GAMIFY YOUR LIFE: GOAL ATTAINMENT USING VIDEO GAME
MOTIVATIONAL STRATEGIES TO SUPPORT BASIC PSYCHOLOGICAL NEEDS

_____

A Dissertation

Presented to

The Faculty of the Department

of Psychology

University of Houston

_____

In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

_____

By

Michelle C. Quist

May, 2016

GAMIFY YOUR LIFE: GOAL ATTAINMENT USING VIDEO GAME

MOTIVATIONAL STRATEGIES TO SUPPORT BASIC PSYCHOLOGICAL NEEDS

_____

Michelle C. Quist

APPROVED:

_____

C. Raymond Knee, Ph.D.
Committee Chair

_____

Clayton Neighbors, Ph.D.

_____

Jennifer L. Bryan, Ph.D.
Baylor College of Medicine

_____

Christine Bachman, Ph.D.
University of Houston Downtown

_____

Steven G. Craig, Ph.D.
Interim Dean, College of Liberal Arts and Social Sciences
Department of Economics

GAMIFY YOUR LIFE: GOAL ATTAINMENT USING VIDEO GAME
MOTIVATIONAL STRATEGIES TO SUPPORT BASIC PSYCHOLOGICAL NEEDS

_____

An Abstract of a Dissertation

Presented to

The Faculty of the Department

of Psychology

University of Houston

_____

In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

_____

By

Michelle C. Quist

May, 2016

ABSTRACT

Over the past two decades, advancements in technology have paved the way for the rise of video games as the world's most popular entertainment medium. Researchers have dedicated a great deal of time and energy exploring both positive and negative effects of video games on society, especially to vulnerable populations such as children and young adults. This paper investigated the associations of video game usage, basic needs satisfaction, and well-being, and how those mechanisms may be used to support goal attainment and relieve college maladjustment through two diary studies. Results were mixed; finding that though video game usage was positively associated with basic needs satisfaction and that basic needs satisfaction mediated the relationship between video game usage and well-being, there was no significant increase in goal attainment or college adjustment in the video game experiment compared to the control goal attainment task. Implications for future research are discussed.

TABLE OF CONTENTS

Dedication

I dedicate this dissertation to my family and friends, without whom I would be lost. To my parents, whose support provided the backbone of every academic goal I have ever accomplished. To my sister Jenny, for always urging me to be more, to my brother Brian for his unspoken permission to be exactly the person I want to be. To Chelsie, my sister-at-arms, to Angelo, my encourager, to Camilla, my anchor in a howling wilderness, to Jenn, my staunch defender, and to Zach, my calm voice of reason.

And finally, to Brad, my beloved, for whom I will always strive to give the best of myself.

Introduction

Imagine, for a moment, an average eighteen-year-old male named Joe. Just graduating from high school, Joe's sense of achievement bolsters his spirits. The summer months resemble the past eleven summers, a release from schoolwork and free time to spend with friends and fun. This particular summer is even sweeter, with the promise of college in the fall and the beginning of a bright, golden future as an adult.

When fall arrives, Joe packs up his supplies and belongings, nervously excited, and travels with his parents a couple hundred miles away to his dorm room. They unload the boxes, take a quick look around campus, and then Joe's parents bid him a wistful farewell. In the wake of their departure, Joe is abruptly confronted with the realization that he is alone. The lifelong friends that he was certain he was going to make are nowhere to be found, and his bored sophomore roommate emanates intimidating disdain. Joe's enthusiasm begins to wane.

Over the next couple of weeks, Joe becomes increasingly anxious as he is continuously exposed to novel experiences and situations. He is in charge of choosing his classes, getting himself up in the morning and to bed at night, preparing his own food, doing his own laundry. His professors are colder and more distant than he remembered his high school teachers being, and the coursework is more difficult and autonomous. He does not have some of the same classmates in each class like he did in high school, which makes it difficult to make friends, and the university cliques and clubs seem impenetrable. He knows he is supposed to be preparing for his future, but he is uncertain of the steps he needs to take to achieve his goals. In the wake of this uncertainty, loneliness, and helplessness, Joe is desperate for a solution. He turns to his computer and logs into World of Warcraft, his favorite game, and immediately, members of his guild begin chatting with him. They invite

him to join a raiding party, and he successfully engages in battle and defeats the monsters. A couple of hours later, it is time to go to class. Joe knows that he should go to class, but there is no one enforcing his attendance. He cannot trace the importance of attending class directly to the future goals he wants to attain. Is Joe going to leave the familiar, comforting, reaffirming video game environment and re-enter the perceived hostility of the real world?

For decades, researchers have been studying the maladaptive effects of entering a university setting on young adults. Faced with a jolting change in their living situations, students over the years have used a wide range of coping techniques to manage the onslaught of new pressures, expectations, and relative absence of their established social network. These techniques can have positive or benign implications, such as in the case of identification with a group such as a club or fraternal order (Mallett et al., 2013; Venter, 2013), or negative implications such as alcohol/substance abuse (Substance Abuse & Mental Health Services Administration, 2011), or other risky behaviors (Adams & Moore, 2007). Even with the increased attention on college maladjustment and the various interventions that have been implemented, the problem still remains. It is a two-pronged problem – college students are unsure *how* to attain their goals in the sudden absence of a structure, and the sudden lack of support contributes to their lack of perceived *ability* to achieve their goals. As of now, researchers are still searching for a way to provide guidance and support to these emerging adults.

In recent years, immersive digital entertainment in the form of video games has become increasingly affordable, available, popular, and, most importantly, engaging. The ease in which video games draw people in and the extent to which the motivational pull extends from childhood through adolescence into adulthood make them a prime target for

investigating as a possible intervention medium. This proposal seeks to investigate this possibility, reviewing the relevant literature and suggesting an empirical line of research that explores the possible contribution of video games to college maladjustment interventions.

Emerging Adulthood

When attempting to identify the factors that contribute to the plight of maladjusted college students, we must first examine their stage of life. In an industrialized nation such as the United States, the period of time encompassing the late teens through the twenties, known as "emerging adulthood," is a potentially anxiety-ridden time of life in any case, characterized by profound change, transition, and important life decisions (Arnett, 2000). In addition to the natural aging and maturation process, which eventually reaches the culmination point of a child becoming an adult and separating from the parents to form a new family nucleus, emerging adulthood in the United States also involves additional pressures formed by the societal educational structure.

It is federal law in the United States that children under 18 must be enrolled in formal education, except through specific permission by the parent or legal guardian. Thus, in 2009, 95% of American teenagers were enrolled in high school at age 16-17 (Institute of Education Sciences, 2011). Furthermore, the federal and state laws also mandate (to a large degree), the content of the education requirements for public and private schools. Thus, students often have very little choice which school they will attend, what structure their classes will take, and only minimal choices of classes in which to enroll. For the most part, their educational path is laid out for them by legislation at the district, state, and federal levels.

Once a student graduates high school, however, they are faced with the first major decision of their educational career. They could graduate and go directly into the workforce;

they could join the military; they could pursue vocational training; or they could seek out higher education at a university. Each of these decisions has benefits and detriments, and though the student will almost certainly be influenced by parents, teachers, friends, and societal norms, the ultimate decision rests on the students' shoulders alone. Whatever path they choose, they are addressing one of the central conflicts of emerging adulthood, the drive to obtain the necessary training and/or education to provide a basis for their lifetime occupations and achievements (Chisholm & Hurrelman, 1995). Though all of these paths are interesting lines of study, for the purposes of this proposal I will focus on the students who choose to pursue higher education.

College adjustment. Achieving higher education leads to a great many positive benefits. Degreed individuals enjoy more successful employment and higher salaries (Pew Research Center, 2013), and often have better overall health, live longer lives, have more time for recreational and leisure activities, and are able to offer their children a better quality of life (Baum, Ma, & Payea, 2013). Thus, over 65% of emerging adults seek a college education after graduating high school (Bureau of Labor Statistics, 2013). It is troubling, however, that in spite of these many benefits and the high admission rates, 37% of college students drop out before graduation, 25% during their freshman year (Hamilton & Hamilton, 2006; American Enterprise Institute, 2011). A decades-old problem, many research studies have been devoted to studying college students, and what factors may be contributing to the dropout rates.

A primary potential culprit is college maladjustment, a dire situation that does not seem to be improving. Studies suggest that the transition from high school to college is becoming increasingly difficult for students to successfully navigate. An annual survey,

starting in 1985, of 279 American universities reported that college freshmen ratings of their own mental health have continuously fallen, with an all-time-low of 51.9 percent of college student rating their mental health as "good" or "above-average" in 2010 – a significant drop from the 63.6 percent who reported in these categories in 1985 – and 29.1 percent of those surveyed reported that they felt "frequently overwhelmed" (Sieben, 2011). Additionally, another recent study showed that 15.6% of undergraduates were diagnosed with either depressive symptoms or an anxiety disorder (Eisenberg, Gollust, Golberstein, & Hefner, 2007), and their self-esteem as freshmen showed a significant decline (Pritchard, Wilson, & Yamnitz, 2007; Shim, Ryan, & Cassady, 2012).

The stresses associated with a new college environment are often multidimensional, as is demonstrated with our imaginary college student, Joe. They are responsible for their own educational path – they must choose their school, their major, their classes, the format of their schedule, and so on. They are also responsible for their personal life and standards of living; they must decide if they are going to live with their parents, with a roommate, in a dorm, on-campus or not. They are, perhaps for the first time, reliant on their own self-discipline to wake up on time, do laundry, feed themselves, and other daily responsibilities previously performed by their family. Many students are also presented with a major financial challenge, as they are responsible for determining how they are going to fund their college expenses. Less than a third of incoming freshmen report confidence in having sufficient funds to complete their education (Pryor et al., 2012). As they are legally adults, it is the students' sole responsibility to navigate financial aid, loans, scholarships, and possible employment while enrolled, as well as personal budgeting for tuition, books, living expenses, and entertainment.

Additionally, over 60% of college freshmen choose to attend a university that is over 50 miles from their home (Pryor et al., 2012), leaving them to face all of these novel challenges while distanced from their established social support system. Forming a new social system introduces other stressors, including not only finding new friends, but also the transitioning of parental roles. Students are no longer adolescents and yet do not yet feel like adults, and are uncertain of their role in managing their own lives (Chang, Heckhausen, Greenberger, & Chen, 2010).

Finally, the emerging adult faces a decrease of "institutional structure" (Schulenberg & Zarrett, 2006) which contributes to feelings of anxiety and uncertainty. Emerging adulthood has no normative demographics (e.g., where or with whom they are living, Arnett, 2000), and relatively fewer immediate negative consequences or enforcement of time management (e.g., notes to parents for missing assignments, detentions for being tardy, or truancy laws). There is no clear path from their everyday decisions to their success in life; they realize vaguely that they are preparing themselves for the future, but the relevance of that message to their everyday undertakings is unclear. Thus, the emerging adult is thrust into an entirely new environment with novel challenges and a plethora of positive and negative opportunities, lacking much of the foundation upon which they have depended for most of their lives to instruct them in the ways in which they should go.

In addition to dropping out, students are susceptible to a variety of potentially negative outcomes. The sudden decrease in parental supervision, coupled with the increased sense of autonomy over their actions can cause a dramatic increase in risky behaviors, such as unprotected sex, risky driving behavior, and substance use (Arnett, 2000; Bachman, Johnston, & O'Malley, 1996). They have been demonstrated to be at increased risk for

substance use (Substance Abuse & Mental Health Services Administration, 2011) and have

worse substance use treatment outcomes (Rossman, Roman, Zweig, Rempel, & Lindquist,

2011; Satre, Mertens, Arean, & Weisner, 2003; Satre, Mertens, Arean, & Weisner, 2004;

Smith, Godley, Godley, & Dennis, 2011). Those who have personality characteristics that

interfere with social functioning find the detrimental outcomes multiplied (e.g. shyness;

Nelson & Padilla-Walker, 2013), which interferes with their ability to build a new social

network. These emotional deficits may form an underlying motivation for students to seek

approval and positive feedback from other sources, a theory which has guided much research

on drinking behaviors (Litt, Stock, & Lewis, 2012), fraternal organizations (Venter, 2013),

and group identity (Mallett et al., 2013). An additional perspective that may prove beneficial,

but has not yet been applied in the established literature, is that of self-determination theory.

Self-Determination Theory

Self-determination theory (SDT) theorizes that human motivation lies along a

continuum, and speaks to the side of the problem that deals with feeling capable of achieving

one's goals. On one extreme end of the continuum there is purely intrinsic motivation, in

which a person's behaviors are motivated by pure enjoyment and internal desires. These

behaviors are considered to be completely self-determined, or autonomous. In the university

realm, a self-determined, autonomous student would choose a major because he or she is

enthralled with that topic, and finds the classes and studies enjoyable and satisfying in their

own right (Deci & Ryan, 2000).

The center of the continuum is comprised of extrinsic motivation, which is any

behavior undertaken for reasons other than pure enjoyment. Extrinsic motivation is separated

into four levels that extend along the continuum, moving away from intrinsic motivation,

beginning with integrated regulation. Integrated regulation is the closest to intrinsic

motivation, and is still considered autonomous behavior. This motivation occurs when the

reason underlying the behavior is consistent with the person's values and needs, and

constitutes an integral part of the self (Deci & Ryan, 2000). A college student, for example,

may feel that a self-defining characteristic is her desire to help people, and she has an

aptitude for physiology, and therefore she decides to become a physical therapist. This

behavior would be integrated and autonomous because it reflects the desires and fulfilment of

the core self, but is classified as extrinsic motivation because it is behavior chosen not for

pure enjoyment, but rather its instrumental value.

Figure 1. Self determination theory motivation continuum

One step further away from intrinsic motivation is identified motivation, in which a

person identifies with the reason for a behavior (Deci & Ryan, 2000). A student with

identified motivation may want to ensure that she will always have a well-paying job, and

therefore choose to pursue a law degree. Both of these motivations, integrated and identified,

involve merging an external standard with one's authentic self, and thus are considered self-

determined.

The other half of extrinsic motivation includes two levels, introjected and external

regulation. These regulations for motivation are considered controlled instead of self-

determined. Introjected regulation indicates a rigid adoption of external standards of self-

worth and social approval that have not been fully identified with the self (Deci & Ryan, 2000; Ryan & Deci, 2001a). When accomplished, meeting these standards can cause feelings of self-worth and self-esteem, but failure often results in self-criticism and negative affect. Furthermore, the lack of identification of these motivations with the authentic self can lead to internal conflicts, as behaviors enacted in congruence with the external standards are incongruent with authentic needs and desires (Koestner & Losier, 2002; Ryan & Deci, 2001). A university example of this motivation classification might be a student who wants to major in political science for the prestige afforded by society for becoming a politician.

The last extrinsic motivation classification is external regulation. People engage in externally regulated behavior due to external contingencies such as threats, shame, punishments, or social or monetary rewards (Deci & Ryan, 2000; Ryan & Deci, 2000a). A family of doctors may put pressure on a student to become a pre-med major, and threaten disappointment or lack of financial support if the student chooses to major in any other subject. If the student is externally regulated, then the student will comply with their wishes and deny their true passion out of fear of emotional or financial reprisal.

Finally, on the other extreme end of the continuum furthest away from intrinsic, there is amotivation, in which a person completely lacks any sort of motivation for behavior. An amotivated student (if he or she has even chosen a major) will be uninterested in the classes, and also uninterested in finding a different major. He or she will be likely to have a lot of absences, as he or she has no reason to attend class. Neither the promptings of the self nor the urgings of society or family will have much of an effect (Deci & Ryan, 2000; Ryan & Deci, 2000a).

Motivation and college adjustment. Research has shown that intrinsically motivated students are more likely to engage with their education, and reap more overall benefits (Conti, Amabile, & Pollak, 1995). Extrinsically motivated behavior is prompted by external motivations, such as pressures from society or parents (Deci & Ryan, 2000; Ryan & Deci, 2000a). Extrinsically motivated students absorb less knowledge and experience fewer benefits, even when they perform well (Gottfried, 1985, 1990). Furthermore, extrinsic motivation has been conceptually tied to negatives in all four established college adjustment domains: academic, personal-emotional, social, and institutional attachment (Baker & Siryk, 1984).

According to SDT, the levels of autonomous and controlled motivation can vary according to domain within a person; that is, they can feel autonomous in one area in their life and controlled in another. Motivation orientation is dependent on the fulfilment or thwarting of three different basic psychological needs: competence, relatedness, and autonomy. Competence refers to a person's need to feel optimally challenged, capable, and effective. The need for relatedness is to feel connected to others and to feel accepted by them, and the need for autonomy is people's desire to choose their behavior and act according to their own interests (Deci & Ryan, 2000).

Extrinsically motivated college students, therefore, may be suffering from thwarted basic needs. Being transplanted from one location to another distances them from their established social group, which would likely result in lowered relatedness need satisfaction. Selecting a degree program based on parental or societal pressure could result in decreased autonomous satisfaction, and the suddenly unfamiliar environment with new expectations and demands could decrease feelings of competence. Thwarting any or all of these basic

needs could result in extrinsically motivated behavior (Deci & Ryan, 2000), which could then lead to the associated negative outcomes and college maladjustment.

The question then becomes, if basic needs are thwarted, what actions might a college student take to attempt to fulfill those needs. To address that question, we will examine the role of video games.

Video Games

The last two decades have seen remarkable advances in technology and communication, allowing for an unprecedented emergence of immersive virtual realities. These simulated environments are useful tools for multiple purposes; communication, social interaction, entertainment, education, and so on, but perhaps the most complex and engaging purpose is that of video game platforms. Online, console, and computer-based video games are epidemic, eclipsing movies in 2004 to becoming the world's largest entertainment medium (Yi, 2004). Video games appeal to a wide range of demographics and appear in a variety of forms; whether it is a traditional single-player, a "massively multiplayer online", or a puzzle game played on a smart phone. In the last available statistic, over 70% of college students report playing video games at least occasionally, and 65% report being regular players. Both men (40%) and women (60%) indulge in video games, with men preferring console-based games often centered around a character such as Halo or Diablo, and women preferring gender-neutral PC-based puzzle games, such as Tetris or Diamond Mine (Jones, 2003).

Concerns about the effects of gaming have grown in tandem with the popularity of the pastime. A great deal of controversy (see Kirsch, 2006 for a review) has sparked countless hours of scientific study, the results of which are often conflicting. Studies have

demonstrated a host of negative effects such as: lower psychological and physical well-being, increased tendencies toward violence, lower productivity and achievement, and more impoverished personal and familial relationships (e.g., Anderson & Bushman, 2001; Healy, 1990; Gentile & Anderson, 2003; Setzer & Duckett, 2000). By contrast, other studies have demonstrated that gaming can also result in positive psychological benefits, such as a sense of efficacy and power over one's environment (e.g., Jones, 2002), and improvements in learning (Gee, 2003; Johnson, 2005), problem-solving (Adachi & Willoughby, 2013), and, interestingly, the transfer of learning from video games to other cognition (Sassi, 2012). These conflicting results indicate that gaming is neither wholly positive nor wholly negative, and therefore further study is necessary to determine the underlying factors that may contribute to, or detract from, success in a college environment.

Motivations for use. One such contributing factor could be that of motivation. Determining what motivates a person to want to engage in video games could help predict the most likely well-being outcome. Self-reported motivation for engaging in video game use varies, for example, men report playing for fun, whereas women report playing when they are bored. Many players feel as if gaming can enhance friendships, gamers report that playing video games makes them feel good, and also that gaming presents a fun challenge (Jones, 2003). A quick glance at these self-reported motivations invites the application of SDT motivations, as the underlying basic needs being addressed are easily identifiable. These study results indicate that playing video games may enhance the students' overall well-being by compensating for their basic needs deficits.

Students also report, however, that they play games as a distraction; to postpone studying or thinking about their responsibilities, or as a respite between classes (Jones, 2003).

This finding indicates an underlying motivation of escapism, which, according to established literature would predict detrimental effects (Li, Liau, & Khoo, 2011). Escapism is the practice of avoiding problems in real life by engaging in media, such as television or video games (Henning & Vorderer, 2001), and has been linked to gamers who are depressed or have high levels of discrepancies between their actual and ideal self (Li, Liau, & Koo, 2011). It is easy to theorize that college students may be especially vulnerable to escapism motivations, as they feel overwhelmed by reality, and perhaps have not yet established the self-discipline required to work instead of play. Thus, delving further into the actual motivations for video game usage could help determine whether video game usage is having a net positive or net negative overall effect on college students' well-being, or some combination thereof.

      Self-determination theory and video game usage. According to previous research that investigated the motivations to play video games in the light of SDT theory, there is some evidence that playing video games does indeed fulfill basic needs (Peng, Lin, Pfeiffer, & Winn, 2012; Ryan, Rigby, & Przybylski, 2006), and basic needs satisfaction accounts for more motivation to play video games than violence (Przybylski, Deci, Rigby, & Ryan, 2014; Przybylski, Rigby, & Ryan, 2010). Further, video game usage has been linked to increases in short-term well-being, theoretically through the mechanism of basic needs satisfaction (Ryan, Rigby, & Przybylski, 2006). Specifically, the study demonstrated that autonomy and competence were both significantly associated with game enjoyment in games that supported such needs, and that games that did not support basic needs yielded no motivation for future play. Results were mixed, however, when predicting well-being outside of the specific game outcomes. It is important to note that, in all of the literature that examines basic needs

satisfaction and video game play, both the well-being effects predicted by satisfaction of basic needs and the need satisfaction itself were associated specifically with the video game play. This leads to the conclusion that, although video games might have a positive effect on well-being short-term, the need satisfaction that results from fulfilling autonomy, relatedness, and competence needs in the virtual world may be somehow tied to that world. The need satisfaction in the "real world" was not assessed in either study; further, SDT research demonstrates that it is possible to feel autonomous in one domain and controlled in another. In fact, a need deficit in one domain can cause people to seek fulfillment from a domain in which they feel they can achieve it, known as compensatory needs fulfillment, (Ryan & Deci, 2000c). Thus, the authors' conclusion that those who find their needs fulfilled and well-being enhanced by video games, and therefore are motivated to engage in their use, may be correct but ultimately unfruitful for long-term benefits in the real world.

The results of the previous research beg the question – knowing we can achieve short-term well-being benefits from playing video games, is it possible that we can also achieve long-term well-being benefits? Is it possible that video games are being used to satisfy the basic needs deficit that is created by attending college? And if so, is it helpful (in that it transfers to other domains) or harmful (in that it remains in the virtual domain)? Such questions bear further exploration.

Overview and Goals of Present Research

Study 1

The goal for Study 1 was to examine the associations of game play, basic needs satisfaction, and specific game characteristics in a two-week diary study bracketed by two panel surveys. The primary hypotheses were:

H1: There is a positive association between self-selected video game usage and basic needs satisfaction.

H2: Basic needs satisfaction will mediate the relationship through which video game usage supports general well-being.

In addition to the primary hypotheses, an additional exploratory hypothesis was tested on game categorization and self-selected game play. In the current literature, there is a suggestion that different types of games predict different types of basic needs support (Ryan, Rigby, & Przybylski, 2006), so the hypothesis that a participant's choice of video game can be predicted by their basic needs satisfaction subscale scores was tested.

E1: Different types of basic needs satisfaction will predict preference for corresponding types of video game usage.

Study 1

Method

Participants

One-hundred and seven participants (Mean age = 21.43; SD = 3.00; 50.47% female) were drawn from the undergraduate psychology pool at the University of Houston over a period of two semesters. The sample was racially diverse, consisting of 29.91% Hispanic,

18.69% White/Caucasian, 19.63% Black/African American, 26.17% Asian, 4.67% Multi-racial, and .93% "Other". Recruited from undergraduate psychology classes using in-class recruitment scripts and flyers posted in public spaces, students completed the study in exchange for course credit.

Measures and Procedures

Participants were administered an initial battery of surveys to establish demographic and baseline information. Demographics were measured using a questionnaire with 18 individual items to ascertain sample characteristics such as age, sex, race, ethnicity, school status, and GPA.

Social support was measured using MOS Social Support Scale, a 19-item scale measuring perceived social support. Participants indicate how much they feel each item is available to them on a 1 (None of the time) to 5 (All of the time) Likert-type scale. Sample items include: "Someone you can count on to listen to you when you need to talk" and "Someone to take you to the doctor if you needed it". Participants' social support score is obtained by averaging the responses across all 19 items (Sherbourne & Stewart, 1993).

Life satisfaction was measured using the Satisfaction With Life Scale, a 5-item scale measuring satisfaction with life. Participants are asked to rate how much they agree with each statement on a 1 (Strongly disagree) to 7 (Strongly agree) Likert-type scale. Sample items include: "In most ways, my life is close to ideal" and "If I could live my life over, I would change almost nothing." Participants' score is obtained by summing the responses to all five items (Diener, Emmons, Larsen, & Griffin, 1985; Pavrot & Diener, 1993).

State stress levels were measured using the Perceived Stress Scale, 14 items measuring levels of perceived stress over the previous two weeks. Participants are asked to

read a statement, and then choose from three responses to indicate which answer most accurately describes their reaction. A sample statement is "When tasks and duties build up to the extent they are hard to manage…" to which the participants are asked to choose from "I am generally untroubled," "I usually feel a little uneasy," and "I normally get quite nervous." The first response for each item is scored as zero points, the second as 1 point, and the third is 2 points. Each individual's perceived stress reactivity score is obtained by totaling the points across all the items, after accounting for the 12 reverse-coded items (Schlotz, Yim, Zoccola, Jansen, & Schulz, 2001).

Self-esteem was measured using the Self-Esteem Scale, a 10-item scale measuring self-esteem. Participants are asked to rate how much they agree with each statement on a 1 (Strongly disagree) to 5 (Strongly agree) Likert-type scale. Sample items include "I feel that I have a number of good qualities" and "On the whole, I am satisfied with myself." Responses are scored by summing across all items (Rosenberg, 1965).

Depression was measured using the Center for Epidemiologic Studies Depression Scale, a 20-item scale measuring depression. Participants are asked to rate how often they have felt each item over the past week on a 1(Rarely or none of the time) to 4 (Most or all of the time) Likert-type scale. Sample items include "I was bothered by things that usually don't bother me" and "I thought my life had been a failure." Depression scores are obtained by summing responses across all items (Radloff, 1977).

Vitality was measured using the Subjective Vitality Scale, a 6-item scale measuring vitality. Participants are asked to indicate how true each statement is for them in general on a 1 (Strongly disagree) to 7 (Strongly agree) Likert-type scale. Sample items include "I feel

alive and vital" and "I feel energized." Responses are coded by summing across all items (Ryan & Frederick, 1997).

Anxiety was measured using the STAI Trait Anxiety Form, a 20-item scale measuring trait anxiety. Participants indicate how often they generally feel each item on a 1 (Almost never) to 4 (Almost always) Likert-type scale. Sample items include "I feel pleasant (reverse-coded)" to "I feel like a failure". Responses are coded by summing across all items after accounting for reverse-coded items (Spielberger, Gorssuch, & Lushene, 1983).

Affect was measured using the Positive and Negative Affect Scale, a 20-item scale meaning positive and negative mood. Participants are given a list of words that describe feelings and emotions, and are asked to rate on a 1 (very slightly or not at all) to 5 (extremely) Likert-type scale how much each emotion corresponds to their feelings in the past two weeks. Sample items include "afraid" and "attentive". Positive and negative scores are obtained by summing their respective items (Watson, Clark, & Tellegan, 1988).

Basic psychological needs were measured using the Basic Psychological Needs Scale (BPNS), a 21-item scale measuring the satisfaction of basic needs. Participants are asked to rate how true each item is for them personally on a 1 (Not at all true) to 7 (Very true) Likert-type scale. Sample items include "I feel like I am free to decide for myself how to live my life" and "I feel pressured in my life (reverse-coded)." The items reflect three subscales, autonomy, relatedness, and competence. Participant scores are obtained by taking the mean of the responses to each subscale, after accounting for reverse-coded items (Deci & Ryan, 2000).

Following the initial survey, participants completed daily measures to assess fluctuations in their daily well-being and track their video game usage. Daily measures

included a daily well-being composite scale, which was a short-form survey assessing basic needs satisfaction, life satisfaction, perceived stress, vitality, positive and negative affect, and physical symptoms (Uysal, Lin, Knee, & Bush, 2012). In addition, they completed a video game usage questionnaire, which was an 8-item questionnaire designed to obtain descriptive information about a video game play session. Information includes length of game time, name of game (for categorization purposes), and participants' general emotions about the game.

Upon completion of the diary study portion, participants were administered a post-diary survey to assess any change over time of the baseline measures. The post-diary survey included all of the mental health and well-being measures from the baseline survey, as well as the basic needs satisfaction measure.

Results

Participants (N=93) recorded 1,136 daily diary entries during the 14-day period, with the average participant completing 12.21 entries. Participants reported playing video games on 719 days, averaging 7.73 days per participant. Means and standard deviations along with correlations among the variables can be found in Table 1.

		1	2	3	4	5	6	7	8
1.	VG Success								
2.	VG Satisfaction	0.84***							
3.	VG Length	0.13	0.07						
4.	Autonomy	0.27**	0.27**	0.16					
5.	Competence	0.17	0.20†	0.09	0.46***				

6.	Relatedness	-0.02	-0.00	-0.04	0.14***	0.20***		
7.	Composite Satisfaction	0.21*	0.24*	0.10	0.89***	0.77***	0.45***	
8.	Daily Well-Being	0.23*	0.17	0.07	0.63***	0.65***	0.51***	0.67***
	Mean	5.36	5.42	80.79	5.19	5.01	3.89	4.70	0.01
	Standard Deviation	0.92	1.05	68.11	1.00	0.79	0.69	0.60	0.52

Table 1. Correlations among study variables. †p<.10; *p<.05; **p<.01; ***p<.001. Variables 1-8 are aggregates of the daily reports for each variable, created by averaging individuals' scores over the 14-day period.

Main analyses

H1

To examine H1, whether basic needs satisfaction predicts daily video game usage, multilevel modeling analyses tested whether perceived success of daily video game sessions, perceived satisfaction with daily video game sessions, or length of video game play on a given day were predicted by needs satisfaction on that same day. As shown in Table 1, the three subscale scores for basic need satisfaction were significantly correlated; therefore they were unit-weighted to form a needs satisfaction composite variable. The composite score was person-centered across the 14 days, and entered as a Level 1 predictor with measures specified as repeated across days and a first-order auto-regressive covariance structure. Needs satisfaction was found to be a significant predictor of the outcomes; success, satisfaction, and length of play (see Table 2 for relevant statistics).

	ICC (within)	*B*	*SE*	*t(df)*	*P*

VG Success	.73	.54	.08	6.87(628)	<.0001
VG Satisfaction	.66	.61	.08	8.16(628)	<.0001
VG Length	.49	10.9	3.73	2.92(630)	<.01

Table 2. Results from Study 1, H1 statistical models

H2

Multilevel modeling was also used to examine H2, the prediction that basic needs

satisfaction would mediate the relationship between daily game usage and daily well-being

across the 14-day study. Three models were run; one for each indication of daily game usage;

satisfaction, success, and length of play. First, a daily well-being composite score was

created by standardizing the daily well-being variables: positive and negative emotions

(negative was reverse-coded), physical symptoms (reverse-coded), and satisfaction with life.

The standardized variables were then averaged together to form a composite daily well-being

score, similar to the procedure employed in latent variable well-being models used in

previous studies (Uysal, Lin, & Knee, 2010). For each video game usage variable (success,

satisfaction, and length), a mediation model was tested in a step-wise fashion. First, a test of

the a-path from the video game usage variable to the composite basic needs satisfaction was

found to be significant for all three video game usage variables (see Table 3 for all relevant

statistics). Second, three models were tested in which each video game usage variable

(success, satisfaction, and length) and the hypothesized mediator, basic needs satisfaction,

were entered as predictors of the daily well-being outcome. All three models returned

significant results, reported in Table 3. Tests of indirect effects were examined using the

product term approach (McKinnon et al., 2002), with derivation of bootstrapped confidence intervals to test for significance using RMediation (Tofighi & MacKinnon, 2011).

	a-path (SE)	b-path (SE)	Indirect estimate (SE)	CI LL	CI UL
VG Success	.12 (.02)	.37 (.03)	.05 (.01)	.03	.06
VG Satisfaction	.14 (.02)	.36 (.03)	.05 (.01)	.04	.07
VG Length	.00 (.00)	.37 (.03)	.00 (.00)	.001	.00

Table 3. Study 1, H2 mediation analyses results

E1

To examine E1, whether the basic needs satisfaction subscale score would predict type of game selected for participants' video game session, each of the three subscale scores (competence, relatedness, and autonomy) were person-centered and entered as predictors of video game type, a multinomial outcome. Results of the Type 3 analysis of effects revealed a non-significant chi-square for each of the subscales (autonomy, $\chi^2(5)=2.89$, p=.72; competence, $\chi^2(5)=2.21$, p=.82; relatedness, $\chi^2(5)=3.18$, p=.67), indicating that the model fit was not significantly better than a null model; thus, this hypothesis was unsupported.

Study 1 Discussion

Results from Study 1 supported both main hypotheses, that there is an association between basic needs satisfaction and three measures of video game usage; success, satisfaction, and length of time. These results are an interesting extension of previous

research. According to the extant literature, video games have been demonstrated to satisfy basic psychological needs (Peng, Lin, Pfeiffer, & Winn, 2012; Ryan, Rigby, & Przybylski, 2006). The effects in these studies, however, were event-specific – that is, the satisfaction of basic needs is tied directly to the video games. This study demonstrates that the effects are not necessarily short-lived, providing evidence that video games may serve the role of a needs-supportive environment. More support for this potential mechanism can be found in the results of the second hypothesis; that basic needs satisfaction mediates the relationship between video game usage and general daily well-being. From these results, we can extrapolate that playing video games may be a self-administered needs-satisfaction intervention, through which daily well-being can be increased.

The exploratory hypothesis was unsupported; the basic needs subscale in which the participants experienced the least or most satisfaction was not significantly associated with the type of video game the participant chose to play. This divergence from the findings in Ryan, Rigby, and Przybylski (2006) suggests that perhaps self-selected video game usage is less sensitive to specific basic needs subscale frustrations, and instead other factors may drive selection of video game usage.

Study 2

The second study sought to replicate and expand these results by investigating: (a) whether these effects may be driven by need frustration, rather than need satisfaction; (b) the effects of college maladjustment; and (c) the role of needs satisfaction from video games in attaining self-appointed goals.

24

Study 2 examined the associations between game play, goal attainment, basic needs satisfaction, and well-being outcomes across a two-panel diary design with an experimental and control condition. The primary hypotheses were:

H1: There is a positive association between self-selected video game usage and basic needs satisfaction, consistent with Study 1.

H2: Basic needs satisfaction will mediate the relationship through which video game usage supports general well-being, consistent with Study 1.

H3: Video game users will experience greater gains in need satisfaction from a goal attainment intervention utilizing video game style motivational techniques than a traditional "task list" goal attainment intervention.

In addition to my primary hypotheses, I will test additional exploratory hypotheses, as follows:

E1: Different types of games will support different types of basic needs satisfaction, consistent with Study 1.

E2: Participants with higher levels of college maladjustment will experience greater basic needs satisfaction and well-being rewards from the experimental condition, compared to the control.

E3: Intrinsically motivated goals will predict the most increase in well-being, and this will not differ across condition.

E4: Participants in the experimental condition will show the most goal attainment for extrinsic goals.

Method

Participants

One hundred and thirty-six participants (Mean age = 21.75; SD = 3.76 ; 60.58% female) participated in the study. The sample was racially and ethnically diverse, consisting of 38.35% Hispanic, 31.34% Caucasian, 14.18% Black/African American, 32.82% Asian, 4.48% Multi-ethnic, .75% Native Hawaiian/Pacific Islander, 2.99% Native American, and 13.43% "Other". Recruited from undergraduate classes using in-class recruitment scripts and flyers posted in public spaces, students completed the study in exchange for course credit.

Measures and Procedures

Participants were administered an initial battery of surveys to establish demographic and baseline information. Initial measures included were similar to Study 1, including the same demographic questionnaire, the MOS Social Support Scale, the Satisfaction With Life Scale, the Perceived Stress Scale, the Self-Esteem Scale, the Center for Epidemiologic Studies Depression Scale, the Subjective Vitality Scale, the STAI Trait Anxiety Form, and the Positive and Negative Affect Scale.

Instead of the Basic Psychological Needs Scale used in Study 1, Study 2 implemented the Basic Psychological Need Satisfaction and Frustration Scale, a 24-item scale measuring both the satisfaction and thwarting of basic needs. Participants are asked to rate how true each item is for them personally on a 1 (Not at all true) to 7 (Very true) Likert-type scale. Sample items include "I feel like I am free to decide for myself how to live my life" and "I feel pressured in my life (reverse-coded)." The items reflect six subscales, autonomy, relatedness, and competence satisfaction and autonomy, relatedness, and competence

thwarting. Participant scores are obtained by taking the mean of the responses to each subscale, after accounting for reverse-coded items (Chen et al, 2014).

In addition, Study 2 participants were also administered the College Adjustment Test, a 19-item scale measuring positive and negative affect, homesickness, and overall adjustment. Participants are asked to indicate how much each item applies to them on a 1 (Not at all) to 7 (A great deal) Likert-type scale. Sample items include "Missed your home" and "Liked your classes". Overall adjustment is scored by reverse-coding the negative items and summing across all responses (Pennebaker, 2013).

Students completed an initial survey battery including all of the above measures, after which they participated in an orientation, where the study was explained to them. During this session, if they chose to participate, students created a list of 3-5 goals they wanted to accomplish in the two week study period. They were asked to determine an implementation plan for their goals, including daily tasks, a to-do list, and both good and bad habits. In addition, participants completed a Perceived Locus of Causality (PLOC; Sheldon & Houser-Marko, 2001) measure for each goal. The PLOC measure is designed to determine the self-concordance of the goals. Participants were asked to rate a series of four statements for each goal, indicating to what level they feel that statement embodies their reason for pursuing that goal on a 1(Not at all because of this reason) to 9 (Completely because of this reason) Likert-type scale. Following this goal specification, implementation plan, and PLOC rating, participants in the experimental condition created an account on www.HabitRPG.com and entered their information.

HabitRPG is a website in which video game motivations (specifically in the form of positive and negative feedback) are used to facilitate goal attainment. Each goal is broken

down into habits, daily lists of repeating tasks, and a list of one-time tasks. As a person completes a task, they check it off in the program and are awarded experience points and gold. They can use the gold to purchase in-game rewards, such as armor, health potions, decorations, and so on. Users create an avatar to represent them, and as they complete tasks, they can find different items such as food and pets. Participants were advised to use the site to track their goals, and to engage in the rest of the site functionality as much as they wished.

In the control condition, participants recorded their implementation plan in a spreadsheet that was organized like the HabitRPG site; thus, they tracked their goal attainment in exactly the same manner as the experimental group, but they did not receive any of the rewards or other feedback.

After the orientation, participants tracked their goal attainment through either the HabitRPG site or their spreadsheet, depending on condition, for two weeks. In addition, participants were asked to fill out a short composite well-being measure at the end of each night.

After two weeks, the participants completed a final battery of questionnaires, including all of the measures in the original packet except the demographics. In addition, participants rated their satisfaction with their goal progress and their perception of the effectiveness of the goal intervention. The completed spreadsheets and activity reports from HabitRPG were used to calculate goal attainment.

Results

Participants (N=127) recorded 1,520 daily diary entries during the 14-day period, with the average participant completing 11.97 entries. Participants reported playing video

games on 723 days, averaging 5.20 days per participant. Means and standard deviations along with correlations among the variables can be found in Table 4.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. VG Success																		
2. VG Satisfaction	0.79***																	
3. VG Length	0.16†	0.18†																
4. Autonomy	0.36***	0.42***	0.09															
5. Competence	0.33***	0.43***	0.07	0.69***														
6. Relatedness	0.23*	0.28**	0.01	0.51***	0.60***													
7. Composite Needs Satisfaction	0.36***	0.44***	0.07	0.87***	0.89***	0.82***												
8. Composite Daily Well-Being	0.30**	0.39***	0.15†	0.70***	0.77***	0.63***	0.81***											
9. Condition	-0.12	-0.07	-0.11	0.15	0.10	0.06	0.12	0.07										
10. Follow-up Need Satisfaction	-0.01	0.00	0.09	-0.07	-0.04	-0.04	-0.06	0.02	-0.04									
11. Baseline Need Satisfaction	-0.07	-0.07	0.09	-0.06	-0.01	-0.11	-0.07	-0.05	0.08	0.22†								
12. Follow-up Need Frustration	0.10	0.13	-0.06	0.10	0.15	0.06	0.12	0.10	0.11	-0.75***	-0.05							
13. Baseline Need Frustration	-0.10	-0.09	-0.09	0.11	0.07	0.15	0.13	0.08	0.02	-0.25†	-0.63***	0.09						
14. Follow-up College Adjustment	0.07	-0.01	0.03	-0.10	-0.05	-0.03	-0.08	-0.01	-0.16	0.63***	0.09	-0.67***	-0.15					

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
15. Baseline College Adjustment	0.08	0.20	-0.02	-0.07	0.03	-0.09	-0.06	0.00	0.11	0.05	0.47***	0.10	-0.56***	-0.03				
16. Goal Attainment	-0.10	-0.16	-0.15	-0.04	0.01	0.03	-0.01	-0.00	0.50***	-0.12	-0.03	0.05	0.07	-0.05	0.14			
17. Controlled Goal Orientation	-0.01	-0.05	-0.12	-0.06	-0.16	-0.02	-0.09	-0.07	0.02	0.07	-0.19*	-0.09	0.36***	0.03	-0.35***	0.07		
18. Autonomous Goal Orientation	-0.01	-0.05	0.07	-0.08	-0.09	-0.07	-0.09	-0.00	0.01	-0.08	0.30***	0.060	-0.26**	-0.01	0.13	-0.02	0.05	
Mean	5.02	5.10	29.34	4.94	4.81	4.76	4.84	-0.00	0.53	3.77	3.63	2.45	2.60	80.98	78.09	59.31	17.48	22.83
Standard Deviation	1.17	1.09	47.17	1.10	0.95	1.02	0.88	.042	0.50	0.71	0.69	0.77	0.80	16.88	15.33	68.72	4.21	3.57

Table 4. Correlations, means, and standard deviations for Study 2 variables. Daily variables are aggregated across all 14 days.

31

Main Analyses

H1

To examine H1, the same multilevel analyses were used as in Study 1 to test whether perceived success of daily video game sessions, perceived satisfaction with daily video game sessions, or length of video game play on a given day were predicted by needs satisfaction on that same day. As shown in Table 4, the three subscale scores for basic need satisfaction were significantly correlated; therefore they were unit-weighted to form a needs satisfaction composite variable. The composite score was person-centered across the 14 days, and entered as a Level 1 predictor with measures specified as repeated across days and a first-order auto-regressive covariance structure. Consistent with Study 1, needs satisfaction was found to be a significant predictor of the outcomes of success and satisfaction, however, unlike the results from Study 1, needs satisfaction was not predictive of length of play (see Table 5 for relevant statistics).

	ICC (within)	B	SE	t(df)	p
VG Success	.68	.13	.06	2.09(915)	.04
VG Satisfaction	.68	.14	.06	2.20(914)	.03
VG Length	.73	-4.77	3.29	-1.45(875)	.15

Table 5. Study 2, H1 results.

H2

As in Study 1, multilevel modeling was also used to examine H2, the prediction that basic needs satisfaction would mediate the relationship between daily game usage and daily well-being across the 14-day study. Consistent with Study 1, three models were run; one for each indication of daily game usage; satisfaction, success, and length of play, using a daily

well-being composite score. For each video game usage variable (success, satisfaction, and length), a mediation model was tested in a step-wise fashion. First, a test of the a-path from the video game usage variable to the composite basic needs satisfaction was not found to be significant for all three video game usage variables, unlike in Study 1. Second, three models were tested in which each video game usage variable (success, satisfaction, and length) and the hypothesized mediator, basic needs satisfaction, were entered as predictors of the daily well-being outcome. Inconsistent with Study 1, none of the three models returned significant results, reported in Table 6. Tests of indirect effects were examined using the product term approach (McKinnon et al., 2002), with derivation of bootstrapped confidence intervals to test for significance using RMediation, providing evidence that needs satisfaction mediates the association between video game usage and well-being (Tofighi & MacKinnon, 2011).

	a-path (SE)	b-path (SE)	Indirect estimate (SE)	CI LL	CI UL
VG Success	.03 (.02)	.28 (.02)	.01 (.01)	-.00	.02
VG Satisfaction	.03 (.02)	.28 (.02)	.01 (.01)	.00	.02
VG Length	-.00 (.00)	.27 (.02)	.00 (.00)	.00	.00

Table 6. Study 1, H2 mediation analyses results

H3

To examine H3, the effect of the experimental condition on basic needs satisfaction and frustration, two regression models were specified. In the first, condition was entered as a predictor with follow-up composite needs satisfaction as an outcome, along with baseline need satisfaction as a control; in the second model, basic needs frustration replaced

satisfaction. Neither model returned significant results, (satisfaction, $F_{(2,66)}=2.49$, $p=0.09$; frustration, $F_{(2,66)}=0.95$, $p=0.39$)

In a second model, the player category variable was entered as a moderator, to test whether the experiment predicted better well-being results for those with different gaming habits. Participants were divided into three groups: dedicated gamers (daily usage), casual gamers (occasional usage), and non-gamers (no usage). Results revealed a marginally significant effect of condition for dedicated gamers (player category 1), such that dedicated gamers experienced greater gains in well-being in the experimental condition, compared to the control condition ($b=.91$, $t(95)=1.95$, $p=.05$).

E1

Consistent with Study 1, whether the basic needs satisfaction subscale score would predict type of game selected for participants' video game session, analyses revealed no significant associations between basic needs satisfaction subscales and type of video game selected for play (autonomy, $\chi^2(6)=3.92$, $p=.69$; competence, $\chi^2(6)=3.73$, $p=.71$; relatedness, $\chi^2(6)=0.94$, $p=.98$).

E2

To examine the second exploratory hypothesis, whether participants with higher levels of college maladjustment would experience greater basic needs satisfaction and well-being rewards from the experimental condition, both a main effect and interaction effect were specified for each basic needs variable to examine separately the effects of needs satisfaction and needs frustration. In each model, the outcome of basic needs satisfaction/frustration was predicted by an interaction of condition and follow-up college adjustment. All continuous

predictor variables were grand-mean centered, and baseline levels of college adjustment and basic needs satisfaction and frustration were entered as controls. In each model, college adjustment was found to have a significant main effect on basic needs, positively for needs satisfaction (b=.03, SE=.00, t(59)=5.8, p<.0001) and negatively for needs frustration (b=-.03, SE=.01, t(59)=-6.28, p<.0001). Significant effects were not found for either the main effect of condition (satisfaction, b=-0.13, SE=0.14, p=0.38; frustration, b=0.16, SE=0.16, p=0.31) or the interaction (satisfaction, b=-0.01, SE=0.01, p=0.48; frustration, b=0.00, SE=0.01, p=0.69) of either model. The introduction of player category as an additional predictor in each model did not change the pattern of results.

E3 & E4

The third and fourth exploratory hypotheses were examined using the same analyses. Autonomous and controlled motivations for each goal were highly correlated; therefore motivation orientation scores for each goal were averaged to obtain two composite motivation orientation scores; one for autonomous and one for controlled. For E3, two hierarchical regression models were run to test main effects and the interaction of condition and autonomous/controlled motivation orientation on the outcome of aggregated daily well-being. No significant main or interaction effects were found (see Table 7 for results). Thus, E3 was unsupported.

Effect	B	SE	P
Condition	0.13	0.10	0.20
Autonomous	0.00	0.01	0.84

Controlled	-0.02	0.01	0.20
Condition*Autonomous	-0.01	0.03	0.79
Condition*Controlled	-0.05	0.03	0.07

Table 7. Main and interaction effects of Study 2, E3

For E4, two negative binomial regression models were run to test main effects of condition and autonomous/controlled motivation orientation on the outcome of goal attainment. In these models, a main effect of condition was found to be significant (b=65.40, SE=13.12, p<.0001). Furthermore, there was a significant interaction effect between condition and controlled orientation, such that those in the control condition experienced greater goal attainment, and this relationship was stronger for those who had higher controlled goal motivation orientation (see Figure 2). No interaction effect was found for autonomous goal motivation orientation (b=0.08, SE=0.05, p=.11). Thus, E4 was unsupported, with effects in the opposite direction.
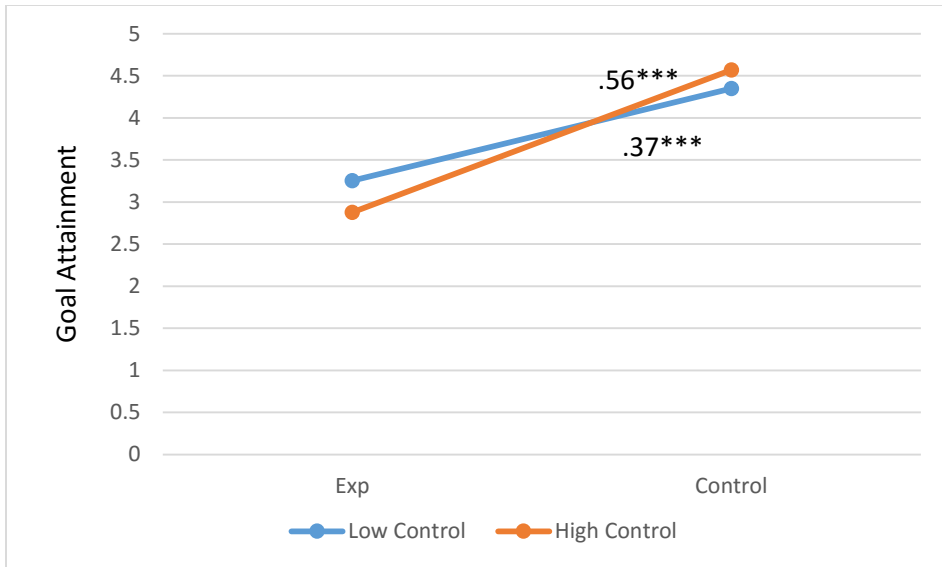
Figure 2. Graph of the interaction of controlled goal motivation orientation, condition, and goal attainment

Study 2 Discussion

The results from Study 2 demonstrated very few of the hypothesized effects; including a failure to replicate the H1 and H2 effects from Study 1. There are several potential explanations for this lack of findings. First, the experimental condition utilized a video game, which imposed an environment in which participants reported playing video games when they might not otherwise have done so. The proposed underlying principle was predicated on the video games being a *self-administered* intervention; the experimental condition made it so that some video game play was forced. Absent the experimental game, these participants may not have reported playing a video game at all, and thus their data would not have been considered in the analyses. This addition of non-self-selected video game usage may have diluted the results such that length of play became an insignificant association in H1, as well as the non-significant well-being mediation results in H2.

37

Furthermore, this lack of self-selected usage may also explain the non-significant findings for both H3 and E2. It might be that the effects of the video game motivation may only work for those who actually choose to engage in video games; thus, those who were randomly assigned to the experimental condition that were not habitual video game users would not have experienced any benefit; whether in the case of needs satisfaction (H3) or goal attainment (E2). Partial support for this proposed mechanism can be seen in the second model for H3, in which including player category as a predictor demonstrated that dedicated gamers experienced greater well-being from the experimental condition. Thus, in future studies, it may be beneficial to include a more sensitive measure of typical video game usage, to determine to what level habitual usage interacts with the hypothesized effects.

Another potential mechanism that would explain the lack of significant results can be found in the Ryan, Rigby, and Przybylski study from 2006, which emphasized that the ease and intuitiveness of the game controls formed a significant piece of the immersive video game experience; contributing to the ability of gameplay to effect basic needs satisfaction. This mechanism could be at work in this study as well; if the participants found the video game intervention difficult to use, then they may not have been able to receive the full benefit of basic needs satisfaction. Anecdotally, a few participants who used the Habitica site remarked that it was difficult to fully engage with the site at first; that it "took a while to get the hang of it." Future studies could have participants track goals for a longer period of time, to see if goal attainment and productivity increased after the user was well-versed in the game play.

Finally, ease of use and forced-play versus self-selected play may also be working in concert, such that E3 and E4 returned non-significant results. Participants may have felt the

burden of a controlled implementation plan on intrinsic goals, which may have reduced the well-being effects of goal attainment (E3), whereas the ease of use in the controlled condition made the goal attainment easier for extrinsic goals by adding an additional level of extrinsic motivation. Put simply, the controlled nature of the intervention subtracted from intrinsic motivation, but added to extrinsic motivation, making it easier to attain extrinsic goals. This relationship was even stronger in the control condition, in which the participants were not derailed by the more complicated goal tracking mechanism.

General Discussion

Overall, both the significant results of Study 1 and the absence of expected results in Study 2 (see Table 8 for description) provide key insights when considering the associations of video game motivations and basic needs satisfaction. To more fully explore these associations, their expansion upon the extant literature, and their implications for future study, the combined study results will be discussed according to three topical sections: video games, basic needs satisfaction, and well-being; video game motivations and goal attainment; and video games and college adjustment.

		Hypothesis	Results
Study 1			
H1		There is a positive association between self-selected video game usage and basic needs satisfaction.	Supported.
H2		Basic needs satisfaction will mediate the relationship through which video game usage supports general well-being.	Supported.
E1		Different types of basic needs satisfaction will predict preference for corresponding types of video game usage.	Unsupported.
Study 2			
H1		There is a positive association between self-selected video game usage and basic needs satisfaction, consistent with Study 1.	Partially supported.
H2		Basic needs satisfaction will mediate the relationship through which video game usage supports general well-being, consistent with Study 1.	Unsupported.
H3		Video game users will experience greater gains in need satisfaction from a goal attainment intervention utilizing video game style motivational techniques than a traditional "task list" goal attainment intervention.	Partially supported.
E1		Different types of games will support different types of basic needs satisfaction, consistent with Study 1.	Unsupported.
E2		Participants with higher levels of college maladjustment will experience greater basic needs satisfaction and well-being rewards from the experimental condition, compared to the control.	Unsupported.
E3		Intrinsically motivated goals will predict the most increase in well-being, and this will not differ across condition.	Unsupported.
E4		Participants in the experimental condition will show the most goal attainment for extrinsic goals.	Opposite effects.

Table 8. Hypotheses and results from both studies.

Video Games, Basic Needs Satisfaction, and Well-Being

The significant results from H1 in both studies, H2 in Study 1, and extant literature (Ryan, Rigby, & Przybylski, 2006) provide clear evidence that video game usage can buffer daily basic needs satisfaction, and that this effect is not specifically related to the virtual world of video games, but rather video games provide a needs-supportive environment that has a global effect on needs satisfaction, which then supports overall well-being. The results from H2 in Study 2, however, suggests the possibility that this mechanism may only be effective for those who habitually play video games. This somewhat intuitive distinction has important implications for interventions involving this mechanism; a prescription of self-selected video games as a needs satisfaction buffer may only work for those who already use video games for that purpose.

The prescription of *specific* video game usage, however, may still have potential benefits for general needs satisfaction. Previous literature has found that some types of games are better at satisfying specific subscales of basic needs satisfaction, but the current study demonstrated that video game players were not likely to select a video game based on their specific needs satisfaction levels. Future studies could investigate whether the prescriptive use of specific video game types helps to buffer needs satisfaction. Researchers could also investigate possible diminishing returns of the video game intervention for basic needs satisfaction – that is, if it is a better for a short-term "boost" in basic needs satisfaction rather than a long-term solution. It may be that potential negative effects of long-term video game usage will outweigh the well-being benefits.

In addition, future studies could also further investigate the potential effects of self-selected video game usage to buffer needs satisfaction using more longitudinal methods. The current studies only explored the fluctuations of basic needs satisfaction and game usage over two weeks; it might be that there are longer, more stable patterns in basic needs satisfaction that predict video game preferences over time. Within the current studies, participants classified as dedicated gamers were likely to play the same game each day, or to vacillate between one or two specific games. It may be that this overall preference for game type may be driven by a long-term needs satisfaction or frustration, rather than the daily fluctuations measured in these studies.

Video Game Motivations and Goal Attainment

The results from Study 2 provide promising evidence for the usage of video games as a motivating mechanism for goal attainment. Though the intervention did not function as planned for all participants, participants in the "dedicated gamer" condition did experience greater well-being in the experimental condition; suggesting that the video game motivation techniques may help goal attainment for video game users. To expand on this foundation, future studies could extend these findings and address the current study's weaknesses by accounting for the participants' level of gaming experience, and the amount of recent gaming in which they are engaging. Some participants reported playing games heavily in their past, but not playing much recently, for example, and that type of playing experience might function differently than those who still play heavily.

In addition, future studies should factor in the "ease of use" that was discussed previously. The lack of results for the attainment hypotheses may be attributed to the learning curve of the video game intervention; future studies should focus more on ensuring that the

participants are better able to engage in the intervention. This may be the mechanism at work in the fourth exploratory hypothesis, which demonstrated that the control condition provided better motivational support for extrinsic goals, as opposed to intrinsic. It may be that the experimental condition would begin to function better than the control in attaining extrinsic goals, as hypothesized, once the participants were able to fully engage. Furthermore, future studies could include a measure to determine how controlling versus autonomy-supportive the participants found the experimental task to be, and thus would be able to test for the effects of motivation orientation on the research outcomes.

Video Games and College Adjustment

The lack of significant improvement in college adjustment over the experimental period is troubling, especially given the improvement in overall well-being. There are a number of potential explanations that would be worth exploring in future studies. First, it may have just been too small of a measurement period; that is, perhaps two weeks is not long enough to expect a measurable change in college adjustment. Future studies could track college adjustment and goal attainment for longer periods of time.

Second, it may have been the goal implementation task itself. A number of participants struggled to identify goals, and implemented goals they were not currently working toward. It may be that the goal striving was an added burden, rather than a relief to their workload. Future interventions could target goals toward which participants are already striving; thus giving them new strategies to attain their current goals; thus relieving pressure instead of adding.

Third, it should be noted that the campus in which this study was completed historically has a large percentage of local students in attendance; that is, students who did

not have to travel far from home to attending school. This could have had an effect on the study such that the local students did not suffer the same maladjustment as those who attend school far away from their home environments. In future studies, this could be controlled for by including residence information in the demographics questionnaire.

Finally, the detrimental effects of video games should also be accounted for in future studies. Since video games usage has been associated with negative outcomes such as impoverished relationships and decreased achievement (e.g., Anderson & Bushman, 2001; Healy, 1990; Gentile & Anderson, 2003; Setzer & Duckett, 2000), it might be that the video games are doing more harm than good over time.

Limitations & Future Directions

Though the study provided clear evidence for a promising potential intervention mechanism, there were a number of limitations that could be addressed in future studies. First, all of the well-being measures were self-report, taken at the end of the day, which relied on the participants' perceptions rather than any objective measure. A measurement that occurs throughout the day, more closely tied to the emotions about which the participants are reporting, may give a more accurate glimpse of their state of well-being.

Similarly, the video game usage information was all self-report as well, and not tied specifically to the event. If needs satisfaction results directly from video games and is tied to that event, then a video game session completed right before filling out the survey could color needs satisfaction responses, which would not accurately reflect the effect of the video game. Future studies could implement event-specific measures as well as daily measures, such that participants record their reactions to the video games as well as their overall well-being.

As previously discussed, future studies should incorporate an intervention that is easy to use, or include enough time to become accustomed to the intervention so that the participants can fully engage. Additionally, more specific video game usage information could be gathered to better account for usage history and habits as a moderator of all effects.

Finally, using a third-party goal tracking mechanism for the experimental condition did not allow for as much control over participant information as would be desirable. The completion reports were unclear as to whether they included all of the data; therefore the attainment totals are suspect. In the future, a program could be developed specifically for this intervention, which would give experimenters greater control and more complete data.

Conclusion

The results of this study provide clear evidence for the relationship between video game usage, basic needs satisfaction, and well-being, as well as a foundation for integrating video game motivational techniques into goal attainment and achievement. The results from this study have clear implications for the future, in which scientists can better utilize the growing popularity of immersive media to enrich lives, and make more productive, adjusted, and happier beings in the world.

References

Adachi, P. C., & Willoughby, T. (2013). Do video games promote positive youth development?. *Journal Of Adolescent Research*, *28*(2), 155-165. doi:10.1177/0743558412464522

Adams, T., & Moore, M. (2007). *High-risk health and credit behavior among 18- to 25-year-old college students*. US: Heldref Publications. doi:10.3200/JACH.56.2.101-108

American Enterprise Institute (2011) Percent of first year college dropout students: The reasons students drop out. Retrieved from http://www.educationse.com/index.php?option=com_content&view=article&id=1471:percent-of-first-year-college-dropout-students-the-reasons-students-drop-out&catid=70:articles&Itemid=285

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science*, *12*(5), 353-359. doi:10.1111/1467-9280.00366

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. American Psychologist, 55, 469 –480. doi:10.1037/0003-066X.55.5.469

Bachman, J. G., Johnston, L. D., & O'Malley, P. M. (1998). Explaining recent increases in students' marijuana use: Impacts of perceived risks and disapproval, 1976 through 1996.*American Journal of Public Health*, *88*(6), 887-892. doi:10.2105/AJPH.88.6.887

Baker, R. W., & Siryk, B. (1984). Measuring adjustment to college. *Journal of Counseling Psychology, 31*(2), 179-189. doi:10.1037/0022-0167.31.2.179

Baum, S., Ma, J. & Payea, K. (2013) Education pays: The benefits of higher education for individuals and society. College Board: Trends in Higher Education. Retrieved from http://trends.collegeboard.org/sites/default/files/education-pays-2013-full-report-022714.pdf

Bureau of Labor Statistics (2013) Recent college graduates in the U.S. labor force: Data from the current population survey. Retrieved from http://www.bls.gov/opub/mlr/2013/02/art1full.pdf.

Burgers, C., Eden, A., van Engelenburg, M.D., & Buningh, S. (2015) How feedback boosts motivation and play in a brain-training game. Computers in Human Behavior, 48, 95-103

Chang, E. S., Heckhausen, J., Greenberger, E., & Chen, C. (2010). Shared agency with parents for educational goals: Ethnic differences and implications for college adjustment. *Journal of Youth and Adolescence*, *39*(11), 1293-1304. doi:10.1007/s10964-009-9488-7

Chen, B., Mouratidis, A., Ryan, R. M., Sheldon, K.M., Soenens, B., Van Petegem, S. & Verstuyf, J., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., Duriez, B., Lens, W., & Matos, L. (2014). Basic psychological need satisfaction, need frustration, and need strength across four cultures. Motivation and Emotion doi: DOI 10.1007/s11031-014-9450-1

Chisholm, L., & Hurrelmann, K. (1995). Adolescence in modern Europe: Pluralized

transition patterns and their implications for personal and social risks. *Journal of*

Adolescence, 18, 129-158.

Conti, R., Amabile, T. M., & Pollak, S. (1995). The positive impact of creative activity:

Effects of creative task engagement and motivational focus on college students'

learning. *Personality and Social Psychology Bulletin, 21*(10), 1107-1116.

doi:10.1177/01461672952110011

Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and

the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

doi:10.1207/S15327965PLI1104_01

Diener, E., Emmons, R. A., Larsen, R. J., & Sharon, G. (1985). The Satisfaction With Life

Scale. Journal of personality assessment, 49, 71-75. doi:

10.1207/s15327752jpa4901_13.

Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007). Prevalence and

correlates of depression, anxiety, and suicidality among university students. *American*

Journal Of Orthopsychiatry, *77*(4), 534-542. doi:10.1037/0002-9432.77.4.534

Gee, J. P. (2003). *What video games have to teach us about learning and literacy.* New York:

Palgrave Macmillian.

Gentile, D. A., & Anderson, C. A. (2003). Violent Video Games: The Newest Media

Violence Hazard. In D. A. Gentile (Ed.) , *Media violence and children: A complete*

guide for parents and professionals (pp. 131-152). Westport, CT US: Praeger

Publishers/Greenwood Publishing Group.

Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school

    students. *Journal of Educational Psychology, 77*(6), 631-645. doi:10.1037/0022-

    0663.77.6.631

Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children.

    Journal of Educational Psychology, 82(3), 525-538. doi:10.1037/0022-0663.82.3.525

Hamilton, S. F., & H. (2006). In J. J.Arnett, J. L.Tanner(Eds.), *School, work, and emerging*

    adulthood Retrieved from

    http://ezproxy.lib.uh.edu/login?url=http://search.ebscohost.com/login.aspx?direct=tru

    e&db=psyhref&AN=EAACABC.J.AMERICANPSYCHOLOGICALASSO.BJJF.DD

    J&site=ehost-live

Healy, J. M. (1990). *Endangered minds.* New York: Simon and Schuster.

Henning B, Vorderer P. Psychological escapism: Predicting the amount of television viewing

    by need for cognition. Journal of Communication 2001; 51:100–120.

Institute of Education Sciences. National Center for Education Statistics, (2011). *America's*

    youth: Transitions to adulthood . Retrieved from website:

    http://nces.ed.gov/pubs2012/2012026/index2.asp

Johnson, S. (2005). *Everything bad is good for you*. New York: Riverhead Books.

Jones, G. (2003). *Killing monsters: Why children need fantasy, super heroes, and make-*

    believe violence. New York: Basic Books.

Kirsch, S. J. (2006). *Children, adolescents, and media violence*. Thousand Oaks, CA: Sage.

Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being highly motivated: A

    closer look at introjection, identification, and intrinsic motivation. In E. L. Deci, & R.

    M. Ryan (Eds.), (pp. 101-121). Rochester, NY US: University of Rochester Press.

Li, D., Liau, A., Khoo, A. (2011) Examining the influence of actual-ideal self-discrepancies, depression, and escapism, on pathological gaming among massively multiplayer online adolescent gamers. *Cyberpsychology, Behavior, and Social Networking, 14(9)*, 535-539.

Litt, D. M., Stock, M. L., & Lewis, M. A. (2012). Drinking to fit in: Examining the need to belong as a moderator of perceptions of best friends' alcohol use and related risk cognitions among college students. *Basic And Applied Social Psychology*, *34*(4), 313-321. doi:10.1080/01973533.2012.693357

Mallett, R. K., Mello, Z. R., Wagner, D. E., Worrell, F., Burrow, R., & Andretta, J. R. (2011). Do I belong? It depends on when you ask. *Cultural Diversity And Ethnic Minority Psychology*, *17*(4), 432-436. doi:10.1037/a0025455

Milyavskaya, M., Nadolny, D, & Koestner, R. (2014). Where do self-concordant goals come from? The role of domain-specific psychological need satisfaction.. *Personality and Social Psychology Bulletin*, *40*, 700-711. doi:10.1177/0146167214524445

Nelson, L. J., & Padilla-Walker, L. M. (2013). Flourishing and floundering in emerging adult college students. *Emerging Adulthood*, *1*(1), 67-78.

Pavrot, W., & Diener, E. (1993). Review of the Satisfaction with Life Scale. *Psychological Assessment*, *5*, 164-172.

Pennebaker, J.W. (2013) . The College Adjustment Test (CAT) . Measurement Instrument Database for the Social Science. Retrieved from www.midss.ie

Pew Research Center (2014) The rising cost of not going to college. *Social and Demographic Trends.* Retrieved from http://www.pewsocialtrends.org/2014/02/11/the-rising-cost-of-not-going-to-college/

Peng, W., Lin, J., Pfeiffer, K., & Winn, B. (2012). Need satisfaction supportive game

    features as motivational determinants: An experimental study of a self-determination

    theory guided exergame. *Media Psychology*, *15*, 175-196.

    doi: 10.1080/15213269.2012.673850

Pritchard, M. E., Wilson, G. S., & Yamnitz, B. (2007). What predicts adjustment among

    college students? A longitudinal panel study. *Journal of American College Health,*

    56, 15–22. doi:10.3200/JACH.56.1.15-22

Pryor, J. H., Eagan, K., Palucki Blake, L., Hurtado, S., Berdan, J., & Case, M. H. (2012).

    The American freshman: National norms fall 2012. Los Angeles: Higher Education

    Research Institute, UCLA

Przybylski, A. K., Deci, E. L., Rigby, C.S., & Ryan, R. M. (2014). Competence-impeding

    electronic games and players' aggressive feelings, thoughts, and behaviors. *Journal of*

    Personality and Social Psychology, *106*, 441-457. doi: 10.1037/a0034820

Przybylski, A. K., Rigby, C.S., & Ryan, R. M. (2010). A motivational model of video game

    engagement. *Review of General Psychology*, *14*, 154-166. doi: 10.1037/a0019440

Przybylski, A. K., Weinstein, N., Ryan, R. M., & Rigby, C. (2009). Having to versus wanting

    to play: Background and consequences of harmonious versus obsessive engagement

    in video games. Cyberpsychology & Behavior, 12(5), 485-492.

    doi:10.1089/cpb.2009.0083.

Radloff, L. S. (1977). Center for Epidemiological Studies Depression Scale.

    doi:10.1037/t02942-000.

Rosenberg, M. (1965). Society and the adolescent self-image. Princeton, NJ: Princeton.

    University Press.

Rossman, S. B., Roman, J. K., Zweig, J. M., Rempel, M., & Lindquist, C. H. (Eds.) (2011). *The multi-site adult drug court evaluation: The impact of drug courts*. Washington, DC: The Urban Institute, Justice Policy Center. Retrieved from http://www.urban.org/UploadedPDF/ 412357-MADCE-The-Impact-of-Drug-Courts.pdf

Ryan, R.M., & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25,* 54–67.

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55,* 68–78.

Ryan, R. M., & Deci, E. L. (2000c). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry*, *11*, 319-338.

Ryan, R. M., & Frederick, C. M. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, *65,* 529–565.

Ryan, R. M., Rigby, C., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion*, *30(4*), 347-363. doi:10.1007/s11031-006-9051-8

Sassi, R. B. (2012). Abstract thinking: Game on: Is there a role for video games in clinical care?. *Journal Of The American Academy Of Child & Adolescent Psychiatry*, *51*(7), 661-662. doi:10.1016/j.jaac.2012.04.009

Satre, D. D., Mertens, J., Arean, P. A., & Weisner, C. (2003). Contrasting outcomes of older versus middle-aged and younger adult chemical dependency patients in a managed care program. *Journal of Studies on Alcohol, 64,* 520–530.

Schulenberg, J., & Zarrett, N. R. (2006). Mental health during emerging adulthood:

Continuity and discontinuity in courses, causes, and functions. In J. J. Arnett & J. L.

Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp.

135–172). Washington, DC: American Psychological Association.

doi:10.1037/11381-006

Schlotz, W., Yim, I. S., Zoccola, P. M., Jansen, L., & Schulz, P. (2001). The Perceived Stress

Reactivity Scale: Measurement invariance, stability, and validity in three countries.

Psychological Assessment, 23, 80-94.

Setzer, V. W., & Duckett, G. E. (2000). The risks to children using electronic games.

Retrieved October 3, 2006, from http://www.ime.usp.br/~vwsetzer/video-g-

risks.html

Sheldon, K.M. & Elliot, A.J. (1999). Goal striving, need-satisfaction, and longitudinal well-

being: The Self-Concordance Model. *Journal of Personality and Social Psychology,*

76, 482-497.

Sheldon, K.M. & Houser-Marko, L. (2001). Self-concordance, goal- attainment, and the

pursuit of happiness: Can there be an upward spiral? Journal of Personality and Social

Psychology, 80, 152-165.

Sheldon, K.M. & Kasser, T. (1998). Pursuing personal goals: Skills enable progress, but not

all progress is beneficial. *Personality and Social Psychology Bulletin*, 24, 1319-1331.

Sherbourne, Cathy D. and Anita Stewart, The MOS Social Support Survey, Santa

Monica, Calif.: RAND Corporation, RP-218, 1993. As of April 17, 2015:

http://www.rand.org/pubs/reprints/RP218

Shim, S. S., & Ryan, A. M. (2012). What do students want socially when they arrive at

  college? implications of social achievement goals for social behaviors and adjustment

  during the first semester of college. *Motivation and Emotion, 36*(4), 504-515.

  doi:10.1007/s11031-011-9272-3

Sieben, L. (2011). College Freshmen Report Record-Low Emotional Health and Higher

  Levels of Stress. *Chronicle Of Higher Education*, *57*(22), A21-A22.

Sheldon, K.M, Kasser, T. (1995) Coherence and congruence: Two aspects of personality

  integration. *Journal of Personality and Social Psychology, 68,* 531-543

Smith, D. C., Godley, S. H., Godley, M. D., & Dennis, M. L. (2011). Adolescent community

  reinforcement approach (A-CRA) outcomes differ among emerging adults and

  adolescents. *Journal of Substance Abuse Treatment, 41,* 422–430.

  doi:10.1016/j.jsat.2011.06.003

Spielberger, C.D., Gorssuch, R.L., Lushene, P.R., Vagg, P.R., & Jacobs, G.A (1983). Manual

  for the State-Trait Anxiety Inventory. Consulting Psychologists Press, Inc.

Substance Abuse and Mental Health Services Administration. (2011). *Results from the 2010*

  National Survey on Drug Use and Health: Summary 0fNati0nal Findings, NSDUH

  SeriesH-41, HHS Publication No. (SMA) 11–4658. Rockville, MD: Substance Abuse

  and Mental Health Services Administration. Available at: http://www.samhsa.gov/

  data/nsduh/2k1Onsduh/2kl0results.htm

The ESA. (2012). Entertainment software association. Retrieved from

  http://www.theesa.com/facts/pdfs/ESA_EF_2012.pdf

   Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits:

 Human needs and the self-determination of behavior. Psychological Inquiry, 11, 227-268.

Venter, R. (2013). Xhosa male initiation: Freedom of choice versus the need to

belong. *Journal Of Child And Adolescent Mental Health*, *25*(2), 139-147.

doi:10.2989/17280583.2013.767263

Watson, D., Clark, L. A., & Tellegan, A. (1988). Development and validation of brief

measures of positive and negative affect: The PANAS scales. Journal of Personality

and Social Psychology, 54(6), 1063–1070.

Yi, M. (2004, December 18). They got game: Stacks of new releases for hungry video

enthusiasts mean its boom time for an industry now even bigger than Hollywood. *San

Francisco Chronicle*, p. A1.