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RECOMMENDATIONS FOR DEVELOPING VIDEO GAMES TO ADDRESS
DEPRESSION AMONG COLLEGE STUDENTS

A DOCTORAL PAPER
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DOCTOR OF PSYCHOLOGY

BY
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Abstract

Depression is a significant problem on college campuses, and the data shows that prevalence is on the rise (The National Survey on Drug Use and Health [NSDUH], 2014; Stewart, Ricci, Chee, Hahn, & Morgenstein, 2003). Depression impacts the well-being of students and puts them at risk for a variety of issues (Leach, 2009; Adams, Wharton, Quilter, & Hirsch, 2008; Serras, Saules, Cranford, & Eisenberg, 2010; Cranford, Eisenberg, & Serras, 2009; Weitzman, 2004). Many students with depression do not receive care (Blanco, Okuda, Wright, Hasin, Grant, Liu, & Olfson, 20008; Eisenburg and Chung, 2012), or receive care that is not minimally adequate (Eisenburg and Chung, 2012). The first aim of this paper is to review current literature from three pertinent areas of research: (a) depression in the university student population; (b) community psychology; and (c) video games as psychological interventions. These reviews are then synthesized to provide the basis for recommendations for the development of a prevention program that engages the university community in the creation of a video game based intervention for students at risk for, or suffering from, depression. These recommendations are based on principles outlined by Nation et al., (2003). By using existing theory based in community psychology, a video game based prevention program to supplement existing university mental health services is not only feasible but may significantly improve the treatment of depression on college campuses.

The prevalence and impact of depression is well-documented (The National Survey on Drug Use and Health [NSDUH], 2014; Hays, Wells, Sherbourne, Rogers, & Spritzer, 1995; Stewart, Ricci, Chee, Hahn, & Morgenstein, 2003). This is especially true for college-aged students (NSDUH, 2014), and the majority of this burden is being absorbed by universities (Kena et al., 2014). Depression can impede students' ability to succeed academically (Heiligenstein, Guenther, Hsu, & Herman, 1996; Leach, 2009), as well as threaten their general well-being (Adams, Wharton, Quilter, & Hirsch, 2008; Rawson, Bloomer, & Kendall 1994; Serras, Saules, Cranford, & Eisenberg, 2010; Cranford, Eisenberg, & Serras, 2009; Weitzman, 2004). At worst, it can also lead to suicide (Arria et al., 2009; Kisch, Leino, & Silverman, 2005).

College campuses are trying to address this problem, but many students are not receiving any treatment (Blanco et al., 20008; Eisenburg & Chung, 2012). Even the students who are being treated often receive less than minimally adequate treatment (Eisenburg & Chung, 2012). Several barriers to treatment have been identified as potential reasons for this gap including lack of time, stigma, fear of a lack of confidentiality, fear of unwanted intervention, and fear of documentation on their academic record (Givens & Tjia, 2002). The literature also shows that gender (Komiya, Good, & Sherrod, 2000), lack of emotional openness (Komiya, Good, & Sherrod, 2000), lack of a perceived need for help, lack of knowledge of available services, and skepticism about treatment effectiveness (Eisenberg, Golberstein, & Golust, 2007) are factors related to whether a student will seek help.

By utilizing the principles identified by Nation et al. (2003), I will make recommendations regarding the development of an innovative prevention program that universities can implement for their student bodies. Specifically, this prevention program involves engaging university resources such as counseling centers, student organizations, and

academic departments in the development and implementation of a video game designed to help students who are depressed or at risk of developing depression. By engaging with the campus community to create this video game, this prevention strategy will operate on multiple ecological levels. This prevention program is intended to complement existing mental health services by addressing identified barriers, and reaching students in a unique and engaging way.

Literature Review

Depression in University Students

Depression is a serious mental health concern that affects millions of people nationwide every year (NSDUH, 2014). Its prevalence and the impact it has on its sufferers are well documented (Adams et al., 2008; Cranford, Eisenberg, & Serras, 2009; Rawson, Bloomer, & Kendall 1994; Serras et al., 2010; Weitzman, 2004). This has not only been studied within the field of psychology, but from other perspectives as well (Greenberg, Fournier, Sisitsky, Pike, and Kessler, 2015). Depression is particularly problematic among university-aged students, and a large portion of their psychological care falls to university counseling centers across the United States. While these centers are doing an admirable job in trying to meet this high need (and funding for counseling centers has generally increased), there are significant numbers of students who are not receiving the care they need (Association for University and College Counseling Center Directors [AUCCCD], 2015). This problem has been examined by researchers, who confirm that both access and adequacy of services have been shown to be lacking (Eisenberg & Chung, 2012). Because of this, many university counseling centers have started to look at methods of intervention besides traditional therapy or antidepressants.

To adequately contextualize depression among college students specifically, an examination of the broader impact of depression will be provided. The 2014 survey conducted

by NSDUH found that 6.6% of adults aged 18 or older (15.7 million people) had at least one Major Depressive Episode (MDE) within the past year, and that 65% of those people who had a major depressive episode (10.2 million people) also experienced severe impairment to their ability to manage at home, manage well at work, have relationships with others, or have a social life (NSDUH, 2014). When you consider the fact that depression not only impacts its sufferers, but family members, friends, and coworkers as well, the true full impact it has starts to take shape. Hays et al. (1995) found that depressed patients experienced similar or worse limitations to functioning than patients with chronic medical illness.

The ripple effects from depression reach much further than that however. In order to try to grasp the scale of this problem, researchers have also tried to quantify the impact of depression from other perspectives. Greenberg et al. (2015) examined the economic burden of depression in the United States, and estimated it to be \$210.5 billion dollars in 2010. Interestingly, they identified that both medical and psychiatric comorbid conditions account for the largest proportion of the burden. Similarly, when the productivity of individuals who suffered from depression was compared with that of individuals who were not depressed, depressed individuals lost 4.1 more productive hours per week (Stewart et al., 2003).

While depression can affect people at any time in their lives, it is most prevalent in late adolescence and early adulthood (NSDUH, 2014). When the NSDUH findings are examined by age group, adults aged 18 to 25 showed the highest percentage of a MDE at 9.3%, as compared with 7.2% for adults aged 26 to 49, and 5.2% for adults 50 or older. Many of the people who fall into this 18 to 25 age category of highest prevalence are attending universities. In 2014, 68% of high school graduates enrolled in college by the following October (Kena et al., 2014). Clearly, the preponderance of the burden of care for this population is falling heavily on the shoulders of

universities and their counseling centers nationwide.

The impacts of depression within the college student population are well documented. It is known to affect academic performance, and is associated with reduced academic productivity (Heiligenstein et al., 1996) and lower GPA (Leach, 2009). Depression can also affect a student's physical health. It has been linked to students' increased risk for acute infectious illness (Adams et al., Hirsch, 2008), unhealthy behaviors such as increased cigarette smoking (Cranford, Eisenberg, & Serras, 2009), and increased alcohol consumption (Weitzman, 2004). Finally, it is also associated with other mental health issues including increased anxiety (Rawson, Bloomer, & Kendall, 1994), increased self-harm behaviors (Serras et al., 2010), suicidal ideation (Arria et al., 2009), and suicidal behavior (Kisch, Leino, & Silverman, 2005).

While depression among college students is not a new phenomenon, there is evidence to suggest that it is more problematic now than ever before. In the 2015 AUCCCD annual survey, over 70% of counseling center directors reported that the severity of student mental health concerns had risen within the past year. We can see even more evidence of this trend when comparing responses to the American College Health Association's National College Health Assessment [ACHA-NCHA] between 2008 and 2015. In 2015, 13.9% of students said they had been diagnosed or treated for depression within the previous year, which was up from 10.2% in 2008. During the same period, the proportion of students who reported they had felt so depressed that it was difficult to function was 36.7% in 2015, up from 30.6% in 2008. Finally, in 2015 9.8% of respondents said that they had seriously considered suicide at some point in the past 12 months, an increase from 6.4% in 2008.

So how effective are colleges in addressing the problem of depression among their students? Unfortunately, research suggests that there is a significant shortfall in the treatment of

depression on college campuses. In their 2008 study, Blanco et al. analyzed ACHA-NCHA data from 2001 to 2002 and found that only 34% of college students with mood disorders received treatment. This is consistent with rates found by Eisenberg and Chung (2012) who conducted an online survey of a random sample of 8,488 students from 15 colleges and universities in 2009. They found that only 41% of students who experienced depression received some form of mental health treatment.

Perhaps more troubling than the low percentage of students who received treatment are the estimates of minimally adequate treatment that they received. Minimally adequate treatment was defined by Wang et al. (2005) as receiving at least two months of pharmacotherapy plus four visits to any type of physician, or at least eight sessions of psychotherapy lasting an average of 30 minutes. Eisenberg and Chung (2012) found only 22% of depressed students received minimally adequate treatment. Additionally, racial/ethnic minority students were significantly less likely to receive treatment for depression, compared to their white counterparts.

One of the major barriers to receiving treatment has been the lack of help-seeking behavior on the part of the students. Givens and Tjia (2002) noted that students identified lack of time, stigma associated with using mental health services, fear of lack of confidentiality, fear of unwanted intervention, and fear of documentation on academic record as reasons for not seeking treatment. Komiya, Good, & Sherrod (2000) also identified lack of emotional openness to be a predictor of students not seeking treatment. Eisenberg, Golberstein, and Gollust (2007) found that a lack of perceived need for help, lack of awareness of service, and skepticism about treatment effectiveness were additional common barriers. Lastly, gender may also be an important variable when it comes to examining reasons that students are not receiving treatment. In Komiya et al. (2000), students who identified as men were also less likely to seek mental

health treatment than those who identified as women. This is supported by Sheu & Sedlacek (2004) who found that women are more receptive to professional help than men.

It is clear through the research that there is a critical problem on our college campuses today. Prevalence rates of depression are increasing, and only a small fraction of students who are suffering from it are receiving treatment. Barriers to treatment are preventing students who need care from receiving it, and those who do receive it often receive care that is not even minimally adequate. Because of these reasons, it is imperative that we not only increase the types of services that are already offered, but also utilize new and innovative ways to help these students.

Community Psychology

The discipline of community psychology is difficult to define. Rappaport (1977) believed this is so because community psychology is a shift in paradigm or focus from traditional applied psychology. Traditional applied psychology attempts to identify individuals who are already suffering, and to have mental health professionals provide rehabilitation through interventions that target individuals or very small groups (e.g., families and couples). In contrast, community psychology emphasizes the importance of analysis at the systemic - rather than individual - level. The aim is therefore to target populations in order to reduce the suffering of its members and to prevent new cases from occurring. Because of this distinct aim, community psychological interventions are essentially preventative in nature. This focus on systems and populations counters reductionistic approaches, which reinforce culturally dominant views on individualism and can lead to victim blaming (Nelson & Prilleltensky, 2010).

Since the scope of prevention programs is larger than that of traditional clinical interventions, community psychologists have to design their interventions with several

considerations in mind. According to (Nelson & Prilleltensky, 2010), prevention programs can be (a) *primary*, which intend to reduce the onset rates of a mental health problem; (b) *secondary*, which intend to detect and treat individuals who are showing early signs of a mental health problem; and (c) *tertiary*, which intend to provide treatment and reduce disability resulting from mental health problems. Additionally, prevention programs are designed with the needs of their particular populations in mind. A *universal prevention program* is created to be applied broadly and help a wide spectrum of community members. *Selective programs* aim to help individuals who have been identified as being at risk to develop a problem. Lastly, *indicated programs* target high risk individuals or those who already show symptoms of a mental health problem (Nelson & Prilleltensky, 2010).

A central component to community psychology is the ecological metaphor (Nelson & Prilleltensky, 2010). This can be defined as the relationship between individuals and the social systems in which they are embedded (Nelson & Prilleltensky, 2010). Through this metaphor, ecological principles can be applied to community psychology. These principles include interdependency, the cycling of resources, adaptation, and succession. Communities are open systems with many levels and connections, and smaller systems are nestled within larger systems. By applying the principle of interdependency, community psychology posits that changes to any single part of a system have a ripple effect on other parts of the system.

Community psychology also strongly considers the concepts of power and empowerment within individuals and communities. Power can be divided into three types: (a) the power to strive for wellness; (b) the power to oppress; and (c) the power to resist oppression and pursue liberation (Prilleltensky, 2008). The construct of empowerment is a core philosophy in community psychology. At its most basic, empowerment connects individual strengths,

proactive behaviors, and natural helping systems to social policy in order to effect change (Rappaport, 1981).

Empowerment is greater in scope than some traditional psychological constructs with which it is compared such as self-efficacy, competency, or locus of control (Perkins & Zimmerman, 1995). Because of this, the process of empowerment has no agreed upon definition. Even so, there is a general consensus that it is an intentional, ongoing process involving mutual respect, critical reflection, caring, and group participation (Cornell Empowerment Group, 1989). Through this process, individuals are able to gain control over their lives, a critical understanding of their environment, and democratic participation in the life of their community (Rappaport, 1997; Zimmerman, Israel, Schulz, & Checkoway, 1992). It is a process through which an individual takes power back in their life (Lord & Hutchison, 2009). Prevention programs are therefore designed to empower clients to help themselves.

Prevention programs can look very different from one another, but there is ample evidence of their effectiveness (Durlak & Wells, 1997). Programs that focus on skill development have been found to improve cognitive and social-emotional outcomes in children (Blok, Fukkink, Gebhardt, & Leseman, 2005), and school-based programs have shown promising results in helping prevent behavioral and emotional problems in students (Waddell, Hua, Garland, Peters, & McEwan, 2007). Prevention programs have also been used to target depression (Jane-Llopis, Hosman, Jenkins, & Anderson, 2003; Price, Van Ryn, & Vinokur, 1992).

Nation et al. (2003) noted that the replication of developed prevention programs is a challenge for many agencies, which leads many agencies to develop their own prevention programs. Because of this challenge, Nation et al. (2003) sought to identify the principles of

effective prevention programs, so organizations can benefit from the rigor that goes into science-based prevention models. They identified nine principles of effective prevention programs, with the first five principles related to program characteristics, and the last four principles related to matching a prevention program with a target population.

Principles related to program characteristics.

Comprehensive.

The first principle identified by Nation et al. (2003) is comprehensiveness. This is defined as providing a variety of interventions to address significant risk factors or mediators to the problem. For example, prevention programs designed to reduce unwanted pregnancies include a combination of interventions focused on encouraging skill development, increasing knowledge and awareness, and offering reproductive health services (Miller & Paikoff, 1992). The other component of comprehensiveness is engaging individuals within multiple settings in order to engage with the different systems levels which impact the development of the problem, and that a combination of parent, peer, and school interventions improve outcomes (Sagrestano & Paikoff, 1997).

Varied teaching methods.

The second principle is varied teaching methods. In their research, Nation et al. (2003) noted there was a consensus among the prevention programs they examined that skill development is important, and prevention programs should not rely too heavily on knowledge and group discussions to provide change. Prevention programs which included a skills-based component in addition to knowledge component were more likely to be effective (Nation et al., 2003). The skills being developed vary based on the nature of the problem they are meant to address. For example, The National Institute on Drug Abuse found that programs which helped

individuals to effectively communicate and be more assertive around issues of drug use were helpful (2003).

Sufficient Dosage.

The third principle is sufficient dosage, which refers to the need for individuals to be exposed to the prevention program for a long enough period of time to be affected (Nation et. al, 2003). This can be measured both by the quality and quantity of the contact hours with the intervention, and appropriate dosage may be determined by the individual's level of risk. Generally, individuals with greater needs will need increased dosage of the intervention (Simeonsson, 1994).

Theory driven.

Theory driven refers to the need for scientific justification of a prevention program. Nation et al. (2003) noted that while this may seem basic, many prevention programs in schools and communities overlook this. Fisher, Fisher, Misovich, Kimble, & Malloy (1996) noted in their review of a prevention program targeting risky sexual behavior that the majority of the interventions were based on a mixture of logic and previous experience. Theories can be either etiological, examining the cause of the problem; or at the intervention level, focused on identifying the best methods of intervening with the etiological risks (Nation et al., 2003).

Positive relationships.

The principle of positive relationships is based on findings that opportunities to develop strong, positive, relationships was associated with positive outcomes (Nation et al., 2003). In this context, positive relationships occur within different settings. For example, a prevention program targeting high school students would hope to foster positive relationships with peers, teachers, and family members. The evidence of these types of relationships being associated

with positive outcomes is well-supported (Grossman & Tierney, 1998; Sloboda & David, 1997). It should be noted that individualized attention may not be enough to be effective, and that the source of the attention should also be considered (Tolan and Guerra, 1994).

Principles related to matching prevention programs with a population.

Appropriately timed.

Prevention programs should be appropriately timed to address the problem being targeted (Nation et al., 2003). This is defined by the developmental appropriateness of the interventions used, and the timing of the intervention being selected to have the maximum impact on the population. Programs which occur too early in the development of an individual may lose their relevance to the problem, and the programs which occur too late may be reaching individuals after the onset of the problem which is being prevented (Haggerty & Mrazek, 1994).

Sociocultural relevance.

To have sociocultural relevance, prevention programs need to take into account community norms, and cultural beliefs and practices (Nation et al., 2003). Prevention programs which are not relevant run the risk of not appealing to high-risk participants (Kumpfer & Alvarado, 1995). One way to improve relevance is to include participants in the planning and implementation of the program (Janz, Wren, Israel, Freudenerg, & Carter, 1996).

Outcome evaluation.

In order to ensure that prevention programs are effective, outcome evaluations must be utilized (Nation et al., 2003). Without the use of evaluation, programmers may assume a program is effective based on anecdotal evidence. Additionally, an ongoing outcome evaluation program can feed back information at several stages of the intervention, allowing the program to be improved over time (Wandersman et al., 1998).

Well-trained staff.

Prevention programs are most effective when they are run by well-trained staff (Nation et al., 2003). This includes staff members who are sensitive, competent, and have received sufficient training, support, and supervision (Lewis Battistich, & Schaps, 1990). It is also important to note that even when staff members are sufficiently competent, their effectiveness can be compromised by low morale, high turnover, or a lack of belief in the program (National Council on Crime and Delinquency, & Howell, 1998).

In summary, community psychology is a paradigm shift away from traditional applied psychology, hence its aims are different. It is also amenable to innovative approaches, as prevention programs can apply the nine principles outlined by Nation et al. (2003) in many different ways. Incorporating these principles into prevention programs provides assurance that they are consistent with the established research. It is these distinctive characteristics that make community psychology a strong framework and strategy for developing a video game based intervention.

Video Games**History.**

Gaming has been a human activity throughout most of our history and archaeological evidence of it dates back to ancient Egypt and Mesopotamia (Egenfeldt-Nielsen, Smith & Tosca, 2016; Hallo, 1993). The existence of gaming throughout human history suggests that it serves an enduring psychological function (Ryan, Rigby, & Przybyliski, 2006). For many game players, this function is now met by playing video games. What started as a niche hobby with the creation of *Pong* in 1972, has since developed into a multi-billion-dollar industry. Video game players vary hugely in terms of demographics and are increasing in numbers every year,

according to the Entertainment Software Association (ESA, 2016).

Advances in technology have improved the ways people play video games. Smartphones have made it so video games can always be in our pockets, and commercially available virtual reality equipment has created a level of immersion that was previously not possible within people's homes. Motion controllers such as Nintendo's Wii remote and Xbox's Kinect encouraged us to get up out of our chairs and move our bodies to play games, while Pokémon Go had players leaving their homes to try and catch digital monsters with their phones. Between 2009 and 2012 the video game industry grew by more than nine percent, which was four times the growth rate of the U.S. economy over the same time (Siwek, 2014). In 2015, U.S. consumers spent \$16.5 billion dollars on video games (ESA, 2016).

Throughout their history, video games have developed and evolved from simple games with a single mechanic to complex games with many different components. The term video game is broad and nonspecific, as it can refer to anything from a single player puzzle game played on a mobile phone, to a multiplayer flight simulation played on a computer using virtual reality equipment, to a first-person shooter on a gaming console plugged into a television. The evolution of videogames as a form of media is closely tied to advances in technology and innovation (Arsenault, 2009). For the purposes of this paper, we will be using the term "video game" as an umbrella term to describe an electronic game that involves human interaction with a user interface to generate visual feedback through an electronic device such as a computer screen, phone screen, or television.

Characteristics of players.

So, who plays video games? Stereotypes and misconceptions about video game players are common and often negative. Williams (2003) conducted a content analysis of leading

magazines from 1970 to 2000 and found that video game players were portrayed in print media as stereotypically male, young, socially inept, and pale from spending too much time indoors. In fact, in a survey conducted by Duggan (2015) for the Pew Research Institute, 60% of American adults agree with the statement “most people who play video games are men.” The same survey found instead that, of the adults surveyed who play video games, 50% were men and 48% were women. This is close to data put forth by the ESA (2016) which claims that 59% of video game players are male and 41% are female. While playing video games appears to be marginally more popular with men, it is clear that there are many women players as well. A difference has been observed however when it comes to the preferred game genres, with males being more likely to prefer strategy, role playing, action, and fighting games; while women are more likely to prefer social, puzzle, music based, educational, and simulation games (Phan, Jardina, & Hoyle, 2012).

In their 2008 study, Williams, Yee, and Caplan found that their results run counter to common stereotypes in surprising and interesting ways. The video game players they looked at were on average less overweight and exercised more than the average American adult. They also reported having slightly lower levels of anxiety than among the general population. Not all their findings were positive however, as their participants reported higher levels of depression and substance abuse than the general population. All told, 49% of American adults play video games, and 10% consider themselves gamers (Duggan, 2015). The mean age of video game players is 35. Sixty-three percent of American households have at least one person who plays video games three or more hours per week. Lastly, women age 18 and older represent a greater portion of people who play games (31%) than boys age 18 or younger (17%) (ESA, 2016). So, what does the literature have to say about the impact that video games has on these players?

Impact and categories of video games.

Much of the early research looking at video games focused on their potential negative impact. Anderson and Bushman (2001) conducted a meta-analysis linking violent video games to increased aggressive behavior, aggression-related thoughts and feelings, physiological arousal, and decreased prosocial behavior. Ferguson (2007) however suggested that the topic of violence in video games has become a highly politicized topic for the public, and that publication bias has impacted the effect size that has been purportedly observed.

Research has also looked into the positive impacts of games, and their potential benefit aside from their entertainment value. In order to make sense of this research, it is important to delineate among different types of games based on several criteria. The first way to categorize a game is based on its intended impact or outcome (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012). The most common type of game is a commercial entertainment game (CET). The primary function of these games is for recreation, and aims to create a fun and enjoyable experience for the player. Examples of this are *Super Mario Brothers*, *Halo*, *World of Warcraft*, or *Candy Crush*. Less common are serious games or games-based learning (GBL). These games aim to create behavior change or learning in the player. Examples of this category are *Carmen Sandiego* to teach geography, or *Project: EVO* to treat ADHD and depression. The terms serious games and GBL are sometimes used interchangeably.

In addition to their intended impact, games can be categorized into genres. While there is no standard accepted classification system of genres, Herz's (1997) system is close to the one used predominantly by the gaming industry, and so has the benefit of being easily accessible and understandable by video game players. Herz differentiates games into eight major categories: (a) action games, (b) adventure games, (c) fighting games, (d) puzzle games, (e) role-playing games, (f) simulations, (g) sports games, and (h) strategy games. These genres can be further broken

down into subcategories as well. While this classification does not take into account important game components such as single-player versus multi-player, and games that cross over into multiple genres, it serves as a reasonably functional tool in categorizing video games.

Video games as interventions.

Serious games have been looked into as an adjunctive treatment modality for a wide variety of psychological conditions. To give just a few examples, they have been used as part of a computer based intervention to: (a) reduce aggression in middle school students (Bosworth, Espelage, DeBay, Daytner, & Karageorge, 2000), (b) address phobias (Klinger et al., 2005; Robillard, Bouchard, Fournier, & Renaud, 2003), (c) increase emotional regulation and impulsivity control with patients diagnosed with bulimia nervosa (Faguno et al., 2013), (d) complement other therapeutic modalities in mental disorders related to impulsivity (Fernández-Aranda et al., 2012), and (e) educate cancer patients about their illness (Beale, Kato, Marin-Bowling, Guthrie, & Cole, 2007). While it is outside the purview of this paper to review all of the literature on serious games, it is clear that this is a thriving area of research that shows many promising outcomes.

Of particular interest for the purpose of this paper is a study conducted in 2012 by Merry et al. evaluating the effectiveness of *SPARX*, a fantasy themed three-dimensional adventure game designed to deliver cognitive behavioral therapy, targeting adolescents seeking help for depressive symptoms. The methodology used in this study was randomized and controlled. The majority (89.2%) of participants in the control group received counseling, 11.3% were waitlisted for an active treatment, and 2.4% were prescribed drugs. Their results indicated that *SPARX* was as effective as the control treatment for most participants.

More recently, Anguera, Gunning, & Areán (2016) examined the iPad game *Project:*

EVO as treatment for late life depression in adults. Participants assigned to the experimental group were instructed to play *Project: EVO* five days per week for about 20 minutes at a time, while control participant participated in Problem-solving therapy (PST) once per week for eight weeks. They found that the participants who played *Project: EVO* showed similar improvements in self-reported functioning and mood as those who received PST. Perhaps more remarkable is the fact that participants assigned to play the game demonstrated a 100% adherence rate. This may suggest that video games may have an advantage over traditional treatments, due to their accessibility and/or the fact that they are enjoyable.

Psychological benefits of video games.

In their systematic review of the literature, Connolly et al. (2012) found 129 papers providing empirical evidence regarding the impact of playing video games. The evidence pointed to learning and behavioral outcomes from playing video games that suggested the potential for the following: (a) knowledge acquisition; (b) the acquisition and development of perceptual skills, cognitive skills, motor skills, and social skills; (c) behavior change; and (d) affective outcomes, motivational outcomes, and physiological outcomes. They concluded that the former lack of empirical evidence regarding the impact of playing games is starting to be addressed through the literature. However, they also highlighted the fact that more randomized clinical trials need to be conducted in order to further bolster the evidence. They found that the majority of research examined entertainment games, instead of serious games or games-based learning. While this emphasis may be surprising, a significant degree of efficacy has been demonstrated by these studies. In fact, at times commercial games have been utilized to greater effect than games designed to serve specific functions.

In their 2014 study, Shute, Ventura, and Ke found that subjects who were assigned to

play a commercial entertainment video game (*Portal 2*) showed significantly more improvement in problem-solving ($P=0.02$), spatial skill ($P=0.04$), and persistence ($P=0.05$) after an eight-hour playing session, than those assigned to play *Lumosity*, a game designed to increase cognitive functioning. Significant effects have been found and associated with other games as well, including improved cognitive functioning in older adults from playing the strategy game *Rise of Nations* (Basak, Boot, Voss, Kramer, 2008) and *Starcraft* with increased problem-solving skills. *Minecraft*, a multiplayer sandbox game which allows players to build objects out of blocks, has been used as an educational tool in a wide variety of topics all over the world, including for social skills (Petrov, 2014), sustainable planning (West & Bleiberg, 2013), and language and literacy (Bebbington, 2014).

Perhaps one of the best examples is the recent international success of *Pokemon GO*, which is an augmented reality game in which players search for digital monsters in their everyday surroundings through their smart phone. In hunting for Pokemon, players significantly increased their levels of physical activity over a period of 30 days (Althoff, White, & Horvitz, 2016). Particularly engaged users increased their average number of daily steps by over 25%. Additionally, *Pokemon GO* effectively engaged low-activity users, whereas leading health apps available for phones only engaged users who were already active.

As this review clearly reflects, the literature on video games is a growing and lively area of research. Society's view of video games and the people who play them have come a long way from the stereotypes and beliefs originally associated with them. As the video game industry continues to grow, it is vitally important that we continue to understand the impact of video game use.

Proposal

To briefly review the three primary points in this paper thus far, I have established (a) that there is a strong need to do more to address depression on college campuses, (b) that video games hold great potential as an innovative and promising new form of intervention, and (c) that community psychology offers a tried and tested framework which can guide the implementation new prevention programs. These three bodies of literature will now be synthesized in order to provide recommendations for designing and implementing a video game based prevention program for university students. This proposal will begin with an outline for the development and implementation of the prevention program. Recommendations are then made based on the principles of effective prevention programs. To quickly review, the principles of effective prevention programs are as follows: (a) comprehensive (b) varied teaching methods; (c) sufficient dosage; (d) theory driven; (e) positive relationships; (f) appropriately timed; (g) socioculturally relevant; (h) well-trained staff; and (i) outcome evaluation (Nation et al., 2003).

Timeline of Development and Implementation

The prevention program progresses through three phases: (a) planning; (b) implementation; (c) and maintenance. Planning will include establishing the necessary knowledge about the community, developing relationships with potential collaborators, and the conceptual development of the characteristics of the prevention program. During the implementation stage the program will be put into action, and the game will be produced and implemented for the university. Finally, the maintenance stage will utilize program evaluation strategies to generate outcome data and to improve the program.

During the implementation stage, the development of the video game itself will take place. For clarification, the development process will be broken down into three phases: (a) pre-production; (b) production; (c) and post-production. Pre-production involves the conceptual

planning and design elements that go into the video game. The production phase is characterized by the creation of the game itself, including programming and creating the art assets that will be used in the game. In the post-production phase, the game is tested and then deployed.

Application of Nine Principles

Comprehensive.

According to Nation et al. (2003), effective prevention programs are comprehensive. This means engaging communities in multiple settings with multiple interventions. The proposed program should provide interventions in two distinct ways: (a) engaging the community in the development and implementation of the program; and (b) delivery of services through playing the video game.

Regarding multiple settings, in developing and implementing the program organizers will need to create collaborative working relationships with different groups across the range of campus communities. In doing so, the program can engage different groups on campus. University counseling centers are an ideal starting point for this collaboration, but other campus organizations should be considered as well. Universities with established game design or development programs will likely want to involve members from that community. Psychology departments may have students or faculty who would be interested in the psychological intervention aspect, and digital art departments could collaborate to create game art tailored to the university itself.

The video game itself can be accessed in many locations, including in dorm rooms or students' homes. This portability is one of the greatest strengths of using a video game to deliver psychological services. Additionally, it potentially addresses two of the identified barriers to treatment (lack of time, and fears about a lack of confidentiality). The consideration of which

video game platform to use should be considered, and accessibility should be a primary consideration. Many college students own, or have access to, a computer or smartphone that gives these platforms a significant advantage as it allows students to utilize the video game without investing in additional hardware. Prevention program staff should consider developing the game with cross-platform capabilities (able to function on different platforms) so that players could access it from different locations. Portability and convenience are not the only accessibility-related issues, however, and developers should consider including accommodations for students who are differently-abled (e.g., optional alternate graphics for students with color blindness).

Modern theories suggest that learning is most effective when the process is active, experiential, situated and problem-based, and provides immediate feedback (Boyle, Connolly, & Hainey, 2011). Therefore, it makes sense that prevention programs are most effective when utilizing multiple interventions. The virtual world within a video game lends itself to flexibility and creativity, and multiple interventions can be leveraged to increase the therapeutic benefit.

The serious game *SPARX* utilized cognitive behavioral therapy (CBT). Players of *SPARX* created an avatar (in-game character they control) to travel through a fantasy-themed world, and utilized strategies that are central to CBT in order to overcome challenges. How they performed when facing these challenges then determined if they were able to proceed by providing immediate feedback on their performance. The potential game for this prevention program could incorporate this with a mechanic that encourages increased physical activity from a game like *Pokemon GO*. Another potential mechanic could encourage players to increase social contact by rewarding them for working together, or even meeting in person. CBT is well supported in the literature, and greater amounts of physical activity, and even low-intensity

exercise, are associated with reduced symptoms of depression (Dunn, Trivedi, & O’Neal, 2001). The virtual worlds in video games are not bound by the same limitations as traditional service delivery platforms, and program developers should consider utilizing this flexibility to increase the therapeutic benefits.

Varied Teaching Methods.

In addition to being comprehensive, effective prevention programs utilize varied teaching methods to increase participant’s skills rather than relying exclusively on knowledge acquisition and group discussion (Nation et al, 2003). Video games offer an ideal format through which this principle can be enacted, as they have been shown to be effective in the acquisition and development of a variety of skills (Connolly et al., 2012). Studies have shown video games can be effective at improving cognitive function (Basak, Boot, Voss, Kramer, 2008), problem solving skills (Adachi and Willoughby, 2013), academic skills (Whalen et al., 2010), among others. It is recommended that the video game in this prevention program be designed to take advantage of this fact, as the serious game *Playmancer* did. *Playmancer* integrated Relaxation Training (RT) by utilizing equipment measuring biological markers related to physiological arousal. It would then measure a player’s response to challenges they faced in the game, and if the player’s arousal reached a certain level, the game would shift into a mini-game in which players would utilize breathing techniques to reduce their arousal. While the way this was implemented with *Playmancer* required specialized equipment, something similar could be achieved by integrating popular peripherals such as a *Fitbit*, which is a wearable activity tracking device.

Sufficient Dosage.

In order to ensure that students receive sufficient dosage of the intervention, it will be

important to engage students as soon as they enter the university. While the exact level of exposure required may be difficult to determine due to the novelty of the intervention strategy, many programs utilize a general principle of prolonged exposure (Nation et al., 2003). Ongoing evaluation data can also be examined to determine effective dosage and prescribe this course of treatment for future students. Differences in exposure should also be taken into account. A student involved in the running of the prevention program will have a qualitatively different exposure than a student who participates only by playing the video game.

Theory Driven.

While the body of literature on video games as interventions is still growing, there is ample evidence that it is an effective delivery method. Interventions selected to be embedded within the game should also be informed by a solid empirical body of evidence. CBT, RT, and increased physical activities have already been mentioned as examples of empirically supported interventions which have been integrated into video games. Additionally, the prevention program itself should be designed to utilize principles of effective prevention programs.

Positive Relationships.

The promotion of positive relationships is another principle of effective prevention programs. This includes relationships with peers, teachers, mentors, and family. The first and most obvious way to integrate this into a video game based prevention program is in the planning, implementation, and maintenance of the prevention program. Depending on how the program is structured, students could become involved through volunteering, or by the creation of courses designed to be involved with this program. This can serve the needs of the community by maintaining the prevention program, as well as the needs of the individuals running the program by fostering these positive relationships.

Additionally, the video game itself could incorporate mechanics designed to promote positive relationships. There are different potential ways that this could be implemented. As has been mentioned, one possibility is that the game could encourage in-person social interaction by including game elements which can only be accessed when in close proximity to other players. Returning to the example of *Pokemon GO*, in order to increase the likelihood that they would find a rare “pokemon,” players were encouraged to gather at “pokestops.” These “pokestops” were real locations with visible landmarks. At these locations, players could then use “Lures,” which in this sense are in-game items that increased the frequency “pokemon.” Additionally, players would meet at digital “pokemon gyms” to battle other players. Both of these mechanics caused players to gather in groups to play together. The video game for this prevention program could utilize mechanics like these, and add other mechanics that reward positive interactions between players.

Another potential way that positive relationships could be encouraged is through online interactions between players. While many are skeptical about the quality of relationships that exist only in a virtual space, the literature suggests that they can be meaningful and have significant impact. Shared virtual spaces are able to support synchronous communication and social interaction (Lucia, Francese, Passero, & Tortora, 2009), and a significant number of massively multiplayer online role-playing games (MMORPG) players surveyed reported that the quality of their friendships with other MMORPG players were comparable to, or better than, their friendships with people outside the virtual world, as described by Yee (2006).

Appropriately Timed.

Nation et al. (2003) also suggest that prevention programs need to be well timed and tailored to the norms of the population. Developmentally, traditionally-aged undergraduate

college students are transitioning from late-adolescence into early adulthood. When this fact is combined with the academic demands placed on college students, it is perhaps not surprising that there is a higher incidence of depression compared to the general population (NSDUH, 2014). Prevention programs should incorporate aspects of student life, and to this end, students should be involved in the design, implementation, and maintenance of the program. It is also important that the program make a specific effort to reach incoming first-year students in order to reach them before the potential onset of depression.

Sociocultural Relevance.

It is clear that video games are a huge industry and are being played by huge numbers of people across the United States (ESA, 2016), suggesting they hold a significant place as a part of American culture. One of the greatest strengths offered by using video games as an intervention is the fact that people enjoy playing video games. While researchers have struggled to operationalize what “fun” is, Ryan, Rigby, & Przybyliski (2006) suggest that the theory of self-determination can be used to explain the attraction many people have to playing video games. They suggest that playing a video game can meet an individual’s needs for autonomy, competence, and relatedness, and found that these factors do indeed predict enjoyment and future game play. It is important when developing a video game for this project that these factors are taken into account, and that enjoyability is a primary concern. This is a somewhat unique consideration, but it is essential and will increase the likelihood that students will engage with the intervention.

There are significant video game design considerations to take into account as well. As has been mentioned, gender differences have been observed regarding preferred video game genre with men being more likely to prefer strategy, role playing, action, and fighting games, and

women being more likely to prefer social, puzzle, music based, educational, and simulation games (Phan, Jardina, & Hoyle, 2012). Additionally, there is a gender gap in help-seeking behaviors with men being less likely to seek mental health treatment (Komiya et al, 2000; Sheu & Sedlacek, 2004). Designers should consider their target audience when developing their game.

To improve relevance, participants of the program should be included in the planning and implementation stages of development (Janz et al., 1996). This will help to ensure that the specific needs of the student population are addressed through the program. It may also help to identify additional considerations of culture which are not immediately apparent to program developers.

Outcome Evaluation.

A video game developed for this prevention program has the benefit of being able to generate data from the users to evaluate the effectiveness of the program, shape ongoing development, and potentially contribute to the existing body of literature. Universities counseling centers often already require some form of evaluation as part of receiving mental health services, and similar measures could be built into a video game.

This could be integrated in a simple manner, by requiring players to complete a brief validated assessment measure at predetermined intervals. Potential measures that could work in this way include the Counseling Center Assessment of Psychological Symptoms (CCAPS) or Beck's Depression Inventory (BDI). Data generated through this manner could verify the efficacy of the video game based intervention, and can also function as a safeguard in case a student gets significantly worse.

In addition to symptom and severity measures, a video game has the benefit of being able to generate a wealth of other data. User demographics, referral sources, usage statistics, and

many other variables can be readily measured and used to shape the development of the prevention program.

Well-Trained Staff.

The final principle noted by Nation et al. (2003) is that prevention program staff needs to be well-trained. For this reason, program developers are encouraged to formalize a training program for staff. As identified in the literature review, it is important that this training program includes selecting staff members who are sensitive and competent, and providing them with sufficient training, support, and supervision (Lewis, Battistich, & Schaps, 1990). As the program continues, a mentorship program is encouraged through which new staff members and students are paired with individuals who have been involved in running the program. Individuals on staff who work in a customer service role should also have training in mental health first aid, as an additional way to support students engaged in the program.

Limitations

While there is ample evidence to suggest that a program utilizing the recommendations proposed would have a significant positive impact on the well-being of university students, there are concerns that need to be considered as well. Although the following list of concerns is not comprehensive, it attempts to address some of the most significant.

First, the up-front cost of developing and implementing a video game based prevention program is likely to be a significant concern for most universities. This cost has the potential to be offset over time, since most of it is accrued in the development and implementation phases of the program, and the cost of maintenance should be significantly less. In order to model and project this cost, program developers are encouraged to utilize data from a variety of similar projects (e.g. video game based interventions targeting the general public, technology based

prevention programs in universities).

Second, while the body of evidence looking at video game based interventions is growing, it is still limited. Connolly et al. (2012) noted that a relatively small number of the papers identified in their search provided empirical evidence. Even fewer were determined to provide “higher quality” evidence (Connolly et al., 2012). Much of the current research is also focused on the impact video games have on children and adolescents, rather than college-aged students or adults. While it is clear that older individuals are playing video games as much or more than their younger counterparts (ESA, 2016), it is possible that there are differences in the ways they are impacted. It is important that current research is expanded upon to further establish a solid empirical base of evidence regarding the strengths and weaknesses of video games as a service delivery method.

Third, one of the greatest potential strengths of a video game based prevention program, portability, is also potentially a risk factor. Since the delivery of this intervention does not require a mental health professional to be present, students who experience a significant change in the severity of their depression may be at increased level of risk. Because of this, it is extremely important that integrated assessment tools be comprehensive and frequently utilized so an at-risk student can be connected with more comprehensive mental health support.

Finally, it is difficult to predict which games become successful and which do not. Many video games that are developed do not achieve popular success, and those that do are often unable to maintain success over a long period of time. There are several possible ways to try and address this concern. First and foremost, the enjoyment that students experience in playing the video game should be a primary aim of the development team. A game which provides the intended mental health services, but is not used by students would ultimately be a waste of

resources. Additionally, it is recommended that universities consider incentives for participation in the prevention program. One possible way this could be implemented is as a class for students involved in running the program. For students playing the game, ongoing participation could be rewarded with social events, awards, or even scholarship money.

As an entirely new type of prevention program, a video game based intervention would face significant challenges and limitations. Even so, it is vitally important that mental health professionals explore the potentials that these programs hold.

Summary

Data has clearly shown that the prevalence of depression in the college student population is increasing, and university counseling centers are struggling to meet these new demands. By synthesizing existing theories and research into powerful new interventions, mental health professionals have the ability to embrace technological advances and reach students in ways that were previously impossible. Interventions which are available “on the go” and from the privacy of one’s own phone or computer are likely to appeal to a student population which is increasingly mobile and self-reliant. Utilizing the principles of effective prevention programs outlined in Nation et al. (2003) as a guideline, recommendations have been made in this paper concerning the development and implementation of such a prevention program. A video game based prevention program has the potential to revolutionize mental health services on university campuses, and significantly reduce the suffering of students with depression.

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