Videogames and Wellbeing: A Comprehensive Review

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Videogames and Wellbeing: A Comprehensive Review

Gaming Research Group, Young and Well Cooperative Research Centre

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About the Authors

Dr Daniel Johnson is the director of the Games Research and Interaction Design Lab at the Queensland University of Technology. Daniel has completed Bachelors and Honours degrees in Psychology, a Graduate Certificate in Higher Education and a doctorate on the psychology of human-computer interactions and videogames. His research interests are motivations for videogame play and the impact of videogames on wellbeing. He has also worked in the games industry for companies such as NextGenVideos and The Binary Mill. He recently completed a year as a post-doctoral fellow at the University of Cambridge Well-being Institute where he remains an affiliate.

Associate Professor Christian Jones is the Associate Dean of Research at the University of the Sunshine Coast, and is also director of the Engage Research Lab where the team researches and develops technologies such as computer games, apps, social media and interactive artworks. Christian's projects include free-to-use computer games for child safety which are used by schools around the world and have won gold awards for crime prevention, apps to treat Alzheimer's Disease, apps to support children with Autism, and social media games for teenage girls to prevent alcohol misuse. He is passionate that computer games can improve mental wellbeing and be part of developing health societies.

Dr Laura Scholes completed her PhD at the University of Queensland. Her thesis examined the influence of dominant discourses of masculinity on primary school boys' reading experiences in the classroom. Currently her work in the School of Early Childhood at the Queensland University of Technology includes teaching in a range of areas and research project management. Laura has been involved in research to enhance boys' literate outcomes, to examine games based approaches to learning, and in the development of a computer game for child safely. Originally a primary school teacher, Laura has experience and an interest in the role of technology in learning.

Michelle Colder Carras is a PhD candidate in the Department of Mental Health at the Johns Hopkins Bloomberg School of Public Health. Her academic research focuses on the use of technology and mental health, including the risks and benefits of online videogames and other interactive media. Current projects include an assessment of technology use in mental health service users and a review of longitudinal research on the negative outcomes of video game play. Michelle's thesis project involves the use of latent variable modeling techniques to distinguish profiles of internet and game use and how these profiles are associated with later mental health outcomes.

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1. Executive Summary

Responding to concerns about the negative impacts of videogames on young people's mental health, as well as emerging evidence of positive impacts of videogames, the Young and Well CRC's Gaming Research Group have compiled this report on the state of play of research linking videogame play and flourishing mental health. The report specifically explores the role of videogames in young people's lives and how technology can be used to improve mental health and wellbeing. It is designed to develop understandings about the positive intersection of gaming and wellbeing, to document evidence regarding links between videogames and positive mental health and to provide guidelines for use by other researchers as they design specific tools and games to improve mental health and wellbeing for young Australians.

There is a range of evidence suggesting that videogames have a positive impact on young people's wellbeing. Existing research suggests that videogames contribute to young people's emotional, social and psychological wellbeing. Specially, videogames have been shown to positively influence young people's emotional state, self-esteem, optimism, vitality, resilience, engagement, relationships, sense of competence, self-acceptance and social connections and functioning. Emerging research suggests that how young people play as well as whom they play with may be more important in terms of wellbeing than what they play. Further research is needed to explore key questions including the moderating influence of personal characteristics on the relationship between videogames and wellbeing and extending existing research by replicating findings across game types, demographic samples and play environments.

ABOUT THE GAMING RESEARCH GROUP

The Young and Well CRC's Gaming Research Group brings together a group of researchers with a range of expertise in videogames and health-related research in order to directly tackle the question of how existing commercial games impact mental health and wellbeing, and specifically seek to identify links between video game play and models of flourishing in mental health.

The group will be positioned to advise other projects in the Young and Well CRC regarding the employment of games, game design techniques and games-related technologies to maximise young people's engagement with the tools and programs produced by the Young and Well CRC.

METHODS

The Gaming Research Group conducted a comprehensive review of international research linking videogame play with positive wellbeing. Papers were drawn from existing paper repositories as well as targeted searches in key areas of focus. Over 200 research papers were identified, reviewed and analysed.

KEY FINDINGS

The key findings of this review are:

- There are many creative, social and emotional benefits from playing videogames, including violent games (Kutner & Olson 2008).

- Although 'excessive' gamers showed mild increases in problematic behaviors (such as somatic symptoms; anxiety and insomnia; social dysfunction, and general mental health status), it was non-gamers who were associated with the poorest mental health correlates (Allahverdipour et al 2010).

- Frequency of play does not significantly relate to body mass index or academic grade point average (Wack & Tentelett-Dunn 2009)

- Videogames have been found to be an effective play therapy tool. Children can be helped to change their views of themselves and the world around through metaphors in games, e.g., 'the force' in *Lego Star Wars*, gaining 'attributes' in *SSX-3* (snowboarding), and conquering 'quests' in *RuneScape* (Hull 2009).

Positive Emotional Impact

- Moderate videogame play can contribute to positive emotions (Allahverdipour, Bazargan, Farhadinasab & Moeini 2010; Kutner & Olson 2008; Ryan, Rigby & Przybylski 2006; Przybylski, Ryan & Rigby 2009; Wang, Khoo, Liu & Divaharan 2008).

- Moderate videogame play can contribute to emotional stability (Przybylski, Weinstein, Murrayama, Lynch & Ryan 2011).

- Moderate videogame play can contribute to reducing emotional disturbances in children (Hull 2009).

- Positive mental wellbeing has been associated with videogame play as a means of relaxation and stress reduction (Russoniello, O'Brien & Parks 2009; Snodgrass, Lacy, Dengah, Fagan & Most 2011; Wack & Tantleff-Dunn 2009).

- Depressed mood has been found to be significantly lower in the moderate players of videogames compared to those who 'never' play videogames and those who play videogames to excess (Durkin & Barber 2002).

- Non-gaming has been found to put boys, in particular, at greater risk for problems. Boys who did not play any videogames during a typical week had a higher risk of emotional disturbance compared to children who were using games for emotional regulation — to help them relax, to forget problems, or to feel less lonely (Kutner & Olson 2008).

- Children play games as a means of mood alteration or 'letting off steam' in response to problems with friends or parents. Feelings of anger, guilt, or frustration were dissipated after some time spent in game play resulting in players feeling much happier (Colwell 2007).

- It appears that children and adolescents deliberately choose to play videogames in the knowledge that they will feel better as a result (Colwell 2007).

Healthy Relationships and Social Capital

- Videogame players report higher levels of family closeness, less risky friendship networks and better attachment to school than non-players (Durkin & Barber 2002).

- Moderate videogame play among young men can provide a healthy source of socialisation, relaxation, and coping (Wack & Tantleff-Dunn 2009).

- Videogaming among college-aged men has been seen to provide a healthy source of socialisation, relaxation, and combating stress (Wack & Tentelett-Dunn 2009, Snodgrass, Lacy, Dengal & Fagan 2011; Snodgrass, Lacy, Dengah, Fagan & Most 2011; Snodgrass et al 2012).

- Massively Multiplayer Online Role Playing Games (MMORPG) players under the age of 18 have been found to feel that the friendships they formed online were comparable or better than their real life friendships (Yee 2006).

- *World of Warcraft* (*WoW*, an MMORPG) players have reported creating social capital through online game play with players using the game to extend real life relationships, meet new people and form relationships (Williams et al 2006).

- The social interactions that occur within and outside of MMORPG play have been found to be highly social, providing opportunities to create strong friendships and emotional relationships (Cole & Griffiths 2007; Yee 2006). As Cole & Griffiths (2007) found in their study of 912 self-selected MMORPG players from 45 countries, the social interactions in online gaming form a considerable element in the enjoyment of playing. This type of game play can be extremely social with a high percentage of gamers making life-long friends and partners.

- 76.2% of male and 74.7% of female players had made good friends within online games suggesting that MMORPGs are highly socially interactive (Cole & Griffiths 2007].

- In a *WoW* study, two fifths of participants said they would discuss sensitive issues with their online gaming friends that they would not discuss with their real life friends, and with female players more likely to do so (Cole & Griffiths, 2007).

- In the *WoW* study, two fifths of participants had met with online friends in real life situations, suggesting that online gaming is a social activity or facilitates social activity (Cole & Griffiths 2007).

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Self Esteem

- Self-esteem was higher in the moderate videogame players, while self-concept was higher amongst players compared to non-players (Durkin & Barber 2002).

- Videogame play may allow players to express themselves in ways they may not feel comfortable doing in real life because of their appearance, gender, sexuality, and/or age (Coles & Griffith 2007).

- The anonymity and fantasy of MMORPG virtual worlds can free players from their real life history and social situation, allowing them to be more like the person they wish to be (Bessiere, Fleming & Kiesler 2007).

- This opportunity can increase their feelings of self-confidence and self worth, potentially impacting positively on psychological health (McKenna & Bargh 1998, 2000).

- Players whose characters display desirable qualities could imagine themselves as different and try to emulate their characters' better traits (Bessiere et al 2007).

FUTURE RESEARCH OPPORTUNITIES

While there is evidence of a range of positive impacts of videogames on wellbeing as well as indications of pre-existing characteristics that may lead to some young people being vulnerable to negative impacts of videogames much further research is needed.

- Broadly, there is a need to continue to explore the nature and extent of the wellbeing benefits of videogames. Knowledge of when, how and for whom there is a positive impact of videogame play will allow for healthy engagement by young people with videogames and the leveraging of videogame play for maximum benefit.

- It is not yet clear to what extent the benefits of videogame play can be adapted to therapeutic settings. Research is needed to explore how and when the positive impacts of videogame play can be leveraged in a clinical setting.

- There is evidence that the degree of violence in videogames is not a key factor in determining players enjoyment (Przybylski, Ryan & Rigby, 2009), however research is needed to determine which combinations of game content, individual characteristics (such as psychosocial vulnerability or youth), play environments and styles of play may have a negative influence on players.

- The findings suggest that the amount of play may be less important for wellbeing than how videogames are played, whether they are played with others, and with whom they are played. However, further research is needed to identify guidelines regarding the amount of certain types of play that are most likely to lead to positive impacts on wellbeing and when there is a risk of negative impacts.

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Table of Contents

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2. Introduction and Context

2.1 INTRODUCTION

Mental health is recognised by governments around the world as crucial to the wellbeing of individuals and societies. It is considered essential to human welfare and to sustained economic and social development (World Health Organisation 2001, 2010; Funk Drew, Freeman, Faydi, World Health Organisation 2010; Herrman, Saxena & Moodie 2005). Flourishing mental health has been defined as a combination of feeling good and functioning effectively resulting in high levels of mental wellbeing (Huppert & So 2013). A conceptual definition of flourishing builds on the recognition that to flourish is more than the absence of disorder with flourishing conceived as the opposite of mental disorder, rather then its mere absence (Huppert & So 2013). Flourishing refers to the experience of life going well including a combination of feeling good and functioning effectively (Huppert & So 2013). A conceptual framework for flourishing wellbeing includes definitions of the features of positive wellbeing and builds on the seminal work of Huppert and So (2013), Keyes (2005) and Seligman (2011). Mental disorders, however, are universal and present in all people of all regions, all countries and all societies (WHO 2001; Australian Bureau of Statistics 2007; Herrman et al 2005). Within Australia, mental disorders are the leading cause of disability burden (Vos & Mathers 2000) with this trend increasing rapidly. With at least one in five Australians believed to have a mental health disorder, mental health has become one of Australia's National Health Priority Areas (ABS 2007).

This report prepared by the Gaming Research Group specifically explores the role of videogames in young people's lives and how videogames can be used to improve mental health and wellbeing. It is designed to develop understanding about the positive intersection of gaming and wellbeing, to document evidence regarding the links between videogames and positive mental health, and to provide guidelines for use by other researchers as they design specific tools and games to improve mental health and wellbeing for young Australians.

Within this report, 'videogames' is used to refer to electronic/digital games played on personal computers, home consoles (e.g., Microsoft Xbox, Sony Playstation, Nintendo Wii), tablets (e.g., iPads), mobile devices (e.g., smart phones, handhelds like Nintendo 3DS) and the world wide web (e.g., via Facebook or other websites). 'Young people' refers to individuals aged from 12-25, consistent with Young and Well CRC's age category for young people. These young people have increasing access to computers and videogames with this mode of entertainment offering increased opportunities to be part of a multi player environment (Brand 2012; Johnson, Smith, Willis, Levine & Haywood, 2011; Entertainment Software Association 2012).

National data collected as part of Interactive Games and Entertainment Association of Australia's (IGEA) 2011 survey of Australian computer game activities highlights these changes. The data was published as *Digital Australia 2012* (Brand 2012). As part of this study, a random sample of 1252 Australian households including 3533 woman, men, girls and boys responded to more than 80 questions in an online survey. According to the report, 95% of homes with children under the age of 18 have a device for playing videogames, and 94% of children aged between 6 and 15, and close to 90% of people aged 16-25 played videogames (Brand 2012). Of note, the data shows that digital games are not a solitary activity as 70% of those surveyed indicated that they played digital games with others either in the same room or over the Internet (Brand 2012). There have also been changes in terms of female gaming engagement and in the seven years from 2005-2011, the proportion of gamers who were female increased steadily from 38% to 47% (Brand 2012). Equal representation of female gamers to males is predicted as imminent (Brand 2012).

It is also informative to look at the types of videogame play that people prefer. Nearly one in five gamers play social network games and one in 10 report their enjoyment for massive multiplayer games (Brand 2012). The growing social and online play is driving interest with one in five gamers 'motivated' or 'very motivated' to sign up to a faster broadband service for game downloads and online play (Brand 2012). While there is an increase in social network gaming within Australia, sales of games indicate there is currently a preference for family games (19%) followed by Action (18%), First-Person Shooters (15%), and Sports and Racing games (9% each) (Brand 2012).

2.2 BACKGROUND

2.2.1 Violent Videogames

Traditionally, much of the research on videogames has focused on the negative effects of playing such games. However the impact of violent videogames is currently contested and it is argued that research reporting the effects of violent games on aggression has room for improvement. The existing body of research has been criticised for concerns about publication bias and an emphasis on the use of laboratory measures of aggression that exaggerate relationships between videogame violence and aggression and do not accurately predict real life behaviour (Boyle, Connolly & Hainey 2011; Ferguson, 2007; Kutner & Olson 2008; Sherry 2004, 2007).

More recent research includes studies focusing on longitudinal measures that attempt to demonstrate causal relationships between violent videogames and aggression. Many of these studies rely on self-reported measures of aggressive feelings or attitudes (Lemmens et al 2011; Möller & Krahé 2009; Anderson et al 2010; Shibuya, Sakamoto, Ihori & Yukawa, 2008), while other studies include self-reported counts of aggressive behaviours (Shibuya et al 2008; Bucolo 2011) or combined teacher and peer ratings (Gentile & Gentile 2008). While some of those studies do report associations between earlier violent videogame play and later self-reported aggression (Anderson et al 2010; Bucolo 2011; Möller & Krahé 2009) or combined peer-and teacher-reported aggression (Gentile & Gentile 2008), others do not support long-term direct effects of violent videogames on self-reported physical aggression (Lemmens et al 2011; Shibuya et al 2008). For a more complete exploration of these issues and the research regarding long-term outcomes of videogame play, see Carras et al (in prep).

While there is ongoing discourse concerning the possible influence of violent videogames, research focused on motivations for play has shown that once needs for feelings of competence and autonomy are accounted for in determining game enjoyment, the degree of violence in games does not uniquely predict the desire for or the enjoyment of game play (Przybylski, Ryan & Rigby 2009). In short, violence is not an important factor in contributing to game enjoyment; players play violent games for the same reasons they play other games, such as enjoyment of the challenge and the freedom to act in a virtual world (Przybylski, Ryan & Rigby 2009).

Focusing on violent videogames as a precursor to aggression and violence amongst young people may cause parents, social activists and public-policy makers to ignore the much more powerful and significant causes of violence amongst young people that have already been well established, including a range of social, behavioural, economic, biological and mental-health factors (Kutner & Olson 2008; Ferguson et al 2013).

2.2.2 Games and Addiction

Although the terminology is still being debated (Lemmens et al 2011) some researchers have begun to voice concerns about pathological gaming as a legitimate behavioural disorder. To this end, the American Psychiatric Association has recently designated "Internet Gaming Disorder" as a condition requiring further study (American Psychiatric Association, 2013). Some studies of small groups of players who spend excessive amounts of time on games have shown that symptoms of addiction can arise including withdrawal, preoccupation, loss of control, and interpersonal or intrapersonal conflicts (Gentile, 2009; Grüsser, Thalemann & Griffiths 2007), while other studies fail to support links between heavy play and negative psychosocial outcomes in non-addicted gamers (Lemmens et al 2011, Van Rooij et al 2011). Although longitudinal research on pathological gaming is relatively scarce, three studies evaluate the psychosocial predictors and outcomes of pathological gaming among adolescents (Lemmens et al 2011, Gentile et al 2011, Van Rooij et al 2011). Gentile et al using a broad definition of pathological gaming (endorsing five or more items on a 10-item scale), grouped children according to changes in their self-rated pathological gaming over time (Gentile et al 2011). These authors evaluated a large number of potential risk factors for the development of pathological gaming and concluded that time gaming as well as psychosocial factors such as impulsivity, social competence and emotional regulation all predicted the development of pathological gaming. They also found that those who became pathological gamers were more likely to show increased scores on scales measuring ADHD, anxiety, and depression.

Consistent with Gentile and colleagues' research, Lemmens and colleagues also found that lower psychosocial wellbeing was generally a precursor of pathological gaming, with diminished social competence, increased loneliness, and lower self-esteem predicting an increase in pathological gaming six months later (Lemmens et al 2011). They also found that pathological gaming was associated with

even greater amounts of gaming six months later, as well as increases in self-reported physical aggression for boys. Finally, a study by Van Rooij and colleagues (2011) of online gamers points to the persistence of pathological gaming over the course of a year, with half of a group of pathological gamers (described as having both heavy play and high self-reported addictive use) showing continued pathological use a year later. In sum, the research suggests lower psychosocial wellbeing is more likely to be a cause rather than a consequence of internet gaming addiction (Chak & Leung 2004; Ko et al 2005), but that harm may result from play that is rated by players as addictive.

Przybylski, Weinstein, Ryan, and Rigby (2009) conducted research exploring the consequences of different styles of engagement in videogame play (further details in Vitality section). The researchers were particularly interested in how need satisfaction in other areas of life moderated the relationship between videogame play and wellbeing. Based on a large sample (n=1324) of videogame players, they established that high levels of basic psychological need satisfaction were positively related to harmonious passion for videogame play (the activity is personally important, freely chosen and in harmony with other aspects of life), whereas low levels of need satisfaction were related to obsessive passion for videogame play (the activity is experienced as a compulsion and conflicts with other facets of life). In turn, harmonious passion contributed to enhancing experiences of play and game enjoyment energy post-play but did not influence amount of play. In contrast, obsessive passion contributed to a disordered pattern of play including greater amounts of play, higher tension post-play, and less game enjoyment for players of some game types (Przybylski, Weinstein, Ryan & Rigby 2009).

According to self-determination theory research, the internalisation motivation for life pursuits (including passion for videogame play) and wellbeing are both direct consequences of the satisfaction of psychological needs (Deci & Ryan 2000; Ryan & Deci 2008). Findings within this study indicated that the quality of play moderated the influence of quantity of play on post-play energy, life satisfaction and positive mental health (Przybylski, Weinstein, Ryan & Rigby 2009). Significantly, in terms of post-play energy, high levels of play paired with low levels of obsessive passion resulted in higher levels of post-play energy (Przybylski, Weinstein, Ryan & Rigby 2009).

2.2.3 Videogames for positive wellbeing

Recently, there has been significant interest in the links between videogame play and positive wellbeing (see Allahverdipour, et al 2010; Barr, Khaled, Noble & Biddle 2006; Colwell 2007; Boyle, et al 2011; Durkin & Barber 2002; Hull, 2009; Przybylski et al 2011; Ryan & Deci 2008; Snodgrass, Lacy, Dengah, Fagan & Most 2011; Wang et al 2008). To date most of the existing literature on gaming has been inconsistent and has often focused on aggression. However, over the last five to ten years, increasing attention has been given to the possibility of games improving health and wellbeing (Desai, Krishnan-Sarin, Cavallo & Potenza 2010). A number of more recent studies have reflected this shift considering a nuanced approach to the positive and negative influences of game play and the number of significant studies that demonstrate clear benefits to individuals who spend time in game play. There is also increased concern that the potential value of videogames has not been sufficiently considered particularly in terms of the benefits for young people at risk (Kutner & Olson, 2008).

There is a gap in the literature in terms of a lack of an explicit review of this emerging research examining the benefits of gaming articulated in these studies and the demonstrated links to positive social and emotional wellbeing (Kutner & Olson, 2008; Allahverdipour, Bazargan, Farhadinasab, & Moeini, 2010) (Kutner & Olson, 2008; Allahverdipour, et al, 2010). As contemporary research provides examples of the benefits of gaming the question then becomes more about optimal levels of game play, the influence of factors such as gender, subgroups and associated experiences, and the interplay of particular genres on wellbeing.

3. Wellbeing Framework

Understanding the relationship between videogames and positive wellbeing involves first defining what constitutes flourishing mental health and then systematically examining empirical research to ascertain evidence of factors linking the complexity of game play with positive mental health and wellbeing of young people.

3.1 DEFINITION OF FLOURISHING MENTAL HEALTH

Flourishing is considered by Keyes (2002) as the epitome of mental health in adults. Flourishing adults posess: high levels of emotional wellbeing; are happy and satisfied; tend to see their lives as having a purpose; feel some degree of mastery and accept all parts of themselves; have a sense of personal growth in the sense that they are always growing, evolving, and changing; have a sense of autonomy and an internal locus of control; and choose their fate in life instead of being victims of fate.

Keyes further argues that mental health does not imply an absence of mental illness but rather is the presence of positive mental health. An individual described as flourishing will have a combination of high levels of emotional wellbeing, psychological wellbeing, and social wellbeing (Keyes 2002, 2007).

3.2 COMPREHENSIVE REVIEW PROTOCOL

The Gaming Research Group conducted a comprehensive review of international research linking videogame play with positive wellbeing. To minimise bias, protocols were developed leveraging established criteria for a 'systematic review' (MacDonald 2000). These protocols involved clear definition of the research focus, transparency in the reporting of search methods, comprehensive searches for published and unpublished studies, criteria for assessing the quality of studies, peer review to reduce bias, and explicit reporting of the findings (Evans & Benefield 2001). Following Evans and Benefield's (2001) framework steps were taken in a comprehensive search to examine empirical research findings within the constructs defined in the flourishing wellbeing framework.

Prior to this research review, the Gaming Research Group collated a repository of empirical research papers focusing on videogame play. This repository was created by a group of academics in the fields of psychology, human-computer interaction, social sciences, humanities, education and health. The collection of over 200 research papers was reviewed and analysed in terms of the flourishing wellbeing framework constructs identified based on the work of Huppert and So (2013), Keyes (2005) and Seligman (2002, 2011).

The flourishing wellbeing framework in Table 1 (Vella and Johnson in prep) provided a starting point for identifying positive mental health. The wellbeing indicators fall into three categories namely: positive characteristics/affect, positive functioning and positive social functioning. The literature search was then extended to academic electronic database searches to identity any recent literature published relating to videogame play and positive health, and key terms associated with Positive Affect, Positive Functioning and Positive Social Functioning (see Table 1). Academic electronic database searches were conducted to identify relevant literature published in the past 10 years that included empirical research findings linking videogames and positive wellbeing within the defined framework. Peer review by several members of the team ensured the research reported included quality studies that followed rigorous methodological protocols.

TABLE 1. Comparison of Wellbeing Related Terms Used by Key Authors

	Seligman (PERMA)	Keyes	Huppert & So
Positive Psychological Characteristics / Emotional Wellbeing	Positive Emotion	Positive Affect	Positive Emotion
		Life Satisfaction	
			Emotional Stability
			Vitality
			Optimism
			Resilience
			Self-Esteem
Positive Psychological Functioning	Engagement		Engagement
	Positive Relationships	Positive Relationships	Positive Relationships
	Accomplishment	Environmental Mastery	Competence
	Meaning	Purpose in Life	Meaning
		Self-Acceptance	
		Personal Growth	
		Autonomy	
Positive Social Functioning		Social Acceptance	
		Social Actualisation	
		Social Contribution	
		Social Coherence	
		Social Integration	

Building on the work of Huppert and So (2013), Keyes (2005) and Seligman (2011), the three categories of positive characteristics/affect, positive functioning and positive social functioning are considered in the following sections.

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4. Findings

4.1 POSITIVE CHARACTERISTICS / AFFECT

4.1.1 Positive Emotion / Emotional Stability

While traditionally research has suggested that videogames contribute to negative outcomes, increasingly empirical research highlights positive outcomes associated with game play. Emerging research suggests that moderate game play may contribute to positive emotions (Allahverdipour et al 2010; Kutner & Olson 2008; Ryan et al 2006; Przybylski, Weinstein, Ryan & Rigby 2009; Wang et al 2008), emotional stability (Przybylski et al 2011), and reducing emotional disturbances in children (Hull 2009). Positive mental wellbeing has also been associated with game play as a means of relaxation and stress reduction (Russoniello et al 2009; Snodgrass, Lacy, Dengal & Fagan 2011; Wack & Tantleff-Dunn 2009).

Consideration of the relationship between game play and measures of psychological adjustment has contributed to our understandings of the potential for gaming to contribute to emotional wellbeing. To this end, Durkin & Barber (2002) examined the relationship between game play and several measures of adjustment for 1304 high school students, finding that videogame play was unlikely to be harmful and instead was often associated with positive outcomes. The survey data used in this study was taken from Wave 5 of the Michigan Study of Adolescent Life Transitions (MSALT), an ongoing longitudinal investigation examining participants' normative and non-normative life transitions from early adolescence through adulthood (Durkin & Barber 2002). As part of the study a sample of 16-year-olds were identified as individuals whose involvement in computer game play was 'never', 'low', or 'high.' Participants were asked to indicate how often they used a computer to play videogames with responses ranging from 1 (never) to 7 (daily). Participants who checked 1 were put into the 'never' group, those who checked 2, 3, 4, or 5 were put into the 'low' group, and those checking 6 or 7 were put into the 'high' group. The study was concerned with videogames in general and did not collect detailed information on the participants' particular game preferences. Differences were then identified between these groups on measures of adjustment, self-concept, risk behaviour, school achievement, and social involvement.

Emotional benefits of game play

There were advantages to adolescents in the low and high play groups compared to the young people who reported that they never played games (Durkin & Barber 2002). Specifically, depressed mood was significantly lower in the low use group compared to the 'never' and 'high' groups who reported similar, higher levels. Self-esteem was also higher in the low use group, with self-concept regarded higher by players than non-players with high use players scoring the highest in this domain.

Both groups of players also reported higher levels of family closeness and less risky friendship networks than non-players, with attachment to school also higher in these two groups (Durkin & Barber 2002). It is suggested that direction of effect is bidirectional, and that videogame play itself both affects psychological adjustment and is a normative part of life for psychologically well-adjusted young people (Durkin & Barber 2002). Implications of this study indicate that the amount of game play young people engage in is a moderating factor on their personal wellbeing.

In a similar manner, Allahverdipour and colleagues (2010) also suggest there is a relationship between the amount of game play and psychological mental health status. In a cross-sectional study to describe patterns and correlates of videogame use in a random sample of middle-school students, moderate game players reported better mental health compared to non-gamers and excessive gamers (Allahverdipour et al 2010). Participants included 444 students ranging from 12-15 years who completed a General Health Questionnaire (GHQ) to assess their mental health. The GHQ measured the subjective symptoms of psychological distress, somatic manifestations often associated with anxiety and depression, relationship difficulties, and social, family, and professional roles; and subscales of somatization, anxiety, social dysfunction, and depression (Goldberg & Hillier 1979).

Participants spent an average of 6.3 hours per week playing videogames with 47% reporting that they had played one or more intensely violent games including: *Dead or Alive, Def Jam, Doom, Driver, Mortal Kombat, Grand Theft Auto, Resident Evil*, and *Prince of Persia* (Allahverdipour et al 2010). Moreover, 92% of boys and 96% of girls played videogames although boys typically played games with greater

duration than girls (Allahverdipour et al 2010). Playing videogames may have different social implications for girls than for boys as it was boys, but not girls, who admitted playing videogames excessively and reported more aggressive behaviours (Allahverdipour et al 2010). However, it is the amount of game play that appears significant with moderate gaming among young men providing a healthy source of socialisation, relaxation, and coping (Wack & Tantleff-Dunn 2009). In terms of amount of play, 'non-gamers' were those who did not play at all, for those who did play, 'low' was defined as 1-6 hours per week, 'moderate' as 7-10 hours per week, and 'excessive' as more than 10 hours per week. The Allahverdipour et al (2010) study found a curvilinear relationship between videogame playing and mental health with 'moderate' gamers faring best. Although 'excessive' gamers showed mild increases in problematic behaviours (such as somatic symptoms; anxiety and insomnia; social dysfunction, and general mental health status), it was non-gamers who indicated the poorest outcomes on these constructs (Allahverdipour et al 2010). Non-gaming has been found to put boys, in particular, at greater risk for problems. This effect for non-gamers has also been reported by others who found gaming positively contributed to creative, social, and emotional benefits (Kutner & Olson 2008).

There is concern that the potential benefits of videogames (including some games with violent content) have not received enough attention. Kutner and Olson, co-directors of the Harvard Medical School Center for Mental Health and Media, are psychiatrists who share this concern. Recently they aimed to identify 'markers' of increased risk for young people's emotional problems conducting a large-scale study funded by the Office of Juvenile Justice and Delinquency Prevention, U.S. Department of Justice. The study involving 1,254 children in grades seven and eight, and 500 of their parents. They found that boys who did not play any videogames during a typical week had a higher risk of emotional disturbance, and that children were using games for emotional regulation — to help them relax, to forget problems, or to feel less lonely, adding impetus for further consideration of the role of videogames for positive wellbeing (Kutner & Olson 2008). Significantly, they also documented many creative, social and emotional benefits from videogame play including violent games.

Kutner and Olson's (2008) study included questions to participants about access to electronic games, game preferences and exposure, and context of and motivations for game use. Children were asked to list five games that they had played a lot in the past six months to assess violent content exposure. Electronic games were defined as computer games, videogames (Xbox, PlayStation, GameCube etc.) and handheld games (Game Boy etc.). As there has been little research about the use of games for children with emotional and mental health problems the study also identified children with symptoms of depression (feeling sad, hopeless and worried, having less fun and feeling down on themselves) and experiences of game play (Kutner & Olson 2008). Two-thirds of the children meeting the threshold for depression agreed they played games to forget problems, and depressed children were more likely than other children to play to feel less lonely and effectively manage anger. Two-thirds of girls said they played games to create another world (Kutner & Olson 2008).

The impact of violent videogames

Playing M-rated games was common among these children aged 12-14 with 44% of boys and 20% of girls playing one or more intensely violent games such as *Grand Theft Auto* series although boys were five times more likely than girls to have played. The top five M-rated game series included: *Grand Theft Auto, Halo*, *Def Jam*, *True Crime*, and *Driver* (Kutner & Olson 2008). Boys were more likely than girls to play at least one M-rated game. While the survey did find correlations between M-rated violent game play and some common childhood problems such as aggressive behaviours or school problems this risk was for both boys and girls (Kutner & Olson 2008). The survey results however, were cross-sectional, and therefore did not show causality. In fact, most children who played violent games did not have problems (Kutner & Olson 2008). There appears to be a need for further examination to identify combinations of game content, children's characteristics, and game play environments that may promote aggressive behaviour, increase fear, or desensitise children to violence (Olson, et al 2007). Of note, many of the boys in this study described using violent videogames to manage their emotions and to deal with anger, frustration and stress (Kutner & Olson 2008). A more nuanced approach to understanding the role of violent videogames includes understanding the potential benefits of game play for wellbeing, and the complexities associated with aggressive behaviours including the multiplicity of influences that go well beyond the boundaries of gaming. According to Kutner and Olson (2008) much of what has been written in the popular press about violent videogames and the link to violent behaviours has been based on misunderstandings and flawed research.

Using game play for stress relief was also important for participants in a study conducted by Colwell (2007). In this study focus groups were conducted, followed by a content analysis, with items corresponding to emerging themes identified in previous research for use in a quantitative survey (Colwell 2007). Fourteen group focus discussions were conducted in two primary (boys and girls 8 to

11-years-old) and three secondary schools (boys and girls 11 to 15-years-old) about leisure activities, computer game play, game preferences, changes in play over time, and reasons for game play. The follow up survey included 482 school students (257 boys and 225 girls), with age range 11 to 15-years-old from two primary and two secondary schools (Colwell 2007). Companionship, preference to friends, fun challenge, and stress relief were found to be significant factors.

Game play for children in the Colwell (2007) study, was said to be used as a means of mood alteration or 'letting off steam,' following problems at school, or with friends or with parents. Feelings of anger, guilt, or frustration were then dissipated after some time spent in game play, with players then feeling much happier (Colwell 2007). Children had an understanding of the mood altering benefits of their play and explicitly made a choice to engage with games as they managed their emotions. As gaming was used for altering mood after an upset or while feeling anger to a more positive mood, it would appear children and adolescents may deliberately choose to play, in the knowledge that they will feel better as a result (Colwell 2007). To this end, children enjoyed playing a wide range of game genres with racing games (e.g., cars racing), puzzle games (brainteasers), role play games (the player can take on another identity), shoot 'em up games (shooting and killing using a variety of weapons) and beat 'em up games (punching and/or kicking), sports games (e.g., golf simulations), and platform games (usually running and jumping onto platforms) mentioned (Colwell 2007). Girls expressed a preference for puzzle, role play, and platform games, whereas boys preferred games which involved action such as racing games, sports games, and beat and shoot 'em ups (Colwell 2007).

In sum, there is clear evidence that moderate levels of play can have a positive influence on emotions and emotional stability. Specifically, videogame play can lead to improved mood, reduced emotional disturbance, improve emotion regulation, relaxation and stress reduction. Importantly, moderate play was associated with better outcomes than either excessive play or a lack of play. Most importantly, there is a lack of negative impact for the majority of young players.

4.1.2. Self-esteem

Self-esteem influences psychological wellbeing and includes one's perceptions of their ideal and actual self-concepts (Rogers & Dymond 1954; Mann, Hosma, Schaalma & de Vries 2004). Evaluation of one's self-concept is dependent on appraisals, social comparisons and self-attributions (Rosenberg, Schooler & Schoenbach 1989). Divergence and convergence of actual self-characteristics and ideal self-characteristics can lead to feelings of disappointment or feelings of joy and happiness respectively (Ryan & Deci 2000). Contexts that support the satisfaction of psychological needs, such as experiences of autonomy and competence, can reduce perceived discrepancies between actual and ideal characteristics enhancing a positive sense of wellbeing (Ryan & Deci 2000).

As noted earlier, Durkin and Barber (2002) also found low amounts of game play associated with higher self-esteem although girls were found to have more depressed moods and lower self-esteem than boys regardless of game play. Videogame play was also a predictor for self-concept including perceptions of intelligence, mechanical repairs and computer skills. Individuals who never played games report lower self-concepts in intelligence and computer skills than those who played low or high amounts of games and less mechanical ability than those who played high amounts (Durkin & Barber 2002). Those who played higher amounts of videogames also reported higher computer skills than those who played lower amounts. Lemmens and colleagues (2011) also measured adolescents' self-esteem using a six-item self-esteem scale. The measure considered self-acceptance, self-respect and generally positive self-evaluation. They also found a gender differences with girls indicating that they were lonelier (t (542) = 4.70, p < .05) and had lower self-esteem (t (542) = 4.71, p < .05) than adolescent boys. Causal interpretations found problematic gaming may not present a primary condition in itself and may be symptomatic of other underlying conditions or problems with diminished social competence and lower self-esteem a predictor of problematic gaming.

Ryan et al (2006) suggest that the psychological 'pull' of games is largely due to their capacity to engender feelings of autonomy, competence and relatedness, and that to the extent they do so can be experienced as enhancing psychological wellness including self-esteem. Their study included a modified 10-item general subscale of the Multidimensional Self-esteem Inventory and assessed self-esteem pre- and post-play. Here the focus was on the short-term effects of pre- and post-game experiences of particular games. Participants who experienced competence satisfaction experienced increased self-esteem and positive affect, whereas individuals who were more autonomous in their playing experienced overall higher self-esteem and positive mood (Ryan et al 2006). Participants who experienced autonomy and competence in play showed positive outcomes, explaining why for some people gaming provides pleasure and perhaps restoration (Ryan et al 2006).

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The genre of the game is significant and can lead to differences in terms of meeting psychological needs. Participants in Ryan et al's (2006) study were exposed to solitary game play and multi-player environments within a four-phase research design. Within the first three phases of the study cohorts of male and female undergraduate students played simple popular platform games, 3D adventure games, 'rail-shooter' 'fighting' and 'arcade-racing' games. Phases one to three examined individuals playing 1, 2 and 4 games, showing that perceived in-game autonomy and competence were associated with game enjoyment, preferences, and changes in wellbeing pre- to post-play (Ryan et al 2006). The fourth phase included 730 members of an online Massively Multiplayer Online (MMO) community. Members completed a survey about past experience in MMO environments. As MMOs are rich in content and provide opportunities for interaction between players, the psychological need for relatedness also emerges as an important satisfaction that promoted a sense of presence, game enjoyment, and an intention for future play (Ryan et al, 2006). Results indicated relations between autonomy and competence satisfactions in solitary game play, and the addition of relatedness in multi-player environments. Autonomy, competence and relatedness not only motivate further play, but can also be experienced as enhancing psychological wellness including post play self-esteem.

Lemmens et al (2011) were also interested in the relationship between adolescents' videogame play and self-esteem. The study examined the psychosocial causes and consequences of pathological gaming among 11 to 17-year-old adolescents using a two-wave longitudinal survey (Lemmens et al 2011). In this study, pathological gaming was measured using a previously validated game addiction scale (Lemmens et al, 2009) designed to reflect DSM-IV criteria for pathological gambling that addresses the addiction domains of salience (thinking a lot about games), tolerance (spending increasing amounts of time gaming), mood modification (playing games to forget about problems), relapse (trying to reduce play time without success), withdrawal (feeling bad when not able to play), conflict (having fights with others about time spent playing), and problems (neglecting other activities in order to play). The scale included one item for each domain; each item was evaluated over the last six months. Items could be rated from 1 (never) to 5 (very often), and the authors defined pathological gaming as having a mean score of 3 or higher, i.e., showing most signs of pathological gaming over the previous six months.

The first wave included 1024 adolescents from four schools of secondary education throughout the Netherlands with a follow up six months later with 941 adolescents. Of these respondents, 543 had played videogames throughout the two waves and had fully completed both questionnaires. The research design included a six-item self-esteem scale by Rosenberg et al (1989). The scale measures feelings of self-acceptance, self-respect and generally positive self-evaluation. In this study girls were again found to indicate they were lonelier and had lower self-esteem than adolescent boys across both waves (Lemmens et al 2011). Finding indicated lower psychosocial wellbeing was generally an antecedent of pathological gaming as diminished social competence, increased loneliness, and lower self-esteem predicted an increase in pathological gaming six months later (Lemmens et al 2011). There was also a reciprocal relation between loneliness and pathological gaming implying that loneliness is both a cause and a consequence (Lemmens et al 2011). These findings are particularly interesting in terms of causal relations as much of the literature implies diminished psychosocial wellbeing is a consequence of pathological gaming. The findings are also noteworthy as they indicate the need to consider subgroups of young people who may be more vulnerable to adverse affects of gaming and the need to consider the importance of the amount of time spent in game play for positive wellbeing. Furthermore, as psychosocially vulnerable gamers are particularly susceptible to pathological involvement with online games (Smyth, 2007) the format of game play is also a significant factor for consideration in terms of game play and wellbeing.

Videogames and Self Concept

The potential of videogames to put players in touch with ideal aspects of themselves is associated with the motivational appeal and emotional impact of gaming (Przybylski et al 2011). Przybylski and colleagues (2011) tested the hypothesis that engagement in videogames allows players to experience their ideal self-characteristics. They examined the relationship among three complementary constructs: *ideal self-characteristics*, or how people would like to experience themselves; *game self-characteristics*, or how individuals experience themselves when playing videogames; and *actual self-characteristics*, or how people are in their everyday lives (Przybylski et al 2011).

The first stage of this study included 144 undergraduates (48 male, 96 female; mean age = 19.83 years, SD = 1.19 years) who responded to introductory questionnaires, played three different videogames, and completed questionnaires after each game. The second stage of the study involved 979 computer and video-game players (829 males, 150 females; age range = 18–48 years, *M* = 23.18 years, *SD* = 4.84 years) who completed a set of questionnaires. In both stages of this study, four items were adapted to

assess motivation to play videogames to assess positive and negative post-play affects (Przybylski et al 2011). Ideal self, actual self, and game self-characteristics were assessed with three repetitions of a 30-item personality inventory with immersion assessed with the nine-item Presence subscale of the Player Experience of Need Satisfaction Scale (Przybylski et al 2011).

The first stage of the study included participants playing three popular videogames. These games were selected because they could be played using simple controls yet provided diverse challenges embedded in accessible narratives, and received above-average rating on imagination, self-confidence, and open mindedness experienced while playing (Przybylski et al 2011). *Bookworm* required players to use their lexical abilities; *Peggle* evoked visual and spatial skills; and *Bejeweled* asked players to match patterns. The second stage of the study extended the investigation by studying a sample of self-selecting video-game players (Przybylski et al 2011). These participants reported playing a majority of socially oriented games with diverse array of narratives and ready-made roles with the most popular games being team-based competition games (24%), such as *Team Fortress 2*, and online role-playing games (19%), such as *World of Warcraft* (Przybylski et al 2011). Also popular were action and adventure games (14%), such as *Legend of Zelda*; strategy games (12%), such as *Star-Craft 2*; and offline role-playing games (12%), such as *Final Fantasy* with the remaining selections (19%) belonged to an assortment of genres and included *The Sims* and *Guitar Hero* (Przybylski et al 2011).

It was anticipated that players would be drawn to games that allowed them to experience their ideal self-characteristics. Using laboratory and observational designs, the study found convergence between people's experience of themselves during play and their concept of their ideal selves which was then related to enjoyment of play and positive shifts in affect (Przybylski et al 2011). Games were intrinsically motivating for players who felt a gap between how they perceived themselves and who they would like to be. Opportunities for real self/ideal self-convergence provided positive experiences for players by reducing discrepancies and potentially increasing feelings of happiness. In turn, this congruence between a person's ideal and actual self-concepts was positively linked to psychological wellbeing and self-esteem. Positive experiences of ideal self-characteristics during play then became a great motivator for players.

In summary, videogame play is associated with greater self-esteem regarding intelligence, computer skills and mechanical ability. Additionally, the experience of feelings of competence, autonomy and relatedness during videogame play is associated with higher self-esteem and positive affect.

4.1.3 Optimism

Optimism has consistently been related to health and wellbeing. Self-efficacy expectations, as a representation of a capable self, and perceived social support, as a representation of a helpful world, shape optimism (Karademas 2005). Optimism in turn predicts satisfaction with life and depressive symptoms: indicators of wellbeing (Karademas 2005). Optimism reflects an overall positive appraisal of the future and of the things to happen (Karademas 2005). Children who experience an emotional disturbance of sadness view the future with hopelessness, futility, lack of control and with a reduced perception of their sense of self worth (Hull 2009). A positive view of the future requires a positive appraisal of the context, relationships and a belief that things are going to become better. A recent study demonstrated the effectiveness of videogames as a play therapy tool for children suffering from an emotional disturbance of sadness including pervasive feelings of irritability, loss of enjoyment in activities previously enjoyed, withdrawal from friends or family, decline in school performance, and hopelessness (Hull 2009). For the children involved in this study their sense of sadness and hopelessness about the future also indicated a reduced sense of optimism.

The positive role of videogames in play therapy with children

The play therapy study involved six boys, ages 9 to 14, referred for treatment by psychiatrists and school psychologists as they were suffering with the specific criterion of sadness. First, the study identified the depths of sadness for the participants including self worth problems, self-image problems, father and family issues, and school performance problems. Second, the study demonstrated the use of the games as a play therapy tool in terms of communication between therapist and participant and the use of metaphor in game play. Finally, the study explained how each participant experienced new growth and change specifically in the areas of gaining new coping skills, gaining a greater sense of self worth, and experiencing a lessening of sadness.

Videogames were an effective play therapy tool building rapport, providing a vehicle for communication, and providing metaphors as a therapeutic foundation for growth and change (Hull 2009). Again

particular games provided specific opportunities to develop wellbeing as children worked through a range of challenges. For example, children experienced 'the force' in *Lego Star Wars*, gaining 'attributes' in *SSX-3* (snowboarding), and conquering 'quests' in *RuneScape* helping participants to change their views of themselves and the world around them (Hull 2009). The metaphor of a power or strength that comes from within was demonstrated by games like *Naruto, Transformers, or Lego Star Wars*. *Transformers* also provided opportunities to liken the 'Decepticons' (robot-like creatures who are trying to take over the earth and make it their home) to the bullies that plagued the boys at school (Hull 2009).

Overall, the findings from the study supported the fact that children suffering from emotional disturbances encounter difficulties academically, emotionally, and socially, and supported the usefulness of video and computer games as a play therapy tool with children suffering from the emotional disturbance of sadness. After six sessions of play therapy with videogames, the lessening of sadness was observed by the children's teachers, caregivers and by the children themselves. Lessening of sadness provided each of the participants a new way of looking at themselves and how they viewed the future with new hope. Subsequently there were also positive changes in related family issues, social issues, school issues, as well as behavioural problems. However, it should be noted that no control condition was used in the study so further research is needed to confirm Hull's (2009) findings and to ensure, for example, that the findings were not due simply to regular interaction with the researchers.

Although the study described provides important initial support for the usefulness of videogames as a play therapy tool and possible links between videogame play and optimism there is a dearth of research in this area. Further research regarding this possible relationship is needed.

4.1.4 Vitality

Vitality, or the energy available to the self, is a significant indicator of health and wellbeing (Ryan & Deci 2008). Przybylski et al (2009b) examined the wellbeing outcomes of wanting to or having to play including the consequences of different styles of engagement in videogame play. The study examined how self-controlling regulation of behaviour (obsessive play – having to play) depletes vitality and energy while autonomous self-regulation of behaviour (harmonious play – wanting to play) does not (Ryan & Deci 2008). It was anticipated that vitality would correspond with activities or contexts that engendered basic psychological need satisfactions including *competence* (i.e., feeling effective), *relatedness* (i.e., feeling significant and connected), and *autonomy* (i.e., feeling volitional rather than controlled) as defined by self-determination theory (see Deci & Ryan 2000; Ryan & Deci 2008). Self-determination theory and a dualistic model of passion were applied to gain a better understanding of the causes and consequences of players' feeling that they have to, instead of want to, play videogames (Przybylski et al, 2009b).

For the study 1,324 (1,168 male) videogame players ranging in age from 18 to 43 years were recruited from a popular online community that provides a forum for discussions about videogames and Internet culture (Przybylski et al 2009b). Items were presented on Likert scales and open-ended questions to measure: game type, trait level need satisfaction, harmonious passion and obsessive passion, game enjoyment, weekly play time, post play energy and tension, life satisfaction, psychological and physical health (Przybylski et al 2009b). Post-play energy and tension was measured via the energy and tension subscales of the Activation-Deactivation Adjective Checklist developed by Thayer (1986). Participants were asked to rate 10 mood adjectives relating to how they felt after playing their favoured game (Przybylski et al 2009b). Terms used reflected energy and vitality (e.g., active, energetic, vigorous), and tapped tension and anxiety (e.g., jittery, clutched up, fearful). Titles of the games enjoyed by participants were categorised into five distinct game genres with games represented including first-person shooters (316), massively multiplayer online games (309), role-playing games (284), strategy games (223), and action-adventure games (192) (Przyblski et al 2009b). It was found that for those engaging with videogames harmoniously greater hours of play were associated with greater post-play energy. In contrast, for those engaging with videogames in an obsessive manner, greater hours of play were associated with reduced post-play energy.

This suggests that how young people engage with videogames (harmoniously or obsessively), is more important in terms of the impact of videogame play on wellbeing that which videogames they play. Specifically, where harmonious engagement occurs vitality is likely to result and moreover, more videogame play can lead to greater vitality.

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4.1.5 Resilience

Resilience refers to an individual's ability to cope with stress and adversity. It includes the capability to resist, adapt and strengthen oneself as a result of interacting with the environment and the processes that either promote wellbeing or protect against the influence of risk factors (Zautra, Hall, & Murray 2010). There have been a number of studies that examine the relationship between videogame play and stress reduction (Allahverdipour et al 2010; Ogletree & Drake 2007; Snodgrass, Lacy, Dengal & Fagan 2011; Wack & Tantleff-Dunn 2009). Recent studies demonstrate the role of game play in stress reduction especially for college-aged males (aged 18-32 with mean age of 20.48) who may rely upon moderated levels of videogame play as a healthy source of socialisation, relaxation, and coping during their college years (Wack & Tentelett-Dunn 2009).

Wack & Tentelett-Dunn (2009) examined electronic game play and obesity, the social/emotional context of electronic game play, and academic performance among 219 college-aged males. Participants completed an online questionnaire that asked them a range of questions including game play habits (i.e., frequency of game play, preferred game genre, age of commencement of game play, specific items to gauge social context of electronic game play) as well as information about participant demographics, including age, ethnicity, grade point average (GPA), height, weight, and relationship status (Wack & Tentelett-Dunn 2009). Respondents were also asked to carefully recall their game play behaviour and provide details regarding frequency of play, types of games played, and length of play in a retrospective daily diary format (Wack & Tentelett-Dunn 2009).

Within this context there was a significant positive correlation between frequency of play and self-reported frequency of playing when bored, lonely, or stressed in contradiction to general conceptions of electronic gaming as detrimental to functioning (Wack & Tentelett-Dunn 2009). These young males reported a weekly average of 9.73 hours of game play with frequency of play not significantly related to body mass index or grade point average. There was also no significant mean differences between other variables related to social functioning (e.g., relationship status) and frequency of electronic game play, revealing no obvious trends in interpersonal functioning for those who play games more or less frequently (Wack & Tentelett-Dunn 2009). Other media usage was either not related to frequency of electronic game play as for magazines or was inversely related, as with the frequency of consumption of television suggesting that these individuals may be more selective with their choice of media (Wack & Tentelett-Dunn 2009). Significantly, results suggested that gaming among college-aged men might provide a healthy source of socialisation, relaxation, and combating stress (Wack & Tentelett-Dunn 2009). These findings are consistent with others who have found that the high level of engagement evoked by some types of game play contributes to stress reduction (see Snodgrass, Lacy, Dengal & Fagan 2011; Snodgrass, Lacy, Dengah, Fagan & Most 2011;Snodgrass et al 2012).

These findings suggest that in many cases, videogames offer a form of catharsis such that playing them reduces stress and provides an opportunity to relax and socialise. This suggests a likely connection to resilience, though further research (incorporating specific measures of resilience) is needed to answer this question thoroughly.

4.2 POSITIVE FUNCTIONING

4.2.1 Engagement

Engagement with a task has been associated with increased happiness as people tend to be less happy when their minds are wandering (Killingsworth & Gilbert 2010). Even when thinking about pleasant topics, people are happier when they focus on a specific task at hand (Killingsworth & Gilbert 2010). Engagement refers to an emotional involvement or commitment to some object or domain of interest, to the experiential intensity of a relationship or interaction, and also to one's temporal involvement or interactions with activities and social partners in the immediate environments (Shernoff 2012). There is a strong relationship between engagement and positive wellbeing (Shernoff 2012). Of critical importance young people who are interested and involved in skill-building and productive pursuits score higher on measures of psychological adjustment, including measures of self-esteem, responsibility, competence, and social relations (Jessor & Jessor 1977; Shernoff 2012). Positive and engaging experiences then become pivotal for positive wellbeing amongst young people (Shernoff 2012). Intrinsically interesting activities that evoke intense concentration and enjoyment have been described as creating *flow* or *optimal experience* as part of the endeavor (Csikszentmihalyi 1998, 2008).

Recently, Snodgrass and associates examined different types of videogame play experiences and the effects they can have on players' lives, including their levels of stress, satisfaction and happiness (see

Snodgrass, Lacy, Dengah, Fagan & Most 2011; Snodgrass, Lacy, Dengal & Fagan 2011; Snodgrass et al 2012). These studies examined the popular Massively Multiplayer Online Role-Playing Game (MMORPG), *World of Warcraft* (*WoW*). The central premise was based on the assumption that *WoW* and similar games can be thought of as new 'technologies of absorption' — contemporary practices that can induce dissociative states in which players attribute dimensions of self and experience to in-game characters, with potential psychological benefit or harm (Snodgrass, Lacy, Dengal & Fagan 2011).

The study involved the research teams own in-game observations, 30 qualitative interviews with *WoW* players and a 100 item formal Web survey. Interviews first elicited responses related to gamers' motivations and goals, play styles, favourite and least favourite aspects of *WoW* and social interactions in the game (Snodgrass et al 2011). Players were then asked to expand on their positive and negative experiences within *WoW* and finally, the cultural conceptualizations of success and wellbeing in both real life and in this game-world were explored (Snodgrass et al 2011). Based on interviews, an 'Absorption-Dissociation' Scale was constructed for inclusion on the web survey (Snodgrass, Lacy, Dengah, Fagan & Most 2011). About half of respondents reported *WoW* as increasing their happiness, and an even larger fraction reported that *WoW* helps them 'relax and combat stress' and that it increases their 'life satisfaction' (Snodgrass, Lacy, Dengah, Fagan & Most 2011). Most respondents did not feel that *WoW* play increased stress in their lives, but nearly one-third agreed at some level that it did. Experiencing an immersive state of consciousness and hence dissociation has been linked to both positive and negative mental health outcomes. Immersive states have been found to be both normal and desirable by players with two-thirds of the web survey sample reported having at times immersive experiences. Some players used game absorption and dissociation therapeutically, reporting that such experiences enhance their perception that *WoW* contributes to their happiness and life satisfaction. Certain vulnerable players however dissociated too deeply into *WoW*, losing control of their game-play and were no longer able to effectively extricate themselves (Snodgrass, Lacy, Dengah, Fagan & Most 2011).

Findings affirmed that dissociation can be positive and normal and that altered 'absorbed' states of consciousness that many gamers reached, such as the 'dissociative' identification some gamers have with their characters, provide some gamers with relaxation as well as some of the most satisfying, meaningful experiences of their lives (Snodgrass, Lacy, Dengah, Fagan & Most 2011; Snodgrass et al 2012). Experiences of 'absorption-dissociation' explain the positive therapeutics of the game, which combines relaxation alternating with mildly stress-inducing flow states (Snodgrass, Lacy, Dengah, Fagan & Most 2011). Positive stress helps players achieve 'flow' and the experience of being in the 'zone,' as players are pushed by the game's tasks and challenges where there is likelihood of experiencing success (Csikszentmihalyi 2008). The two states of experience and consciousness are achieved if players imaginatively immerse themselves in this game-world and feel heavily identified with their character-avatars (Snodgrass, Lacy, Dengah, Fagan & Most 2011). This deep immersion can divert attention from real-world stress, allowing gamers to more readily reach deeply relaxed, even meditative, states of play (Snodgrass, Lacy, Dengah, Fagan & Most 2011).

However, there were also occasions when certain forms of dissociation were problematic. As much as absorptive pleasures can be therapeutic a certain proportion of *WoW* players find their play deeply distressing and problematic (Snodgrass, Lacy, Dengah, Fagan & Most 2011). As *WoW* promotes dissociative experiences, especially in conjunction with stress relieving and producing mechanisms, certain players experienced negative addiction (Snodgrass, Lacy, Dengah, Fagan & Most 2011). While some players are able to use game absorption and dissociation therapeutically reporting that such experiences enhance their perception that *WoW* contributes to their happiness and life satisfaction, other players dissociated too deeply into *WoW* and lose control of their game-play (Snodgrass, Lacy, Dengah, Fagan & Most 2011). As *WoW* is so engaging and pleasurable, in certain circumstances it can be used to excess (Snodgrass, Lacy, Dengah, Fagan & Most 2011).

In sum, this research suggests that the experience of engagement while playing videogames can have a positive influence on wellbeing. However, excessive game play can become problematic. This is supported by other studies previously reported in this review where the amount of game play was found to be significant in moderating the potential wellbeing benefits (see Allahverdipour et al 2010; Durkin & Barber 2002) but should be considered in tandem with findings identifying the influence of the nature of engagement (harmonious or obsessive, Przybylski, Weinstein, Ryan & Rigby 2009) as well as the influence of pre-existing psychosocial vulnerability (Lemmens et al 2011, Van Rooij et al 2011).

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4.2.2 Positive Relationships

The term friendship and how we define relationships appears to be shifting as many young people today form and maintain what they consider friendships online (Amichai-Hamburger, Kingsbury & Schneider 2013). Friendship is important for the psychosocial adjustment and wellbeing of children, adolescents and adults (Bagwell & Schmidt 2011). The digital world is changing the logistics of many friendships although it would seem that just as in the past there remain deep, close friendships and more shallow ones and these friendships, involving different degrees of closeness, occur both on and offline (Amichai-Hamburger et al 2013). The social interactions that occur within and outside of MMORPG play have been found to be highly social providing opportunities to create strong friendships and emotional relationships (Cole & Griffiths 2007; Yee 2006). Interestingly, online MMORPG gamers under the age of 18 have been found to feel that the friendships they formed online were comparable or better than their real life friendships (Yee 2006). *WoW* players have reported creating social capital through online game play with players using the game to extend real life relationships, meet new people and form relationships of varying strength (Williams et al 2006).

Some argue for the stimulation hypothesis in terms of friendships, suggesting that online communication is being used to enhance both the quantity and quality of communication between friends, leading to greater closeness and intimacy (Valkenburg & Peters 2011). The Snodgrass, Lacy, Dengal & Fagan (2011) study reported above also considered the differences between playing *WoW* with individuals known outside of the game and playing with people met online. Playing with offline friends who are also friends in real life was healthier as interactions helped regulate game play (Snodgrass, Lacy, Dengal & Fagan 2011). Playing with real life friends also allowed players the added benefit of transferring positive gaming experiences into real life and mediating immersive experiences (Snodgrass, Lacy, Dengal & Fagan 2011). Game play with friends appeared to make it harder to immerse, impacting on some of the stress reduction benefits although also potentially reducing the risk of problematic play and addiction (Snodgrass, Lacy, Dengal & Fagan 2011). Playing with real life friends also allowed players of *WoW* to share their experiences of success and achievement to bolster and repair their feelings of worth and esteem, as players temporarily live as heroes, defeating evil even when the odds are against them (Snodgrass, Lacy, Dengal & Fagan 2011). Players are then able to transfer in-game accomplishments and status to their real life networks of friends and family (Snodgrass, Lacy, Dengal & Fagan 2011). Playing *WoW* in this way creates cognitive and social bridges between on- and offline worlds providing more objective perspective on MMO use and allowing better self-regulation (Snodgrass, Lacy, Dengal & Fagan 2011). Therefore, playing with friends has the potential to affect levels of problematic play by mediating immersion and enhancing real life relationships increasing social and psychological resilience (Snodgrass, Lacy, Dengal & Fagan 2011). Seminal studies also add credence to this concept as game play is not always a solitary activity but often is a social activity involving many players with emotional and social factors motivating play (Colwell 2007; Hull 2009; Trepte, Reinecke, & Juechems 2012; Wack & Tantleff-Dunn 2009).

Cole & Griffiths (2007) found in their study of 912 self-selected MMORPG players from 45 countries, that social interactions in online gaming form a considerable element in the enjoyment of playing. This type of game play can be extremely social with a high percentage of gamers making life-long friends and partners. The Cole & Griffiths (2007) study included 70% males (*n* = 641), and 29% female (*n* = 261), and 1% who did not supply their gender (*n* = 10) with the mean age of 23.6 years. Participants were asked to complete an online questionnaire that was divided into five sections. Participants provided demographics (gender, age, country of residence, and which game was played and how often); information about friendships within the game (attraction to other players, and meeting online friends in real life); topics that players might discuss with their online friends; information about their gaming motivation; and responded to questions about their personality type (Cole & Griffiths 2007).

WoW was the most popular MMORPG for participants in this study, more popular among females than males, with this gender difference attributed to the social and visual nature of the game (Cole & Griffiths 2007). Significantly, 76.2% of male and 74.7% of female players had made good friends within online games, suggesting that MMORPGs are highly socially interactive. Of interest, two fifths of participants (39.3%) said they would discuss sensitive issues with their online gaming friends that they would not discuss with their real life friends, with females being more likely to do so (Cole & Griffiths 2007). Also of interest, 42.8% of participants had met with online friends in real life situations, again suggesting that online gaming is a social activity or facilitates social activity (Cole & Griffiths 2007). In fact, 31.3% of participants had found themselves attracted to another player (26.2% males compared to 42.3% females) suggesting that MMORPGs offer a safe environment for players to become emotionally involved with others (Coles & Griffiths 2007). It would appear that virtual gaming may allow players to express themselves in ways they may not feel comfortable doing in real life because of their appearance, gender, sexuality, and/or age (Coles & Griffiths 2007).

In sum, there is clear support for the notion that videogames offer an opportunity for social connection in terms of the building and fostering of positive emotional relationships and friendships. There is also evidence to suggest that playing with friends from outside the game world further increases the associated wellbeing benefits. Finally, there is emerging evidence that videogames may allow players to express themselves in ways they may find difficult in the real word – further research is required to confirm this possibility and to fully assess the associated implications.

4.2.3 Competence (Achievement)

As detailed previously Ryan and colleagues (2006) suggested that the psychological 'pull' of games is largely due to their capacity to engender feelings, including competence, therefore enhancing psychological wellness. Competence is a psychological need that includes the need for challenge and feelings of being effective (Ryan et al 2006), therefore factors that enhance the experience of competence (such as opportunities to acquire new skills or abilities, to be optimally challenged, or to receive positive feedback) enhance perceived competence (Ryan et al 2006). Competence is enhanced in gaming contexts where game controls are intuitive and readily mastered, and tasks within the game provide ongoing optimal challenges and opportunities for positive feedback (Ryan et al 2006). Ryan et al (2006) found the desire for future play was predicted by feelings of presence and players self determined needs for competence, autonomy and relatedness.

Yee (2006) and Suznjevic and Matijasevic (2010) both found achievement was an important motives for playing MMORPG games. Yee (2006) conducted an online survey with 6675 (male = 5939, female = 736) users of MMORPGs over a three-year period and examined participants' demographics, motivations and experiences. The study used quantitative survey data to explore the significance and salience of the relationships that form in MMORPGs, the degree of emotional investment in the environment, and whether real life leadership skills could be acquired in the online environment (Yee, 2006). Demographic composition of MMORPG users and their usage patterns was obtained, exploratory factor analysis of the different motivators was conducted, and the salience of the relationships and emotional experiences derived from the online environments was examined (Yee 2006).

MMORPGs appealed to a broad age range (M age= 26.57, range = 11-68) in this study (Yee 2006). It was however female players who were more driven by the Relationship factor and more likely to use the MMORPG environment to build supportive social networks, supporting findings reported by Cole & Griffiths (2007) and Snodgrass, Lacy, Dengal & Fagan (2011) that online gaming can support positive relationships. Male players in this cohort were significantly more likely to be driven by the Achievement factor (Yee 2006). The 'Achievement' factor measured the desire to become powerful in the context of the virtual environment through the achievement of goals and accumulation of items associated with power (Yee 2006). While some users participated in the environment to make friends and form supportive social networks others used the environment to become powerful through the achievement of goals (Yee 2006).

In sum, videogames (as a function of intuitive controls, ready mastery, optimal challenges and positive feedback) have been shown to lead to feelings of competence and achievement for players. Such feelings have been shown to have a positive influence on wellbeing.

4.2.4 Self-acceptance

Virtual self-enhancement through online game character development is attractive for individuals dissatisfied with aspects of themselves (Bessiere et al 2007). Individuals with a marginalised self-identify seek affirmations in their use of the Internet (McKenna & Bargh 2000). Opportunities to create a presence in an online world, such as spaces provided in MMORPGs, allows a player's character to interact with others freely, anonymously providing a means to escape poor self-evaluation by eschewing negative traits and enacting a better virtual self (Bessiere et al 2007). People with larger discrepancies between their actual self versus their ideal self have higher depression and lower self-esteem (McKenna & Bargh 2000). Therefore the ability to create characters that embody aspects of players' ideal selves has implications for players' psychological wellbeing (Bessiere, Fleming & Kiesler 2007; Przybylski et al 2011).

Bessiere and colleagues (2007) examined identity exploration possibilities presented by online multiplayer games when players used graphics tools and character-creation software to construct an avatar, or character. They predicted *World of Warcraft* players would create their main character to reflect their ideal self. The study involved a survey via the Internet to a sample of *WoW* players.

Participants included 51 valid participants ranging in age from 18 to 27-years-old with a mean of 21 years who were primarily male (43 men, eight women) (Bessiere et al 2007). The respondents answered questions about *WoW*, their actual self, their character, and their ideal self. An adjective rating method based on Big Five Personality Inventory (Donahue & Kentle 1991) was used to assess the different self and character views. The survey included 44 items in five categories: conscientiousness (e.g., thorough, reliable, organized), extraversion (e.g., talkative, energetic, assertive), neuroticism (depressed, worried, nervous), agreeableness (e.g., trusting, forgiving, kind), and openness to experience (e.g., creative, artistic, inventive) (Bessiere et al 2007). Participants rated how similar each personality characteristic was to their actual and ideal selves and also evaluated their primary *WoW* character. To examine whether the player's character was viewed as more ideal than player's actual self a paired *t*-test was implemented to find the differences between the self-discrepancy and the character discrepancy. Findings were significant for three of the five personality dimensions: conscientiousness, extraversion, and neuroticism were all found to differ (Bessiere et al 2007).

The study also examined whether people with poorer psychological wellbeing were more likely to see their character as realising aspects of their ideal self. To this end a mixed-model analyses of variance on the personality dimensions was conducted. Participants with high depression scores, as compared with low depression scores, (a) had much lower actual self views and (b) created characters who were close to their ideal (Bessiere et al 2007). That is, those with lower levels of psychological wellbeing rated their characters as much better than themselves allowing them to be more like the person they wished to be within the anonymity and fantasy of the game world. This data suggests that MMORPG virtual worlds offer players the opportunity to create idealised characters as alternative selves as, on average, participants rated their virtual character as being more conscientious, extraverted, and less neurotic than themselves (Bessiere et al 2007). Significantly, this trend was reported more among those who were more depressed or had lower self-esteem.

Results from this study support the idea that the game world's anonymity and fantasy frees players from their real life history and social situation, allowing them to be more like the person they wish to be (Bessiere et al 2007). This opportunity may serve to reduce some people's actual ideal self-discrepancy and increase their feelings of self-confidence and self worth, potentially impacting positively on psychological health (McKenna & Bargh 1998, 2000). Furthermore, potentially players whose characters display desirable qualities could imagine themselves as different and reduce their ideal actual self discrepancies dependent on the extent to which players try to emulate their characters' better traits (Bessiere et al 2007).

In sum, there is clear initial evidence of the positive impact of videogame play on self-acceptance through the exploration of idealised characters and alternative selves. Further research is needed to replicate this finding with other genres of games.

4.2.5 Personal Growth

When videogame play reduces players' ideal actual self-discrepancies, there are significant opportunities for personal growth (Bessiere et al 2007). Encouragingly, ideal self-representation has positive benefits as such visual imagery techniques have been used to help drug addicts create ideal self-representations in attempts to have them reject their addictive self (Avants et al1994). The study above by Bessiere et al (2007) provides positive implications for developing young people's personal growth as does the study by Hull (2009) previously reported (see Optimism).

In play therapy conducted by Hull (2009), boys aged 9-14 who were suffering from sadness were referred for treatment by psychiatrists and school psychologists and underwent significant personal growth. After engaging in the challenges provided by the videogames used in the therapy participants parents and teachers reported an increase in the boys self worth (Hull 2009). Furthermore, the increase in self worth in turn brought about an increase in coping skills, and gaining new coping skills brought about newfound self worth (Hull 2009). Videogames selected for therapy provided metaphors that related to inner values such as strength and courage (Hull 2009). For example, one participant 'John' identified with the game *Naruto* and the idea of inner strength and courage used to demonstrate for him the 'power' of ignoring the bullies. 'John' then experienced change within himself ('I feel good, I'm feeling powerful') (Hull 2009). Similarly, 'Geoff' revealed feeling better about himself by being able to ignore the negative comments from bullies and also experienced a change in his thinking. The 'attributes' of strength, courage, and bravery in videogame play were used to deal with those who made fun of him and he reported 'It makes me feel better about myself because I don't have to believe what they say about me. I know that I'm smart and when I play the game I feel smart. But I also know that I am smart in real life (Hull 2009, p. 98).' Within this study there was growth for participants in relation to

gaining new coping skills, increasing the participant's sense of self worth, and helping to lessen the sadness experienced.

While there is clearly potential for personal growth through videogame play and important initial evidence of a small sample experiencing growth through play, further research is needed to replicate this finding with a larger sample.

4.3 POSITIVE SOCIAL FUNCTIONING

MMOs are one of several online 'places' in which social interaction might occur and are unique in the fact that they collect and mix people pursuing goals in three-dimensional space (Williams et al 2006). *WOW* creates an engaging and highly social space for millions of players. It is a vibrant space populated with a range of social experiences ranging from ephemeral impersonal groups to sustained and deep relationships that extend offline (Williams et al 2006). Games such as *WOW* include structure and rule sets impacting on what kinds of people play, what they do, and how and why they interact with one another (Williams et al 2006). As part of game play social organisations are created with the design encouraging the formation of persistent player associations (Taylor 2003).

Socialisation is a significant motivational factor for *WoW* players. This motivational influence was identified recently in a study of Spanish *WoW* players (Fuster, Oberst, Griffiths, Carbonell, Chamarro & Talarn 2012). In this study by Fuster et al (2012), the aim was to assess the psychological motivations of playing *WoW* and examine how they related to socio-demographic variables and gaming styles. The study implemented a questionnaire to assess motivations for gaming including: socialisation, exploration, achievement, and dissociation. Socialisation was one of the main motivational factors and gamers were found to prefer the *Player-versus-Player* element of the game (Fuster et al 2012). While the game includes players grouping together in guilds and working towards common goals, the *Player versus Player* aspect includes players forming strategic alliances to deal with arising conflicts, battles and wars with players forming strategic alliances that require mutual interaction in order to fight between factions and groups of players (Fuster et al 2012).

The sample for this study included 253 Spanish *WoW* players who were all young males between the ages of 16 and 35 years of age. Following the pilot study, the survey instrument comprised of 32 items including demographics and dedicated items on socialisation (n=6), power (n=6), exploration/discovery (n=5), escape and evasion (n=8), and identity (n=6). Survey respondents were all Spanish speaking online gamers with a mean age of 22.2 years (*SD* = 4.4 years); the median was 21 years, and ages ranged from 16-35 years (Fuster et al, 2012). Factor analysis of the questionnaire scores showed the presence of four motivations for gaming: socialisation, exploration, achievement, and dissociation all of which showed high levels of internal consistency (Fuster et al 2012).

The three items for *socialisation* referred to the relational component of the game, establishment of friendships with other players, and feeling supported by them. *Exploration* included five items related to discovery of the game, its history, and the various phenomena that occur within the game. *Achievement* included five items referring to dominance, leadership, prestige and achievement of goals. *Dissociation* included seven items related to identification with the avatar, and with evasion of, or escaping from, reality (Fuster et al 2012). Players were very interested in *socialisation*, relating with others via the game, establishing friendships with other players, and feeling supported by them (Fuster et al 2012). They exhibited medium-high interest in *exploration*, the discovery of the game and development of the adventures involved (Fuster et al 2012). Interest levels in leadership, prestige, and *achievement* of were medium low. While there were relatively low scores on *dissociation* that was associated with low levels of identification with their avatar, and low levels of escape from reality (Fuster et al 2012).

For this Spanish cohort of players the strongest motivation for playing *WoW was* socialisation, with these players preferring to play with other players, something that appears to avoid serious dissociation and potential addiction (Fuster et al 2012). There was a broad range of ages and occupations suggesting diversity among *WoW* players, and contradicting stereotypes about gaming addicts. The typical online gamer in the study was a young male student with a medium-high educational level (96%). And while players dedicated a considerable amount of time to the game (a mean average of 22.6 hours per week), playing on both weekdays and at weekends, the number of hours per week spent playing did not decline with age (Fuster et al 2012). Findings from this study suggest that online game environments such as *WoW* are attractive beyond adolescence and have the potential to provide healthy spaces for socialisation. While this study was conducted in a specific cultural context, with a limited number of participants, further exploration of the role of socialisation in MMORPGs in terms of positive wellbeing appears warranted.

This research provides clear evidence of socialisation as a key motivation for videogame play. It should be noted that genres of videogames other than MMORPGS also offer opportunities for socialising with other players. For example first-and third-person-shooters and sport games almost always include online multiplayer modes that allow for both competitive and cooperative play. Similar modes are also sometimes included in action games, platforming games, puzzle games and other genres. To this end, Johnson and Gardner (2010) found differing genres of games to result in varying experiences of autonomy but similar levels of competence and relatedness. However, to date, there is less research on the social components of such games and this is an area worthy of further research.

4.3.1. Social Coherence

The concept of social cohesion can be defined as a willingness of individuals to cooperate and work together to achieve collective goals (Jeannotte et. al. 2002). When *WoW* players work together in guilds they often participate in highly structured organizational experiences working towards common goals. Williams and colleagues (2006) were interested in the social environments provided by participation in guilds such as *WoW*. They examined the social dynamics of guilds and formal practices adopted within different guilds when the structures have a relaxed atmosphere with corresponding structure such as a guild known as the 'the tree house,' or when they are highly structured, hierarchical organisations such as the guild known as 'the barracks' (Williams, et al 2006). Essentially they were interested in the size, structure, formal practices and individual experience within social groups formed as player guilds. The study they initiated with a survey and network mapping of players was based on interviews with online players finding that the majority of high-centrality respondents belonged to the more structured guilds, whereas low-centrality respondents tended to be affiliated with unstructured groups (Williams et al 2006). Centrality refers to how often the character grouped with others in their guild with those who grouped more often thought to be more 'central' or social hub-like members of their guild (Williams et al 2006). Therefore players in formally structured guilds tended to have a more social experience than others. These social experiences had the potential to provide opportunities for developing highly structured organisations that involved participants working towards a common goal.

As part to the Williams et al (2006) study 48 male and female participants (numbers and ages not specified) were involved in interviews to explore player behaviours, attitudes, and opinions; the meanings they make; the social capital they derive; and the networks they form and to develop a typology of players and guilds (Williams et al 2006). While largely exploratory, this study contributed some interesting findings in terms of the social nature of *WoW* players' experiences, as interviews revealed that players used *WoW* to extend real life relationships, meet new people, form relationships of varying strength, and also used others merely as a backdrop (Williams et al 2006). The moderating factor was the game's mechanic, which encouraged some kinds of interactions while discouraging others (Williams et al 2006).

The organisational design of *WoW* player guilds can be considered a network and player behaviours and group behaviours vary according to game goals, personal preferences, and player awareness (Williams et al 2006). Playing *WoW* is then social like a team sport, which has its own rules, literal boundaries, and social norms (Williams et al 2006). There is however self-initiated tactics, team strategies, styles, and goals that make the play space a stage for socialisation, organisation, and networks (Williams et al 2006). Game guilds can be considered organisations as they arise from people able to communicate working towards a common goal (Williams et al 2006). Formal practices within guilds included mission statements, recruitment and expulsion policies, and external Web sites and these became more likely as guild size increased (Williams et al 2006). Some guilds relied on relatively haphazard policies and procedures, and were more likely to contain social tensions, misunderstandings, and fights. Guilds with clear policies and procedures managed tasks better and had generally happier members (Williams et al 2006). Implications of this study indicate that social capital was created during game play and civic revitalization is possible for some players and in a new way (Williams et al 2006). When players knew each other beforehand, *WoW* was an important way for them to maintain and even reinforce their relationship although for most others, it was an entrée to bridging social capital that could build up into something more over time—ranging from a few weeks to a year (Williams et al 2006).

In sum, there is clear evidence of social coherence occurring as part of Massively Multiplayer Online Role-Playing Games in the form of guilds and the sharing of common goals. Further research is needed to explore whether this relationship exists in other videogame genres.

4.3.2. Social Integration

Social integration requires understanding a common language, common laws and working towards a common set of values. Again, *WoW* provides participants opportunities for social experiences that include team work and collective game play towards common goals. Billieux et al (2013) were interested in the motives of *WoW* players and found that team work and competition were significant for participants engaged in *WoW* as these are associated with fast progression in the game (Billieux et al 2013). In this study Billieux et al (2013) recruited a sample of 690 *World of Warcraft* players who had their avatar monitored for eight months. These participants completed an initial online survey about their motives to play while their actual in-game behaviours were measured through the game's official database. While there were some association between problematic use and advancement and escapism the longitudinal analysis showed that high involvement in the game is not necessarily associated with a negative impact upon daily living.

The majority of participants in this study were male (87.10%) ranging in age from 18-66 years (M = 26.22, SD = 8.14 years). Participants represented a number of countries including France (73.6%), Switzerland (18.8%), Belgium (4.8%) or other countries (2.1%) and non-reported (0.7%) (Billieux et al, 2013). Participants were employed (54.9%), undergraduate students (37.5%), and unemployed (5.5%) or did not indicate their profession (2.1%). The Motivation to Play in Online Games Questionnaire (MPOGQ) developed by Yee (2006) to measure players' motives to engage in online games was the instrument used in this study.

The comparison of cross-sectional and longitudinal analyses highlighted that advancement and mechanics motives are associated with higher achievement scores in the game in the cross-sectional analysis (data collected in the initial survey), however, optimised progression in the game (data collected through avatar monitoring) is better predicted by other motives, such as teamwork or discovery, as well as by being affiliated to a guild. Players motivated by advancement and mechanics eventually display elevated ranking in the game but longitudinal data suggested that this will require more time and effort if they are not motivated by both discovery and cooperation with other players which generally involves joining a network of players in a guild (Billieux et al 2013).

There is evidence of social functioning, social relationships and social coherence as part of videogame play and it is likely that in some cases this results in social integration. Further research is needed to explore the extent to which videogame play with friends contributes to social integration beyond the game world.

4.4 DIVERSITY IN VIDEOGAMES

4.4.1. Females Play Games Too

While there are games targeted at female gamers there is some concern that gender stereotyping is still prevalent within many games casting male characters as warriors for battling and female characters as damsels who ask for help (Dickey 2006; Ong & Tzuo 2011). The stereotypical and unrealistic hyper-sexualised portrayal of both mens' and womens' physical appearance, behaviours, and personalities has been critiqued and debated (Reinhard 2006). These concerns however are decreasing due to a rise in powerful female characters, an increasing trend for women to be used as the sole protagonists and greater understanding of female preferences. Jade, the protagonist of *Beyond Good and Evil* and Chell, from *Portal* are recognised as strong and confident female characters that have not been hyper-sexualised. These characters are part of the change associated with game character development in modern videogames that includes women as active and self-reliant. While concerns remain about depictions of gender within videogames, it is clear that the situation is improving.

Moreover, there is greater understanding of what females want from a game and their perception that game narratives should be purposefully designed with opportunities to manage power, customize game characters, disrupt gender stereotypes and negotiate between girls' and boys' roles and identities (Ong & Tzuo 2011). Having the option to create a female character or an ambiguously gendered character is a way for girls to manage power relations. Significantly, and contrary to stereotypical expectations girls are not averse to battling and may enjoy battling and violence in moderate doses, while others may even enjoy a high dose of battling in their game play (Ong & Tzuo 2011). Furthermore, there is evidence that for many genres, there is not a great deal of difference in preferences across gender with similar numbers of males and females listing adventure games, strategy games and fighting games as their favourites (Brand 2012). However on some genres, there is evidence of a difference in preferences – for

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example, more females have indicated a preference for puzzle games and more males indicating a preference for first-person shooters and sport games (Brand 2009).

4.4.2. LGBTQ Characters In and Players of Videogames

While historically it can be observed that sexual diversity has been lacking in videogames, the situation appears to be changing. Recent examples include the incorporation of same-sex romances in the *Mass Effect* series, the option for same-sex couples to marry in *The Sims 3* and examples of same sex attraction among young people in games like *Bully*. It seems likely that as designers become more focused on building deep, fully developed characters this trend towards diversity will continue. Interesting, in ethnographic research conducted with an online community of gay videogame players (Shaw 2012) it was found that the representation of diversity of characters in videogames was less important to the community than a safe online space to express one's identity as a gay gamer. Concerningly, in a large scale survey (over 10,000 respondents) survey of videogame players, over 80% of respondents had heard homophobic language used among their gaming community (Rockwood, cited by Sliwinski 2007). While this is alarming and clearly an area for future focus, it is simultaneously encouraging to note that events such as 'Electronic Arts Full Spectrum' and 'GaymerX' are appearing and providing a focus for exploring LGBTQ issues around videogames.

5 Future Research

As research moves beyond approaches that focus on a 'good-bad' dichotomy and develop nuanced understandings about videogame play, how dimensions of game play impact on wellbeing will become more visible to those interested in positive mental health. At least five dimensions on which videogames can affect players have currently been identified to include; the amount of play, the content of play, the game context, the structure of the game, and the mechanics of game play (Gentile 2011).

5.1 VIDEOGAMES HAVE MENTAL HEALTH BENEFITS – EVEN VIOLENT VIDEOGAMES

Playing M-rated games is common among young people, with 44% of boys and 20% of girls aged 12-14 playing one or more intensely violent games (Kutner & Olson 2008). Many cross-sectional studies have shown correlations between violent game play and some common childhood problems such as aggressive behaviours or school problems for both boys and girls (Kutner & Olson 2008, Anderson & Bushman 2001). Cross-sectional studies, however, cannot show causality and most children who play violent games did not have problems (Kutner & Olson 2008). Of note, many of the boys in this study described using violent videogames to manage their emotions and to deal with anger, frustration and stress (Kutner & Olson 2008). According to Kutner and Olson (2008) and Ferguson, Garza, Jerabeck, Ramos & Galindo (2013), much of what has been written in the popular press about violent videogames and the link to violent behaviours has been based on misunderstandings and methodologically weak research. Weaknesses such as the use of single-item measures of aggression or measures that do not correspond to real-world violence, failing to control for important confounding variables such as family environment and personality, small sample sizes and weak measures of videogame exposure) may reduce or eliminate effects (Ferguson et al 2013, Anderson et al 2010), although these reductions may also be seen as inappropriate (Anderson et al 2010).

There is a need for further research to examine and identify combinations of game content, individual characteristics, and game play environments that may promote aggressive behavior, increase fear, or desensitise children to violence (Gentile 2011, Olson et al 2007). A more nuanced approach to understanding the role of violent videogames includes understanding the potential benefits of game play for wellbeing at different stages of development and the complexities associated with aggressive behaviours including the multiplicity of influences that go well beyond the boundaries of gaming (Ferguson et al 2013, Anderson et al 2010, Willoughby et al 2012., Moller & Krahe 2009, Shibuya et al 2008).

5.2 PATHOLOGICAL GAMING AND THE PSYCHOSOCIALLY VULNERABLE

Pathological gaming continues to be an area of concern. However, to date, questions remain over whether such a disorder actually exists and if so exactly what form it takes and when it is more likely to occur. The American Psychiatric Association has recently identified "Internet Gaming Disorder" as an area warranting further study given that there is currently insufficient evidence to make a firm conclusion (American Psychiatric Association, 2013). The definition proposed entails symptoms along the traditional addiction domains of conflict, salience, mood modification/euphoria, tolerance, withdrawal symptoms and relapse that "lead to clinically significant impairment or distress" (American Psychiatric Association, 2013, Gentile et al 2009, Lemmens et al 2011).

Longitudinal studies show some support for individual vulnerabilities such as diminished social competence, impulsivity, increased loneliness, and lower self-esteem predicting an increase in pathological gaming (Lemmens et al 2011, Gentile et al 2011). Consequences of pathological gaming may include depression, anxiety, social phobia, and poor school performance (Gentile et al 2011); there may also be a reciprocal relation between loneliness and pathological gaming implying that loneliness is both a cause and a consequence (Lemmens et al 2011). Research into the online aspects of videogame play consistently demonstrate connections between online play and higher levels of pathological gaming (Van Rooij et al 2011, Smyth 2007, Ng & Wiemer-Hastings, 2005), indicating factors that may increase risk for vulnerable young people.

Findings indicate the need to consider subgroups of young people who may be more vulnerable to the adverse effects of gaming and the need to consider the importance of both the amount of time spent in

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game play and the nature of engagement (obsessive versus harmonious passion) for positive wellbeing. Further research into game play for positive wellbeing must consider the above findings and the needs of psychosocially vulnerable gamers.

5.3 HOW MUCH IS TOO MUCH VIDEOGAME PLAY?

While the positive benefits of playing videogames have been described, too much play can become problematic. While two studies of pathological gaming fail to support time gaming as a predictor of pathological gaming (Van Rooij et al 2011, Lemmens et al 2009), studies focusing on psychological and behavioral correlates of media use describe low- to moderate-use groups having the most benefits (Allahverdipour et al 2010; Durkin & Barber 2002).

Future research should attempt to identify the causal relationships, including bidirectional effects, between time spent on games and negative as well as positive outcomes in a developmental framework. Potential areas of focus include longitudinal assessment of time spent on games over adolescence and whether this predicts problems such as poor school performance and pathological gaming, or whether time spent on games is associated with better outcomes such as less depression and loneliness. Evaluation of moderators such as gender and pre-existing psychosocial wellbeing are also vital to incorporate. Research is also needed to explore the possibility that games can be designed to moderate in-game time such that players achieve flourishing wellbeing.

5.4 VIDEOGAMES FOR WELLBEING THERAPY

After six sessions of play therapy using videogames, a research study found a lessening of sadness in children as well as increase in personal growth and feelings of self-worth (observed by teachers, caregivers and by the children themselves (Hull 2009)). This lessening of sadness provided each of the participants a new way of looking at themselves and how they viewed the future with new hope. Subsequently, there were also positive changes in related family issues, social issues, school issues, as well as behavioural problems. The videogames selected for therapy provided metaphors for the children that related to inner values such as strength and courage.

More rigorous research is required to confirm Hull's (2009) findings and to ensure, for example, that the findings were not due simply to regular interaction with the researchers. More broadly, further research is needed to explore the potential benefits of videogames as a form of play therapy and to assess whether the wellbeing benefits of videogame play observed in a non-therapeutic settings can be leverage for clinical use.

5.5 PLAYING WITH ONLINE AND REAL LIFE FRIENDS

The Snodgrass, Lacy, Dengal & Fagan (2011) study reported differences between playing a videogame (*World of Warcraft, WoW*) with individuals known outside of the game and playing with people met online. Playing with offline friends who are also friends in real life was healthier as interactions helped regulate game play. Playing with real friends also allowed players the added benefit of transferring positive gaming experiences into real life and mediating immersive experiences. Game play with friends appeared to make it harder to immerse, impacting on some of the stress reduction benefits although also potentially reducing the risk of problematic play and addiction. Playing with real life friends also allowed players of *WoW* to share their experiences of success and achievement to bolster and repair their feelings of worth and esteem as players temporarily live as heroes, defeating evil even when the odds are against them. Players are then able to transfer in-game accomplishments and status to their real life networks of friends and family. Playing *WoW* in this way creates cognitive and social bridges between on- and offline worlds providing more objective perspective on MMO use and allowing better self-regulation. Therefore, playing with friends has the potential to affect levels of problematic play by mediating immersion and enhancing real life relationships increasing social and psychological resilience.

Research should consider whether real life friendships are formed after the forming of online friendship, and how online status can be transferred to real life. Does wellbeing in games transfer to wellbeing outside of games? Is this relationship stronger if you have common friends in the game and in real life?

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5.6 WORLD OF WARCRAFT IS ONLY ONE VIDEOGAME – WHAT ABOUT THE OTHERS?

While much research has focused on MMORPGs (and particularly, *World of Warcraft*) it should be noted that other genres of videogames offer opportunities for flourishing wellbeing. For example, first-and third-person-shooters and sport games almost always include online multiplayer modes that allow for both competitive and cooperative play. Similar modes are also sometimes included in action games, platform games, puzzle games and other genres.

To this end, Johnson and Gardner (2010) found differing genres of games to result in varying experiences of autonomy but similar levels of competence and relatedness. However, to date, there is less research on the social components of such games and this is an area worthy of further research. Additionally, videogames are no longer restricted to personal computers and consoles. Instead, much game play is through short gaming activities (causal games) on mobile platforms, or social media games (such as *FarmVille* on Facebook). These short, but frequent, engagements in videogames may be allowing players to manage their wellbeing.

Research should consider how videogames in all their forms can enable a flourishing society.

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