employed for a recruiting period of three months.

Procedures

      Posts were made to both general and gamer-specific internet bulletin boards with a brief description of the study and information on a chance to win one of at least four $25 Amazon gift cards for incentive. Each post included a link to survey materials, including electronic informed consent, video game preference questions, the International Personality Item Pool Representation of the Revised Neuroticism-Extraversion-Openness Personality Inventory (IPIP-NEO-120; Johnson, 2014), WHO's Quality of Life Scale, brief version (WHOQOL-BREF; World Health Organization, 1997), and demographic questions. Endorsement of an electronic informed consent statement caused the survey to proceed. The first section of the survey asked respondents to name the video game they have played most frequently over the previous two weeks. They then completed the IPIP-NEO-120, followed by the WHOQOL-BREF, which included demographic questions. Participants were then given an opportunity to provide their ethnicity. After completing study materials, participants were provided a separate link to register for a chance to win a $25 Amazon gift card at their discretion.

Magnitude of Effect

      The sensitivity of MMR analysis to interaction effects is relatively low (Frazier, Tix, & Barron, 2004); interaction effects are inherently demanding of statistical power. In the context of this study, a modest effect size is considered meaningful, and the proposed sample size of 400 was intended to provide adequate power to detect even a small effect (Aguinis, Boik, & Pierce, 2001; Shieh, 2010). Cohen (1988) asserts that standards by which to evaluate effect sizes in multiple regression are $f^2 = .02$ for a small effect, $f^2 = 0.15$ for a medium effect, and $f^2 = .35$ for a large effect.

Measures

Both newly constructed questionnaires and standardized measures were utilized. A questionnaire was used to assess most played video game and time spent playing video games. Standardized measures were used for assessing quality of life and personality. All measures were provided online for participants to complete electronically.

Quality of life. Quality of life total scores were assessed using the WHOQOL-BREF. The WHO developed the WHOQOL-BREF for use as a general quality of life measure based on WHO's definition of QoL (World Health Organization, 1997).

The WHOQOL-BREF has several strengths that warranted its use in this study. First, the WHOQOL-BREF was developed across numerous cultures for international and cross-cultural usage. It was initially developed in coordination with multiple WHO field sites, including sites in Australia, Argentina, Bulgaria, Croatia, Germany, Hungary, India, Israel, Italy, Japan, Malaysia, Russia, Spain, Turkey, the United Kingdom, and the United States (Skevington, Lotfy, & O'Connell, 2004). As a result, the WHOQOL-BREF is standardized for use with many cultures, populations, and countries. This will allow the generalization of results to a broad population. Another strength of the WHOQOL-BREF is that it measures multiple facets of QoL, including physical, psychological, social, and environmental domains. These domains augment the total QoL score it provides. Another major advantage is that the WHOQOL-BREF is a very brief measure of only 26 items (World Health Organization, 1997), beneficial in reducing the burden of participation in the study in the hopes of reducing attrition and minimizing participant fatigue and random responding.

The WHOQOL-BREF also has strong psychometric properties (Bonomi, Patrick, Bushnell, & Martin, 2000; Harper & Power, 1998; Hsiao, Wu, & Yao, 2013; Skevington et al.,

2004; World Health Organization, 1997). The WHOQOL-BREF has been tested on healthy, mentally ill, and physical ill populations with consistent results (e.g., Chiu et al., 2006; Garcia-Rea & LePage, 2010; Trompenaars, Masthoff, Van Heck, Hodiamont, & De Vries, 2005). Cronbach alpha values representing the internal consistency of WHOQOL-BREF scales are consistently between .66 and .84 (Harper & Power, 1998; Skevington et al., 2004). The construct validity of the WHOQOL-BREF is comparable to that of the more comprehensive WHOQOL-100 on which it is based, with t-tests conducted to determine significant differences between well and ill populations (Harper & Power, 1998; Skevington et al., 2004). These analyses revealed significant differences (at $p < .001$) in mean scores between the two groups on all QoL domains, demonstrating sound discriminant validity. The construct validity of this measure is also supported by high correlations between scale items and scale scores, as "no item for the total sample correlated more strongly with another domain than with its own domain" (Skevington et al., 2004, p. 305). QoL total scores were of primary interest in this study, and the WHOQOL-BREF is a suitable measure for assessing adult overall QoL.

Concerning video game content. Concerning video game content was determined by self-report. Video game players were asked what video game they had played the most over the previous two weeks. Concerning content was indicated by the number of content descriptors previously assigned to a game by the ESRB. Content descriptors, herein referred to as content warnings, were developed by the ESRB in 1994 to identify concerning content present in a video game (e.g., violence, nudity, strong language; "ESRB history," 2016). The type of content warning is dependent on the age rating of the game (e.g., T for Teen), while the number of warnings assigned to a single game is independent of age rating. Therefore, number of content warnings was used to operationalize concerning video game content and provide more content

specificity than age rating alone. Participant responses were scored on the number of ESRB content warnings assigned to the participant's identified game, based on the ESRB ratings database (ESRB, 2016). For a list of all content warnings used by the ESRB and included in this study, see Appendix.

Personality. Participants were also asked to complete the IPIP-NEO-120 (Johnson, 2014). The IPIP-NEO-120 is a public domain personality measure that consists of 120 items based on the revised edition of the Neuroticism-Extraversion-Openness Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). The measure requires approximately fifteen minutes to complete and provides scores on openness, conscientiousness, extraversion, agreeableness, and neuroticism and 30 related facet scores. Studies using large community and internet samples have demonstrated good reliability and validity of the five domain scores of the IPIP-NEO-120 and high convergent validity with other personality inventories (Johnson, 2014; Maples, Guan, Carter, & Miller, 2014). The IPIP-NEO-120 scale scores correlate highly with NEO-PI-R scales; mean disattenuated convergent correlations between IPIP-NEO-120 scale scores and NEO-PI-R scale scores are consistently above $r = .85$ (Johnson, 2014; Maples et al., 2014). Scale scores measuring conscientiousness, extraversion, agreeableness, and neuroticism were of primary interest in the current study, and the IPIP-NEO-120 was appropriate for measuring these dimensions.

Study Design

This study used a correlational design to examine the relationship between the number of concerning video game content warnings and QoL, while also testing for a potential moderator effect of personality dimensions. An online survey was created and distributed nationally to adult video game players via general and gamer-focused online bulletin boards to collect data on these

variables. Concerning video game content was measured using an internationally-recognized classification system developed by the ESRB (Entertainment Software Rating Board, 2016). Big Five personality dimensions of conscientiousness, extraversion, agreeableness, and neuroticism were examined as potential moderators in the relationship between concerning video game content and QoL using MMR analyses.

Ethical Considerations

The ethical considerations for this study were based on Antioch University's *Investigator's Handbook for the Protection of Human Participants in Research* (Antioch University, 2017) and the APA's *Ethical Principles of Psychologists and Code of Conduct* (American Psychological Association, 2017). This study was also informed by applicable legal statutes governing the practices of professional psychologists.

Confidentiality. Participation in and responses to the survey were kept confidential in accordance with federal statutes, APA standards, and university principles. Identifying information did not accompany individual responses in either published or unpublished results, and study findings are only reported in aggregate form.

Consent. Physical written consent was not feasible due to the online nature of the proposed study. An Institutional Review Board waiver was granted to pursue electronic consent in lieu of physical informed consent documentation on the basis that research could not reasonably be conducted without the waiver. Electronic informed consent documents provided information identical to physical documentation, including (a) information related to the nature and purpose of the research; (b) participant expectations, risks, and benefits; (c) the voluntary nature of participation; (d) confidentiality of responses; and (e) contact information for the principal investigator and supervisor (Antioch University, 2017). All information was presented

at an eighth-grade reading level to help ensure understanding, and participants were allowed to discontinue at any time. Informed consent documentation was provided for each participant prior to beginning the online survey, as well as an acknowledgement that the participant was at least 18 years of age and legally able to participate in the study without guardian consent. Participants checked boxes to indicate their understanding of the informed consent documentation and acknowledge their rights and risks in participating. These steps served to provide reasonable protection from harm for all study participants.

Results

Once participants were recruited and administered a brief video game questionnaire, demographic questions, and QoL and personality measures, the resulting data were examined for completion and prepared for the intended MMR analyses. Cases were removed based on exclusion criteria and skipped items, content warnings were verified and coded, and variables were standardized. Missing values on the WHOQOL-BREF were substituted with average domain scores as dictated by the measure's scoring instructions, and missing values on the IPIP-NEO-120 were substituted with the middle value of three on a Likert scale of five (Johnson, 2005). Standardizing continuous variables allows for interpretation of scores between different scales and reduces the effects of multicollinearity. The raw scores on IPIP-NEO-120 subscales and the number of content warnings assigned to a game were converted to z scores with a mean of 0 and a standard deviation of 1. The standardized scores of the predictor variable and those of moderator variables were then multiplied to produce product terms denoting the interaction between concerning video game content and personality dimensions.

Data Screening and Construction of the Sample

To be included in analyses, each survey respondent was required to be an adult living in

the United States who had played an ESRB-rated video game within the two weeks prior to

completing the survey. Data were excluded from respondents who missed more than one

question on either the WHOQOL-BREF or IPIP-NEO-120 or reported playing a video game that

was not rated by the ESRB. The number of survey responses excluded from data analysis based

on these criteria was 326, resulting in a final sample size of 262. See Figure 1 for a visual

representation of participant erosion.

Sample Characteristics

Participants all reported age at or above 18 years, with a median reported age of 28 ($M =$

29.56, $SD = 9.07$). Most reported being in their 20's and 30's. Participants identified primarily as

male (68%), and ethnicity was largely homogenous, with nearly 78% of respondents identifying

as White/European American. All respondents reported at least a high school education. Most

respondents reported being single and denied being currently ill. See Table 1 for frequencies of

all demographic variables collected.

Descriptive Data

The predictor variable was *concerning video game content*, indicated by the number of video

game content warnings assigned to a video game by the ESRB, and measured on a ratio scale

ranging from zero to seven. While there is no limit to the number of content warnings that can be

assigned to a game, that number rarely exceeds seven (ESRB, 2016), which was the maximum

number assigned to a game in the present study. The IPIP-NEO-120 provided interval scale

measurement of *personality domain scores* ranging from 24 to 120. Standard scores on

conscientiousness, extraversion, agreeableness, and neuroticism were examined as potential

moderator variables. Total *QoL scores* with possible values between 26 and 130 were

standardized to serve as the criterion variable and were measured on an interval scale using the

WHOQOL-BREF. See Figure 2 for a visual representation of this model. Moderated multiple

regression was used to determine the predictive value of concerning video game content and

conscientiousness, extraversion, agreeableness, and neuroticism, with QoL scores as the

criterion. Table 2 presents correlations among variables, and Table 3 presents the means,

standard deviations, and score ranges for predictor and criterion variables.

Hypothesis Testing: Predicting QoL from Content Warnings and Personality Dimensions

Moderated multiple regression analyses were conducted to predict QoL scores based on

concerning video game content and personality domain scores. Standardized scores were used

for all of the variables in the model. A separate regression model was tested for each

hypothesized personality moderator, resulting in four tested models with two steps. The first step

in building each model was to enter main effect scores for concerning video game content and

the relevant personality dimension. Next, the product term, representing the interaction effect,

was entered in a second predictor block. The effect of primary interest was the increment in

criterion variance accounted for by the model, with the addition of the product term. SPSS was

used to compute a significance test for this change in R^2 with the addition of Block 2 to each

regression model.

Results for each of the regression models are presented in Table 4. As can be seen in Step

1 of each model, main effects were present for three of the four personality dimensions:

conscientiousness, extraversion, and neuroticism. Neither agreeableness nor concerning video

game content generated significant main effects on QoL. The addition of moderator effects did

not yield significant increments in variance accounted for, in any of the four models.

Because some of the concern about video game play has focused specifically on violent

games, MMR analyses were repeated using only content warnings specific to violent content, to

examine whether these demonstrated a different relationship with QoL and personality dimensions than the non-violent content. Six content warnings included the word "violent" or "violence" in the label: *violence*, *violent references*, *intense violence*, *cartoon violence*, *fantasy violence*, and *sexual violence*. See Appendix for a description of these content warnings. Results for this second set of MMR analyses are presented in Table 5. Because only the primary predictor variable was redefined, the main effects of personality dimensions on QoL remain unchanged from Table 4. Main effects and interactions involving violent video game content are generally slightly stronger than for the full set of content warnings, but do not approach statistical significance.

Discussion

The goal of this study was to examine relationships between concerning video game content, select personality domains, and QoL. This investigation was inspired by previous research demonstrating individual (main effect) relationships between (a) violent video game content and negative outcomes such as aggressive thoughts and behaviors (C. Anderson et al., 2010); and (b) conscientiousness, extraversion, agreeableness, neuroticism and QoL domains (Pocnet et al., 2016, 2017; Soto, 2015; Specht et al., 2013; Weber et al., 2015). Given these established relationships, this study was designed to test the hypothesis that personality dimensions of conscientiousness, extraversion, agreeableness, and neuroticism moderate the relationship between concerning video game content and QoL. Inconsistencies in identifying concerning video game content in prior research (APA Task Force on Violent Media, 2015) motivated the use of a preexisting international content classification system to reduce content coding bias and improve replicability. Findings are discussed, along with study implications and limitations and directions for future research.

Three primary findings were demonstrated in this study: (a) Concerning content did not significantly predict QoL scores, even when focused on violent content; (b) conscientiousness, extraversion, and neuroticism significantly predict QoL scores; and (c) personality domains of conscientiousness, extraversion, agreeableness, and neuroticism did not serve a moderating role between concerning video game content and QoL.

Primary Findings

Why might this study have failed to find an effect of concerning video game content on QoL? Multiple possible explanations exist. First, the preponderance of research focusing on addiction and aggression (Ferguson, 2015), together with the relative lack of research on QoL outcomes, may limit the applicability of violent video game literature to the present study. While aggression and addiction outcomes provide specific information on the potential negative effects of gaming related to particular areas of an individual's functioning, QoL was used as the criterion variable to capture broader life experiences by measuring both positive and negative experiences related to playing video games. Aggression and addiction also focus primarily on behavioral expression, where QoL focuses more on internal life experience and perception. Therefore, the different breadth and emphasis of QoL outcomes may obscure previous research findings demonstrating significant effects of video game content on more narrow, focused outcomes like aggression and addiction.

A second explanation for failing to find effects that might have been expected is that operational definitions of concerning video game content have varied widely across existing video game research, leaving ample latitude for biases. Previous researchers have frequently relied on video game players to report the content of a video game (APA Task Force on Violent Media, 2015). Doing so increases risk of social desirability bias resulting from the stigma

associated with playing video games with controversial content (Trochim, 2006). This study was designed to collect content data without informing participants and to use anonymous surveys, in part to reduce the influence of social desirability bias. This study operationalized concerning content using the coding scheme that is actually communicated to the public by the gaming association (ESRB). It is possible, of course, that the ESRB content warnings are not applied in a consistent or sensitive way (Thompson, Tepichin, & Haninger, 2006), or that inaccuracy was introduced by respondent reporting errors or use of emulators. While there may be room for debate concerning the validity of various methods for identifying concerning content, the ESRB ratings have the virtue of being the dominant scheme in use, readily available to the gaming public, and free from investigator-introduced bias.

This study's findings did support main effects of conscientiousness, extraversion, and neuroticism on QoL scores. This is consistent with personality literature demonstrating a strong and positive relationship between conscientiousness, extraversion, and QoL, and a similarly strong negative relationship between QoL and neuroticism (Pocnet et al., 2016, 2017; Soto, 2015; Specht et al., 2013). These results are not consistent with personality literature demonstrating a strong, positive relationship between agreeableness and QoL (Soto, 2015; Specht et al., 2013; Weber et al., 2015).

Post hoc exploratory analyses focusing on violent game content warnings, in particular, demonstrated no more specific predictive relationship to QoL scores. While significant research has been dedicated to demonstrating violent video game use as a risk factor for aggressive thoughts and behaviors (APA Task Force on Violent Media, 2015), the results of the present study did not indicate that violent video game use was significantly associated with the broader QoL variable. Moreover, there was no statistical support for the hypothesis that

conscientiousness, extraversion, agreeableness, and neuroticism moderate the relationship between concerning video game content and QoL, even when the concerning content was restricted specifically to violence.

Given professional interest in the relationship between personality and gaming preferences, additional post hoc exploratory analyses were conducted to explore the relationship between personality traits and video game preference. Specifically, these analyses were aimed at exploring whether a preference for violent versus nonviolent video games is associated with differences in the levels of any or the measured personality dimensions. Previous research has demonstrated significant, positive correlations between openness and extraversion and violent video game play and significant negative correlations between agreeableness and neuroticism and preference for violent video games (Chory & Goodboy, 2010). Categorization of a video game as violent or nonviolent was determined by the presence or absence of six content warnings: (a) violence, (b) violent references, (c) intense violence, (d) cartoon violence, (e) fantasy violence, and (f) sexual violence. Games classified as violent contained at least one of these six content warnings, while nonviolent games contained none.

To test for a significant difference among personality traits between individuals who prefer violent video games and those who prefer nonviolent games, independent samples *t* tests were conducted. Results indicated no significant main effects among openness, conscientiousness, extraversion, agreeableness, or neuroticism scores and preference for violent video game content. See Table 6 for a visual representation of these results.

Limitations and Bias

The study described here presents limitations related to survey validity, statistical power, and assorted biases.

Anonymous surveys are vulnerable to invalid sampling or responding. This limitation relates partly to the challenges inherent to anonymous, online surveys. Participants may have been dishonest in their reporting or may have accidentally misreported information. They may have taken the survey more than once, either by accident or on purpose to gain additional raffle entries. The SurveyMonkey site settings were configured to disallow multiple responses from the same device, but participants could have used multiple devices or used a Virtual Private Network (VPN) to mask their device address and take the survey multiple times.

A second limitation to survey validity was that there was no test of random or misleading response patterns included in the survey measures, so participants who may have responded inconsistently were not eliminated from data analyses. Answers to survey questions were not required to proceed with the survey, so participants could skip through the survey to obtain the incentive. Participants not interested in the survey may have otherwise answered randomly to obtain the incentive. While this approach allowed a high percentage—19%—of incomplete surveys, it was used partly to reduce unreliable response patterns; however, participants may have still completed the survey disingenuously. Finally, wide dissemination of surveys via email and online bulletin boards was intended to achieve an adequate sample size, but this approach exerted few controls on sampling and thus carried the risk of recruiting a non-representative sample of gamers. Demographic information provided by participants on age, sex, and ethnicity was used to estimate the generalizability of findings, in relation to the U.S. population of video game players as estimated by the Entertainment Software Association (2017). The obtained sample underrepresented women (41% of U.S. gamers and only 31% of the current sample), players over age 35 (45% of U.S. gamers and 19% of the current sample), and ethnic minorities (estimated at 33% by the Nielsen Company (2015), and only 21% of the current sample).

Validity may have also been impacted by challenges in coding content warnings. Participants' reported video games were interpreted at face value. For example, a participant who reported playing "Minecraft" was understood to mean the original Minecraft game, as opposed to a longer title that they chose to shorten such as "Minecraft Story Mode." In addition, some participants reported playing a much older version of a newly released game. Since participant report of their preferred video game was assumed to be accurate, participants were included in data analysis and the number of content warnings was determined by their exact report. Inaccurate or incomplete reporting could have resulted in participants who were assigned the incorrect number of content descriptors. Participants were also not asked if they used an emulator to play their preferred video game. An *emulator* is hardware or software that allows a game to be played on a different platform than the one for which it was created ("Emulator," 2018). Therefore, a participant could have used an emulator to play a game on a different platform than the one for which it was rated (e.g., playing a rated Xbox game on a computer). Although many games have the same ratings and content warnings across platforms, some do not, and some games are rated for one platform but not rated for another ("ESRB," 2015). This coding challenge could have altered the number of content warnings assigned to a participant's game of choice or could have led to the exclusion of respondents who reported playing a game on a platform for which it was not rated. These challenges may have reduced the ability of content warnings to effectively capture concerning video game content.

Beyond the potential for erroneous assignment of content codes, there is some evidence that ESRB codes have—at least in the past—underestimated concerning content. Research on the reliability and validity of content warnings is limited and dated (Gentile, Humphrey, & Walsh, 2005; Haninger & Thompson, 2004; Thompson et al., 2006). Absent alternative or more

respected standardized measures of video game content, exploration of convergent validity with other measures was not available. Therefore, coding challenges and lack of research establishing the psychometric properties of content warnings as a measure of concerning content may have increased measurement error, reducing the accuracy of the regression coefficients.

Measurement error and sample size may have hampered statistical power. The aforementioned challenges in coding content warnings may have lowered the reliability of predictor and moderator variables, increased the standard error of the interaction term, and lowered the statistical power of the analyses (Aiken, Reno, & West, 2010). In addition, while a sample size of 400 was sought to achieve sufficient power for MMR analyses to detect a small effect, the actual usable sample was reduced to 262. Therefore, the recruited sample may not have been large enough to provide sufficient power to discover a statistically significant, small effect using MMR analyses. Given the novelty of the present study, the observed effect sizes remain the best available estimate of the predictive value of concerning video game content—as measured by ESRB content warnings—and personality scores for QoL.

Efforts to limit the influence of bias. This investigator has extensive childhood and adulthood experience playing video games and personal familiarity with some subjective effects of gaming on QoL and was mindful of the risk these experiences posed for increasing bias. The risk of bias was reduced in the current study by replacing researcher-determined definitions with a preexisting system for quantifying concerning video game content (ESRB, 2016). Disseminating this survey as widely as possible and adhering to the proposed analyses were additional techniques used to reduce confirmation bias and partiality. Wording bias in the survey was limited by editing thoroughly and submitting to multiple editors for review prior to survey dissemination.

Convenience sampling via my Facebook account was used to increase the sample size. This approach may have increased sampling error due to recruiting an unrepresentative sample of the total population. Even though social media contacts with prior awareness of the purpose of the survey were asked not to participate, some may have still participated and provided biased responses.

Future Research

The present study was unique in its use of preexisting standards for assessing concerning video game content, examination of QoL as a criterion variable, and incorporation of personality traits as possible moderator variables. The limitations of the present study, including coding difficulties, unrepresentative sample demographics, and an insufficient sample size, limited the validity and generalizability of findings. Nevertheless, a larger sample is not likely to produce effects where the current study found nearly non-existent effect sizes (independent of statistical significance). Therefore, results of this study do not support the notion that violent or concerning video game content predicts overall QoL. These results do not necessarily negate previous research demonstrating a significant relationship between violent content and aggression (APA Task Force on Violent Media, 2015), as differences in criterion breadth and nature preclude direct comparison.

Video game research could be made more robust with continued investigation into the reliability and validity of content warnings assigned to video games by the ESRB. Future research should continue to use a consistent method of operationalizing and measuring concerning video game content as an alternative to idiosyncratic methods. Doing so reduces the influence of researcher bias and allows for study replication. If content warnings are used in future research to identify concerning video game content, care should be taken to identify the

exact game played by the participant. Coding difficulties in the present study arose when participants did not provide enough information to identify their game of choice. Future research that uses content warnings to identify concerning content would benefit from providing a database of video games from which to select or limiting the number of games included in the study, as opposed to the open-ended response style used herein.

Clinical Implications

One implication of these findings is that the standard ESRB ratings of video games should not necessarily be a cause for alarm in estimating the effect of video game play on adults with whom clinicians are working. This does not obviate concerns arising from other elements of video game play (time spent playing, for example), or functional impairments that may be related to game playing (social withdrawal, for example). Clinicians should continue to monitor client video game play with a mind toward understanding the complex factors affecting client experiences within and outside of the game.

Conclusion

Despite myriad studies on the effects of video game content on various outcomes, many areas remain unexplored. This study was designed to examine the interactions between concerning video game content, select personality domains, and QoL. Previous research showing significant correlations between (a) violent video game content and aggression and (b) personality and QoL domains, sparked this study's hypothesis that select personality domains might moderate the relationship between concerning video game content and QoL. The central hypothesis of the study was not supported, adding one more data point to the ongoing discussion surrounding the impact of video gaming, while leaving open several questions surrounding operational definitions and data collection strategies. The quality and scope of video game

literature could be improved with additional research on the psychometric properties of content

warnings as a measure of concerning video game content, and studies with larger samples to

address limitations to validity and power.

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Table 1

Demographic Characteristics of Participants		
Variable	*n*	%
Gender		
Male	179	68.32
Female	81	30.92
No Response	2	0.76
Age		
18-19	27	10.31
20-29	126	48.09
30-39	73	27.86
40-49	22	8.40
50-59	9	3.43
60+	3	1.15
No response	2	0.76
Education		
Elementary School	1	0.38
High School	55	20.99
College	147	56.11
Graduate School	58	22.14
No response	1	0.38
Marital Status		
Single	158	60.31
Married	78	29.77
Living as Married	19	7.25
Separated	2	0.76
Divorced	5	1.90
Currently Ill		
Yes	33	12.60
No	229	87.40
Ethnicity		
Arab	2	0.76
Asian/Pacific Islander	13	4.96
Black/African American	5	1.91
Indigenous/Aboriginal	1	0.38
Latino/Latina	13	4.96
White/European American	204	77.86
Multiracial	14	5.34
Other	0	0
No response	3	1.15

Note. *N* = 262

Table 2

Intercorrelations of Participants' Concerning Video Game Content, Personality Domains, and QoL

Variable	CWs	C	E	A	N	C × CWs	E × CWs	A × CWs	N × CWs
QoL	-.013	.323***	.507***	.131*	-.593***	-.029	-.024	.025	-.032
CWs	—	.029	-.017	-.140*	.079	-.117	-.112	-.143*	.111
C		—	.236***	.242***	-.354***	-.032	.035	.014	-.029
E			—	.198***	-.562***	.033	.102	.121*	-.077
A				—	-.200***	.015	.134*	.166**	-.036
N					—	-.028	-.079	-.033	.031
C × CWs						—	.225***	.284***	-.263***
E × CWs							—	.251***	-.619***
A × CWs								—	-.229***
N × CWs									—

Note. CWs = Content Warnings. C = Conscientiousness. E = Extraversion. A = Agreeableness. N = Neuroticism.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 3

Means, Standard Deviations, and Ranges of Participant Raw Scores of Concerning Content,
Personality Domains, and QoL

Variable	Mean	SD	Range
QoL	95.25	16.21	50-125
Content Warnings (all content)	3.55	1.77	0-7
Content Warnings (violent content only)	3.81	1.57	1-7
Conscientiousness	88.14	10.32	45-112
Extraversion	73.52	15.90	32-117
Agreeableness	92.36	11.08	59-117
Neuroticism	68.70	16.53	34-108

Note. Means and SDs of QoL, CW's, Conscientiousness, Extraversion, Agreeableness, and
Neuroticism are provided for unstandardized scores.

Table 4

Moderated Multiple Regression Analyses Predicting Quality of Life from All Game Content and Personality Domains

	Model 1				Model 2				Model 3				Model 4			
	Step 1		Step 2		Step 1		Step 2		Step 1		Step 2		Step 1		Step 2	
Variable	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE
CWs	-.03	.06	-.03	.06	-.01	.05	-.02	.05	-.00	.06	-.00	.06	.03	.05	.03	.05
C	.03	.01	.03	.01												
CWs × C			-.02	.06												
E					.03	.00	.03	.00								
CWs × E							-.08	-.06								
A									.01	.01	.01	.01				
CWs × A											.01	.06				
N													-.04	.00	-.04	.00
CWs × N															-.02	.05
R²	.10		.10		.26		.27		.02		.02		.36		.36	
Δ*R²*	.10		.00		.26		.01		.02		.00		.36		.00	
Δ*F(df1;df2)*	15.04(2; 259)		0.16(1; 258)		45.52(2; 259)		2.29(1; 258)		2.09(2; 259)		0.01(1; 258)		71.52(2; 259)		0.09(1; 258)	
p	.000		.691		.000		.131		.126		.933		.000		.765	
f²	0.13		0.12		0.54		0.36		0.02		0.02		1.23		0.55	

Note. CWs = Content Warnings. CI = confidence interval. C = Conscientiousness. E = Extraversion. A = Agreeableness. N = Neuroticism.
Small effect = $.15 > f^2 \geq .02$. Medium effect = $.35 > f^2 \geq .15$. Large effect = $f^2 \geq .35$. Unrounded R² values were used to calculate f^2.

$$f^2 = \frac{R^2}{1-R^2}$$

Table 5

Moderated Multiple Regression Analyses Predicting Quality of Life from Violent Game Content and Personality Domains

	Model 1				Model 2				Model 3				Model 4			
	Step 1		Step 2		Step 1		Step 2		Step 1		Step 2		Step 1		Step 2	
Variable	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE	*B*	SE
CWs	-.04	.07	-.04	.07	-.02	.06	-.02	.06	-.02	.07	-.03	.07	.01	.06	.01	.06
C	.03	.01	.03	.01												
CWs × C			-.06	.07												
E					.03	.00	.03	.00								
CWs × E							-.07	.06								
A									.01	.01	.01	.01				
CWs × A											-.02	.07				
N													-.04	.00	-.04	.00
CWs × N															-.02	.06
R^2	.11		.11		.25		.26		.02		.02		.36		.36	
ΔR^2	.11		.00		.25		.00		.02		.00		.36		.00	
$\Delta F(df1;df2)$	14.37(2; 238)		0.63(1; 237)		40.42(2; 238)		1.26(1; 237)		2.43(2; 238)		.09(1; 237)		67.39(2; 238)		.12(1; 237)	
p	.000		.430		.000		.262		.090		.765		.000		.730	
f^2	0.12		0.12		0.34		0.35		0.02		0.02		0.57		0.57	

Note. CWs = Content Warnings. CI = confidence interval. C = Conscientiousness. E = Extraversion. A = Agreeableness. N = Neuroticism.
Small effect = $.15 > f^2 \geq .02$. Medium effect = $.35 > f^2 \geq .15$. Large effect = $f^2 \geq .35$. Unrounded R^2 values were used to calculate f^2.
$$f^2 = \frac{R^2}{1-R^2}$$

Table 6

Average Personality Domain Scores Across Nonviolent and Violent Video Game Preference

	Game Preference	Mean	SD	Mean Difference	Sig.	Cohen's *d*
Openness	Nonviolent	.24	.70	.26	.13	0.30
	Violent	-.02	1.02			
Conscientiousness	Nonviolent	-.30	1.05	-.33	.15	0.32
	Violent	.03	.99			
Extraversion	Nonviolent	-.12	.86	-.13	.57	0.14
	Violent	.01	1.02			
Agreeableness	Nonviolent	.27	.93	.30	.19	0.31
	Violent	-.02	1.00			
Neuroticism	Nonviolent	-.11	.97	-.12	.61	0.12
	Violent	.01	1.00			

Note: Nonviolent Gamers: n = 21. Violent Gamers: n = 241.

Figures

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┌─────────────────────────────────────┐
│     588 consented to participate     │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│  173 excluded for not providing a valid │
│          video game title            │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│  111 excluded for skipping more than  │
│     one item on either measure       │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│   42 excluded for not playing an ESRB- │
│           rated video game           │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│        Total sample: N = 262         │
└─────────────────────────────────────┘
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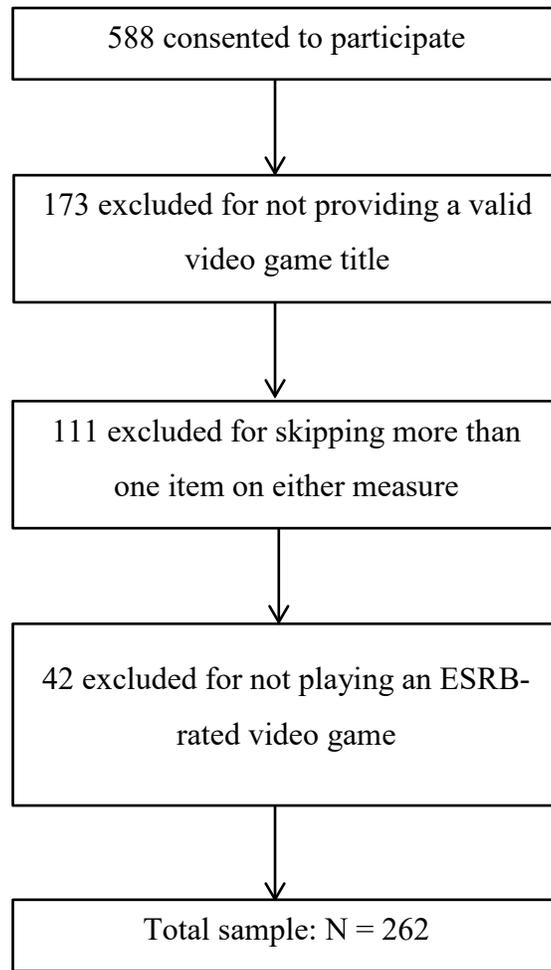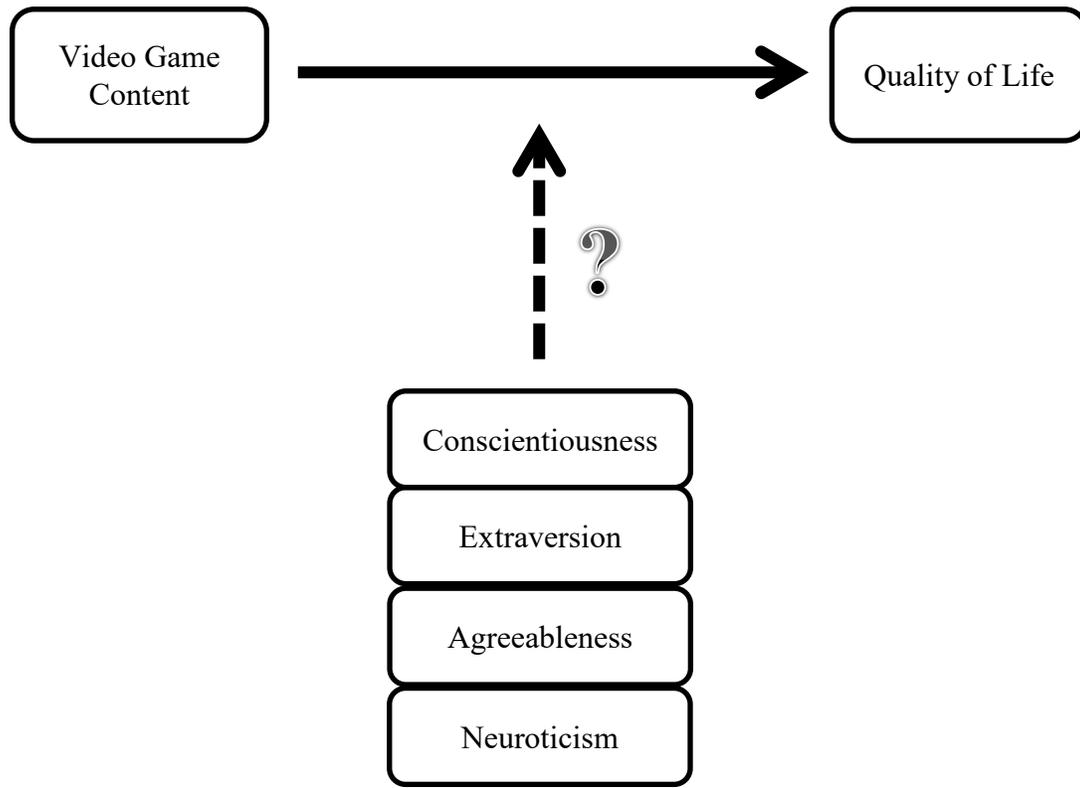
Figure 2. Sample erosion.

Figure 2. Proposed moderators. This figure illustrates this study's hypothesis that

conscientiousness, extraversion, agreeableness, and neuroticism serve as moderators in the

relationship between video game content and QoL.

Appendix

Table A1. *Entertainment Software Rating Board Content Descriptors* (Entertainment Software Rating Board, 2016)

Content Descriptor	Description
Alcohol Reference	Reference to and/or images of alcoholic beverages
Animated Blood	Discolored and/or unrealistic depictions of blood
Blood	Depictions of blood
Blood and Gore	Depictions of blood or the mutilation of body parts
Cartoon Violence	Violent actions involving cartoon-like situations and characters. May include violence where a character is unharmed after the action has been inflicted
Comic Mischief	Depictions or dialogue involving slapstick or suggestive humor
	Crude humor - Depictions or dialogue involving vulgar antics, including "bathroom" humor
Drug Reference	Reference to and/or images of illegal drugs
Fantasy Violence	Violent actions of a fantasy nature, involving human or non-human characters in situations easily distinguishable from real life
Intense Violence	Graphic and realistic-looking depictions of physical conflict. May involve extreme and/or realistic blood, gore, weapons and depictions of human injury and death
Language	Mild to moderate use of profanity
Lyrics	Mild references to profanity, sexuality, violence, alcohol or drug use in music
Mature Humor	Depictions or dialogue involving "adult" humor, including sexual references
Nudity	Graphic or prolonged depictions of nudity
Partial Nudity	Brief and/or mild depictions of nudity
Real Gambling	Player can gamble, including betting or wagering real cash or currency
Sexual Content	Non-explicit depictions of sexual behavior, possibly including partial nudity
Sexual Themes	References to sex or sexuality
Sexual Violence	Depictions of rape or other violent sexual acts

Table A1 (continued)

Content Descriptor	Description
Simulated Gambling	Player can gamble without betting or wagering real cash or currency
Strong Language	Explicit and/or frequent use of profanity
Strong Lyrics	Explicit and/or frequent references to profanity, sex, violence, alcohol or drug use in music
Strong Sexual Content	Explicit and/or frequent depictions of sexual behavior, possibly including nudity
Suggestive Themes	Mild provocative references or materials
Tobacco Reference	Reference to and/or images of tobacco products
Use of Alcohol	The consumption of alcoholic beverages
Use of Drugs	The consumption or use of illegal drugs
Use of Tobacco	The consumption of tobacco products
Violence	Scenes involving aggressive conflict. May contain bloodless dismemberment
Violent References	References to violent acts