Online Gaming Involvement and Its Positive and Negative Consequences: A Cognitive
Anthropological “Cultural Consensus” Approach to Psychiatric Measurement and Assessment

Jeffrey G. Snodgrass^{a,1}, HJ Francois Dengah II^b, Michael G. Lacy^c, Andrew Bagwell^a, Max Van
Oostenburg^d, and Daniel Lende^e

^aDepartment of Anthropology, Colorado State University; ^bDepartment of Sociology, Social
Work, and Anthropology, Utah State University; ^cDepartment of Sociology, Colorado State
University, ^dPacific States Marine Fishery Commission & NOAA, Seattle, Wash.; ^eDepartment
of Anthropology, University of South Florida

¹ Corresponding author: Jeffrey.Snodgrass@Colostate.edu, Department of Anthropology,
Colorado State University, Fort Collins, CO 80523-1787

Acknowledgements We'd like thank the Colorado State University students from fall 2014 ANTH 444: Cultures of Virtual Worlds: Research Methods and spring 2015 ANTH 566: Field Methods in Online Environments, who helped with this research, and especially Tyler Beeton, Noah Benedict, Madison Brandt, Angela Huxel, Brandi Megrew, Scott Morton, Evan Polzer, Cheri Smarr-Foster, and Emmy Swisher. We'd also like to thank 444 alumnus (from fall 2011) Scarlett Eisenhauer, now at UCLA, who has stayed engaged with our research and helped with interviews. We acknowledge Colorado State University and its Department of Anthropology for financial and other support for this research, especially for ensuring that all software and equipment in Dr. Snodgrass' Ethnographic Research and Teaching Laboratory (ERTL) ran smoothly and were up-to-date. We also acknowledge support from the U.S. National Science Foundation (Snodgrass, J. G., & Dengah II, H. F. (2016). NSF Award #1600448 - EAGER: A Biocultural Study of the Functional Genomics of Intensive Internet Use). The research described in this article, including the use of appropriate informed consent procedures, has been reviewed and approved by the Colorado State University Institutional Review Board (IRB) for the protection of human subjects.

Abstract: We employed ethnographic methods more attentive to insider gamer perspectives to develop culturally-sensitive scale measures of online gaming involvement and its positive and negative consequences. Our inquiry combined relatively unstructured in-game participant-observation, semi-structured interviews, and a web survey. The latter derived from both ethnography and theory, and contained 15 involvement items and 21 each for positive and negative consequences items. Cultural consensus analysis revealed broadly shared understandings among players about online gaming involvement and its positive consequences, but less agreement about negative scale items. Our findings suggest the need for caution in employing current tools to assess “addictive” and “disordered” gaming, as our gamer respondents judged commonly used scale items, such as cognitive salience, withdrawal, and tolerance, as not fitting with their own understandings and experiences. We argue that our approach, rooted in gamers’ actual experiences and also current theory, contributes to more valid psychiatric assessments of online gaming experiences, though more research is needed to refine the new measures we present.

Key words: Internet gaming disorder, Internet addiction, Engaged play, Anthropology, Cultural consensus analysis

1. Introduction

Researchers propose “internet gaming disorder” as characterized by excessive or poorly controlled behaviors, preoccupations, and urges regarding online gaming that lead to distress or impairment (Pontes & Griffiths, 2015; Pontes, Kiraly, Demetrovics, & Griffiths, 2014). They suggest that distressful patterns of internet use, like other behavioral addictions, can be usefully classified with alcohol and drug use disorders, as they share common characteristics related to salience, mood modification, tolerance, withdrawal, conflict, and relapse (Block, 2008; Griffiths, 2005; Király, Griffiths, & Demetrovics, 2015; Petry et al., 2014; Pontes et al., 2014). However, researchers have questioned the validity of measures assessing problem gaming according to standards established for disordered behaviors related to substance use and gambling, arguing that the parallels between gaming and such behaviors have been assumed rather than established (Griffiths et al., 2015; Kardefelt-Winther, 2014a, 2015a; Van Rooij & Prause, 2014). Some thus argue that new approaches to assess problem gaming, resting on theory-driven research into the actual experiences of gamers, are needed to properly measure such problems and distinguish them from highly engaged but pleasurable play (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015; Charlton & Danforth, 2007; Kardefelt-Winther, 2015a, 2015b).

Here, we describe the development of alternative scales that can be used to assess both what we call intensive online gaming “involvement” and the positive and negative consequences resulting from such play. Our psycho-cultural approach builds upon Yee’s well-established understanding of online gaming involvement, with *achievement*, *social*, and *immersion* motivations shaping online play’s pleasures and perils (Yee, 2006a, 2006b, 2006c), a scheme based on foundational work by Bartle and further validated in other research (Bartle, 1996; Charlton & Danforth, 2007; Snodgrass et al., 2012; Snodgrass, Dengah, Lacy, & Fagan, 2013).

Taking seriously gamers' own reports on positive and negative experience, we use the “cultural consensus” (Romney, Weller, & Batchelder, 1986; Weller, 2007) approach from cognitive anthropology to empirically investigate how players' experiences are elaborated and instantiated in shared community-specific frames of meaning and behavioral scripts, which establish the cultural norms and standards through which gamers assess and interpret their online experiences and activities.

In our study, we use ethnographic methods to gain insight into cultural insider idioms of pleasure and distress (Kleinman, 1988; Nichter, 1981). Iteratively combining participant-observation, semi-structured interviews loosely following the McGill Illness Narrative Interview format (Groleau, Young, & Kirmayer, 2006), and a web survey, we arrive at 15 gaming involvement and 42 positive and negative consequences items (21 items for each of the two scales), which we test for cultural salience among gamers with consensus modeling. Overall, we suggest that these survey items are frames of meaning that both motivate cultural insiders (D'Andrade & Strauss, 1992)—here, gamers—and also provide them and researchers alike with a foundation from which to assess gamer community experiences as being alternately worthy or impaired. As such, they provide a window into both pleasurable and also potentially “disordered” gaming experiences that are recognized by gamers themselves as salient and sensible and thus possess what researchers would refer to as *face* or *ethnographic* validity (Kardefelt-Winther, 2015b).

2. Theoretical Background

2.1. “Internet Gaming Disorder” (and Its Critics)

An expanding body of research examines uncontrolled and distressful use of online games, studied as a distinct type of problematic Internet use (Caplan, Williams, & Yee, 2009;

Seay & Kraut, 2007; Yee, 2006c). Related studies make a convincing case that some gamers get involved in online worlds in order to alleviate dysphoric moods and to escape life distress and that this attempt to compensate for offline dissatisfactions, failings, and problems can itself lead to negative outcomes such as excessive and problematic online gaming (Kardefelt-Winther, 2014a, 2014b; Snodgrass, Lacy, et al., 2014; Snodgrass, Dengah, & Lacy, 2014). Still, researchers estimate that only small percentage of online gamers play online videogames problematically—estimated at 5% in one global study (Pontes et al., 2014), and between 3-9% in others (Pontes & Griffiths, 2014; Rehbein, Psych, Kleimann, Mediasci, & Moble, 2010; Turner et al., 2012), variability due in part to the range of assessment tools and cut-off points used—in ways that compromise their ability to function in day-to-day life (Caplan et al., 2009; Pontes & Griffiths, 2014; Pontes et al., 2014; Rehbein et al., 2010; Seay & Kraut, 2007; Turner et al., 2012; Yee, 2006c).

Nevertheless, U.S. and world psychiatrists have yet to reach consensus on exactly what to call or how to parse—or even whether to recognize as a mental disorder—uncontrollable and distressful online activity. In the DSM-5, the sole recognized “behavioral addiction” is “gambling disorder,” grouped with other formerly classified substance “abuse” and “dependence” disorders into a single “substance-related and addictive disorders” category. “Internet gaming disorder”—like other Internet-related problems—has yet to gain such a recognized status, instead being identified in an appendix of this manual (Section 3) as a condition warranting more clinical research before potentially being included in the main book as a formally recognized disorder (American Psychiatric Association, 2013).

In part, this failure at official recognition reflects how games studies research has yet to produce a consensus on how to conceptualize, measure, or assess so-called problematic or

disordered gaming, as illustrated by a recent lively exchange between a team of 14 researchers on the one hand, who point to an emerging consensus, and 28 on the other, who critique their ideas (Griffiths et al., 2015; Petry et al., 2014). Among other things, members of the second critical group of scholars point to the manner that we are still unsure whether online gaming problems should be modeled on other disordered behaviors related to substance use and gambling (Griffiths et al., 2015; Kardefelt-Winther, 2015b). We are also unable to properly distinguish “problem” online play from strong and healthy “engagement” and interest in gaming as a hobby, with the former potentially highly correlated with the latter but nonetheless distinct (Charlton & Danforth, 2007; Griffiths et al., 2015; Hussain, Williams, & Griffiths, 2015; Kardefelt-Winther, 2015b; Lafreniere, Vallerand, Donahue, & Lavigne, 2009). This in turn produces in current measures various problems of content, face, and construct validity of “internet gaming disorder” as a clinical construct (Kardefelt-Winther, 2015b, 2015c). That is, it is still not clear whether the items or “components” typically used to assess problem gaming include the right ones and exclude the wrong ones (content validity), whether such items are perceived by gamers themselves to measure what they purport to measure (face validity), or most importantly whether commonly employed scales measure what they purport to measure (“internet gaming disorder”) rather than something else (like “engagement”) (construct validity). As such, some researchers have suggested that we need alternate approaches that are at once theory-driven and also place so-called gaming “disorder” or “addiction” within a wider array of online play experiences outside of seemingly problem play (Griffiths et al., 2015; Kardefelt-Winther, 2015b, 2015c).

2.2. Online Gaming Involvement and Its Positive and Negative Consequences

Yee relied upon quantitative analyses of large sample surveys, complemented by open-ended questions to survey items, to posit three principal overarching online gaming motivational components: *Achievement* (including motivations related to *advancement*, *mechanics*, and *competition*), *Social* (*socializing*, *relationship*, and *teamwork*), and *Immersion* (*discovery*, *role-playing*, *customization*, and *escape*) (Yee, 2006a, 2006b, 2006c). Other studies confirm Yee's three factor motivational framework for MMO play and involvement (Charlton & Danforth, 2007; Snodgrass et al., 2012), including work of our own that modified Yee's framework to better account for cultural factors (XXX).

A range of studies have connected Yee's three broad motivations to positive playing experiences. For example, McGonigal and others point out that overcoming challenges create important *achievement* experiences, which are integral to why many online and other games are experienced as fun (Charlton & Danforth, 2007; Koster, 2013; McGonigal, 2011; Snodgrass et al., 2012, 2013; Snodgrass, Lacy, Dengah II, Fagan, & Most, 2011; Yee, 2006b, 2006c). Games studies researchers also propose that online gaming and other spaces are akin to the pubs or coffeehouses that came before them and thus serve as important new "third places" between the first space of home and the second of work, providing positive *social* experiences (Putnam, 2000; Steinkuehler & Williams, 2006). Indeed, gaming with so-called "real-life" or offline friends has been shown to be associated with more positive online gaming experiences (Snodgrass, Lacy, Francois Dengah, & Fagan, 2011), as has belonging to certain in-game social groupings referred to as *guilds* (Longman, O'Connor, & Obst, 2009; Nardi, 2010; Snodgrass, Lacy, et al., 2016). Finally, *immersion* gamers too report *WoW* play can relieve the stress in their lives, providing positive play experiences and temporary breaks from the offline world (Snodgrass et al., 2012, 2013; Snodgrass, Lacy, et al., 2014; Yee, 2006a, 2006b, 2006c).

Nevertheless, research illuminates how *achievement*-motivated play, such as one finds in multiplayer MMO “raiding,” is associated with compulsive online activity, as players stay on longer than they intend to accomplish their goals (Charlton & Danforth, 2007; Snodgrass et al., 2012, 2013; Snodgrass, Lacy, et al., 2014; Snodgrass, Dengah, et al., 2014; Snodgrass, Dengah, Lacy, & Fagan, 2011; Yee, 2006a, 2006b). Other studies explicitly treat extensive online *social* gaming as problematic activity, with gamers seeking online a life they lack offline, binding them to Internet communities in potentially unhealthy, even “addictive,” ways (Kardefelt-Winther, 2014b). Here, certain gamers get drawn into communities and collaborations that demand increasing amounts of time, in some cases maladaptively avoiding actual-world commitments and problems, which in the long-run can harm both gamers’ psyches and their offline social lives as their gaming pleasure assumes “addictive” qualities (Hussain et al., 2015; Kardefelt-Winther, 2014a, 2014b). Finally, even the motivation to escape offline problems and responsibilities through *immersion* in online worlds has been linked to gamers, in their own estimation, getting overly involved in online gaming realities to the detriment of their offline lives (Caplan et al., 2009; Charlton & Danforth, 2007; Seay & Kraut, 2007; Snodgrass, Lacy, et al., 2014; Snodgrass et al., 2011; Yee, 2006b).

2.3. Cognitive Anthropological Assessments of Online Gaming Experiences

To function effectively within online play groups, members need to know—and indeed psychologically “internalize” or commit to (D’Andrade, 1995; D’Andrade & Strauss, 1992; Spiro, 1987)—their groups’ particular cultural “models” or understandings of “doing good.” And culturally internalized normative goals—socially learned and transmitted in the act of play itself—importantly shape whether online game-play is experienced as psychosocially beneficial or harmful. For example, anthropologists and others have examined the confluence of shared

cultural norms that lead gamers to learn both how to enjoy the game and also sometimes to employ the language and frame of “addiction” to communicate their gaming-related distress and suffering (Castronova, 2008; Nardi, 2010; Snodgrass, Lacy, et al., 2016; Stromberg, 2009).

In these cognitive anthropological terms, *culture* is understood to be that which one must know in order to function adequately in a given social system (Goodenough, Levinson, & Ember, 1996). Rather than ambitiously trying to grasp the totality of culture, cognitive anthropologists typically try to understand how cultural *frames, models, schemas, and scripts* (the terms often used interchangeably) structure individuals’ reasoning and practice (D’Andrade, 1995; Ross, 2004; Strauss & Quinn, 1997). *Cultural* models, as opposed to idiosyncratic or *personal* models, are understood in this context to be mental representations of the world that are socially transmitted and widely shared within a group (Bennardo & De Munck, 2014; D’Andrade, 1995; Holland & Quinn, 1987; Ross, 2004). Of particular interest to our study, medical and psychiatric anthropologists have demonstrated that cultural models (labeled “explanatory models” in Kleinman’s now classic work) can be arranged to form more complex “idioms of distress,” which provide important cognitive resources through which individuals make sense of and also label their illness experiences (Groleau et al., 2006; Kirmayer & Sartorius, 2007; Kleinman, 1988; Nichter, 1981). From this perspective, “addiction” is a cultural category with particular historical roots (Room, 2003; Singer, 2012; Spradley, 1999). And anthropologists have been careful to also document the sociocultural contexts that lead individuals to frame as “addictive” their (overly) passionate pursuits of certain kinds of behavior (Lende, 2005; Raikhel & Garriott, 2013; Schüll, 2006; Singer, 2012; Stromberg, 2009).

Methodologically, cognitive anthropologists use the methods of cultural consensus analysis (CCA) to quantitatively specify the characteristics and extent of shared cultural

knowledge (Romney et al., 1986; Weller, 2007). These methods have been widely used in diverse disciplines, proving particularly useful in medical anthropological investigations (Dressler & Bindon, 2000; Gravlee, Dressler, & Bernard, 2005; Weller, 2007). Combining interviews, observations, and more structured methods like free-lists, a CCA researcher first identifies a series of statements that constitute a cognitive domain (Bennardo & De Munck, 2014; Johnson, Weller, & Brewer, 2002; Romney & Weller, 1988; Ross, 2004). Informants' responses to these statements are presumed to be a function of their cultural "competence," that is, their knowledge of the culturally correct responses to these questions (termed the "answer key" in CCA), as well as a random component, since any informant's knowledge is imperfect and incomplete. The statistical procedures of CCA recover this unknown answer key and measure the cultural competency of each informant according to this key.

Cognitively-oriented medical and psychiatric anthropologists commonly use ethnography, interviews, and structured surveys to gain insight into local mental health processes (Groleau et al., 2006; Kaiser, Kohrt, Keys, Khoury, & Brewster, 2013; Kleinman, 1988; Kohrt, Hruschka, Kohrt, Panebianco, & Tsagaankhuu, 2004). Many also explicitly employ CCA to help construct emically (from an insider's point of view) meaningful mental health scales, as well as to understand closely related cultural models such as insider conceptions of the "good life" or identity (like race) that might affect health and well-being (Dressler & Bindon, 2000; Fielding-Miller, Dunkle, Cooper, Windle, & Hadley, 2016; Gravlee et al., 2005; Hruschka, 2009; Kohrt & Hruschka, 2010; Panter-Brick, Eggerman, Mojadidi, & McDade, 2008). Mental health analyses that incorporate cultural insider conceptions of well-being are thus proving invaluable to anthropologists and others wanting to better understand local experience and practice.

Of most direct relevance to our study, **research with U.S. gaming populations** has demonstrated how being in sync or “consonant” (Dressler & Bindon, 2000) with shared and socially transmitted models of success, conceptualized as cultural ideals, drive game-play as well as the positive and negative experiences associated with such play (Snodgrass et al., 2013; Snodgrass, Dengah, et al., 2014; Snodgrass, Dengah, et al., 2011). But anthropologists and other researchers have not yet used linked ethnography, interviews, and the consensus and consonance methods to develop culturally sensitive online gaming distress scale measures.

3. Research Model

In previous work, we constructed a *World of Warcraft*-specific problematic play measure (e.g., XXX), which we adapted from Young’s commonly used Internet Addiction Test, itself based on DSM criteria for problem gambling (Young, 1999). In response to recent debate about the validity of assessing problem play according to standards developed for substance use and gambling (Kardefelt-Winther, 2015b), we decided for the current study to build new measures closer to actual gamer experiences. Though remaining true to certain features of our earlier problem play measure, Yee’s tripartite model of online gaming involvement (Yee, 2006a) served as the foundation for our ethnographic inquiry into pleasurable and potentially disordered gaming, given its validation and successful use in our own research (XXX). Likewise, research that implicitly treats highly engaged play as necessarily problematic has raised concern among games studies scholars (Charlton & Danforth, 2007; Griffiths et al., 2015; Hussain et al., 2015). As such, we separated online gaming *involvement* from its positive and negative *consequences*, in an attempt to better understand relationships between engaged and problem play.

4. Methods

4.1. Initial Participant-Observation and Interviews

We began fall 2014 with several months of participant-observation research, documented extensively in field-notes, in the “massively multiplayer online role-playing game” (MMORPG) *Guild Wars 2*. This phase of research included observations and unstructured interviews—many of them within in-game associations of like-minded players termed *guilds*—focused on understanding the positive and negative experiences connected with intensive online gaming involvement from the point of view of players themselves, which we describe in detail elsewhere (XXX).

We followed our participant-observation with semi-structured interviews (N=20) using the McGill Illness Narrative Interview (MINI) (Groleau et al., 2006), which we modified to better elicit insider gamer understandings of both positive and negative play experiences (see Appendix A for our full interview protocol). We sampled interviewees from our own play networks, aiming for a roughly equal balance of players reporting overall positive, negative, or mixed positive/ negative play experiences (~6-7 from each of these categories). Within each of these three experience categories, we also sampled respondents who played a range of online games and game genres, for example, speaking in each case to MMORPGs players of *World of Warcraft* and *Guild Wars 2* and also with massive online battle arena (MOBA) “e-sports” gamers who played *League of Legends* and *Dota 2*, thus hearing from players of multiple popular games within prominent online gaming genres.

Our interviews were digitally recorded, transcribed, and subsequently coded and analyzed using the software MAXQDA (Kuckartz, 2007), loosely following a “grounded theory” approach (Glaser & Strauss, 1967). Overall, our iterative coding and memoing of interview transcripts helped us isolate important components of online gaming involvement, the insider language of each component, and how each component was associated with positive and

negative gaming experiences. Details related to our interview analysis are presented in Appendix B, with readers directed both to that supplementary material and also to our earlier publications (XXX) for insight into the actual gamers' experiences and behaviors that provide an ethnographic foundation for the survey items and analysis presented here.

4.2. Survey Item Generation

Based on interview analysis, we developed potential survey items for “involvement” and the “positive and negative consequences” of such involvement, aiming to create items that were both ethnographically meaningful and also theory-driven. We treat these interrelated survey scale items as cultural *models* that “frame” gaming experience, thus lending them their meaning (Bennardo & De Munck, 2014; D’Andrade, 1995). This resulted in large initial items pool, 88 for involvement, 68 positive benefits, and 51 negative consequences, which were impractical for inclusion in a survey. We consolidated these items through an iterative schema analysis process (Bennardo & De Munck, 2014; D’Andrade, 1995; Ross, 2004), which included both preliminary (rather than final) cultural consensus analysis on survey field-test data as well as further interviews with key informants. This allowed us to consolidate common experiences and behaviors and only include the most salient themes in each domain of experience, as well as to refine the content and phrasing of each survey item representing a given gaming theme and domain. This iterative process led us to 57 survey items, 15 for involvement and 21 each for positive and negative consequences.

The final 15 involvement items included three questions for each of Yee’s gamer motivations (*achievement*, *social*, and *immersion*), nine items total, which also were confirmed as key themes in our ethnographic interviews (again, see Appendix B for all interview results). To these, we added three questions each about overall *involvement* (commitment of time, energy,

and effort to gaming) and also what we called “*engagement*” (motivated and passionate gaming). The three *involvement* questions emerged from a high-level theme code in our interviews, which was developed to capture insiders’ language about “intensively involved” online gaming. The *engagement* items were derived from our *hardcore* versus *casual gaming* interview code themes, which referenced gamer motivation, emotional intensity, and also ultimately skill level.

The 21 positive and 21 negative consequences items followed our interview coding scheme closely and included in each positive and negative case six *psychosomatic* impacts (loosely, three more *psychological* and three more *embodied* or “*somatic*,” though linked as in the case of items about adrenaline-fueled arousal), six *behavioral* consequences (such as the game producing positive structure or by contrast boring and potentially compulsive routine), six *social* ones (like the game providing satisfying community or instead over-play creating social isolation), and three *achievement* items (as the game producing satisfying feelings of accomplishment or feeling more like a dead-end job, themes that emerged in interviews). Of note, our negative consequences scales included items that corresponded loosely to problematic outcomes identified in theory-driven measures of internet gaming disorder, which we matched with parallel positive ethnographic counterparts. Thus, for example, an inability to focus on or fully engage with offline activities because one was always thinking about gaming (negative preoccupation) was paired with the satisfying experience of looking forward to gaming (positive anticipation), both of which were reported by respondents in our MINI interviews. In general, we tried to ensure that our negative consequences items included experiences commonly employed in other prominent online gaming disorder or addiction scales, such as salience, mood modification, tolerance, withdrawal, conflict, and relapse (Griffiths, 2005; Pontes & Griffiths,

2014, 2015; Pontes et al., 2014), while remaining true to our informants' actual experiences, concepts, and speech.

We present all 57 scale items in Appendix C, which shows among other things how positive and negative consequences are matched, for example, with positive consequence item 16 paired with negative item 37, question 17 with 38, and so forth.

4.3. Survey Sampling and Analysis

Along with other demographics and control variables, the 57 model items were placed on an online survey (XXX). We asked respondents whether they agreed or disagreed (on a 4-point Likert Scale format ranging from “Strongly Disagree” to “Strongly Agree”) that each *involvement* item characterized intensively involved online gaming from what they saw as a typical gamer's point of view. Gamers similarly responded as to whether they agreed or disagreed (using the same 4-point scale) that the *positive and negative consequences* of such play described in our survey items would be seen by gamers as typical of such experiences.¹ For use in our cultural consensus analysis, we dichotomized survey items into a simpler “Disagree/Strongly Disagree” vs. “Agree/ Strongly Agree.” Besides offering data with an arguably better fit to the formal CCA statistical model, this choice was substantially motivated by communications from respondents, who reported that the choice of (e.g.) “Agree” vs. “Strongly Agree” was challenging, which members of our research team similarly experienced in trial runs of our survey.

We distributed the survey to our own play networks as well as on Reddit gaming forums, receiving 672 responses that are analyzed here. Reddit forums are sites where registered users post content, which is up or down voted by members, thus organizing the content by moving popular posts to the top of the page. More intensively involved or “hardcore” gamers in

particular now commonly frequent such sites to learn about their games of choice and also to socially network with other players in an entertaining way, thus making such sites particularly relevant for a study such as ours on “highly involved” online gaming. We distributed our survey across a range of online gaming “subreddits,” from which we invited responses, so as to contact players of the main online gaming genres, including “massively multiplayer online role-playing games” (MMORPGs) like *World of Warcraft*, “multiplayer online battle arenas” (MOBAs) such as *League of Legends*, “real-time strategy games” (RTS) like *Starcraft 2*, and “first-person shooters” (FPS) including *Team Fortress 2*.

Survey results were analyzed via CCA. We report three conventional CCA summary measures reported in the original Romney et al. paper: 1) The eigenvalue ratio, with greater than a 3:1 ratio of the 1st to 2nd eigenvalues of the factored respondent agreement matrix being understood to demonstrate evidence of high consensus and thus cultural sharing; 2) The average respondent competence scores, with an individual’s score indicating their relative agreement with the culturally shared responses; 3) The culturally agreed upon best model or “answer key” for each item. We also include two other methodological extensions of them: 1) An alternate method to assess the goodness of fit of our CCA analysis derived from the “Proportional Reduction of Error” or “PRE” family of statistical procedures, which, among other things, allows us to assess the relative goodness of individual consensus items (XXX); 2) Linear regression with cultural competence as the outcome and a variety of theory- and ethnography-driven predictors, which allowed us to assess variation from a culturally dominant answer key (Handwerker, 2001).²

5. Results

Among our 672 survey respondents, 88.0% were male and 10.9% female, with 1.2% reporting “other.” The average respondent was 24.5 years old ($sd=6.8$), played 33.5 hours a week ($sd=20.7$), and rated their level of online gaming involvement a 5.7 (on a 7-point ordinal scale ranging from 1=“Casual gamer” and 7= “Hardcore gamer”) ($sd=1.3$). A little over half (53.4%) of our survey respondents’ self-reported main game genre was MMORPGs (like *World of Warcraft* and *Guild Wars 2*), while 14.1% mainly played MOBAs (such as *League of Legends*), 4.3% RTS games (like *Starcraft 2*), 1.5% FPS games (*Team Fortress 2*, etc.), .45% sports games (such as *FIFA Soccer*), and 6.0% preferred equally MMORPGs and MOBAs, 6.7% equally MMORPGs, MOBAs, and FPSs, 1.9% MOBAs and FPSs, and 11.6% a variety of other kinds of online games. 62.5% of our sample lived in the United States/ North America, with the remaining 37.5% being largely European, but with some respondents also coming from South America, Asia, and other parts of the world.

More central to our concerns in this article, our CCA analysis of dichotomized responses to all 57 items revealed agreement on the meaning of intensive online *involvement* and the potential *positive and negative consequences* of such involvement (eigenvalue ratio: 3.57; Average competence: .56).

To consider the different aspects of this involvement and gaming consequences cultural domain, we averaged the percentages of respondents agreeing to each of the 15 *involvement* items and found that on average 81.8% of all informants agreed that each *involvement* item described an important and typical highly involved gaming experience. Likewise, the culturally consensual and thus shared response (in CCA terms, the “answer key” response that is “correct” from a gamer community point of view) for all 15 *involvement* items was “Agree.” (See Table 1 for more detail.) Regarding online gaming’s *positive consequences*, the average percentage

agreement of each item's importance was 79.2%, and the answer key again was "Agree" for all items except question 20 about feeling exhilarated by gaming long hours, which was "Disagree." (Detail provided in Table 2.) *Negative consequences*, by contrast, showed a different pattern. The average percentage of respondents that agreed the item was important was much lower, 45.2%, with the answer key response being "Disagree" on 15 of the 21 items. Only six out of the 21 *negative consequences* items had as their consensual answer "Agree."

Of particular note in regard to our *negative consequences* items, respondents were less likely to agree that classic internet gaming disorder scale measures such as cognitive salience, withdrawal, and tolerance described important and typical experiences (with a per item average agree response of 38.8%) compared to our scale's other items (a per item average of 49.9%). And *none* of our *negative consequences* scale's versions of classic gaming disorder items had as their culturally correct answer "Agree." This contrasts with our *negative consequences* scale's more purely ethnographic items, of which six of those twelve questions had a CCA answer key of "Agree." (Details for this third set of negative consequences questions are shown in Table 3, with asterisks indicating our study's versions of nine classic internet gaming disorder items.)

As a more intuitive and otherwise advantageous alternative to the eigenvalue ratio, we also describe the fit of the cultural consensus model of all 57 items using the new summary statistic developed by us (XXX), for which $\rho_{CCU} = 0.30$. According to these new standards, this indicates that a cultural consensus model provides a good fit to the data, since this value shows that predicting individuals' actual responses based on their competence scores and the answer key would give 30% fewer errors compared to an *a priori* guessing model.

A useful feature of the ρ_{CCU} approach to summarizing CCA data is that it enables an examination of the relative fit of each item to the overall domain consensus. It does so by

indicating the extent to which the cultural consensus model would *fail* (i.e., result in prediction errors) to reproduce individuals' responses to each item. Thus, the final column of Tables 1-3 shows the number of prediction errors associated with each item, the magnitude of which is a relative measure of the *badness* of fit of each item to the overall consensus. Of note is that the per item mean errors for the negative consequences items (287.0) is about 40% higher than for either the involvement (202.6) or the positive consequences questions (204.4), further indicating that gamers have less consensus about the negative consequences part of the cultural domain. Of further interest, the average per item number of errors of our study's versions of nine classic internet gaming addiction items (again, as indicated with asterisks in Table 3) was somewhat higher (292.5) compared to our survey's more purely ethnographic ones (283.0), also suggesting less consensus and thus more cultural variability regarding the classic internet gaming disorder items compared to others featured in that negative experiences scale.

To focus in on the different parts of the overall cultural domain, we also conducted separate cultural consensus analyses (again with items dichotomized) for each section of questions. The 15 *involvement* items considered by themselves showed considerably more agreement than did the overall consensus analysis (eigenvalue ratio: 6.4; $\rho_{CCU} = 0.50$; mean competence: .69; Answer Key: "Agree" on all items), as did analysis of the 21 positive consequences items (eigenvalue ratio: 6.78; $\rho_{CCU} = 0.44$; mean competence: .67; Answer Key: "Agree" on all items except for question 20, as seen previously). However, a key finding was an *absence* of consensus for the 21 negative experiences items considered alone (eigenvalue ratio: 2.26 (below the conventional 3:1 eigenvalue ratio); $\rho_{CCU} = 0.18$; mean competence: .34; Answer Key: "Disagree" on all items except for questions 38 about frustration and 52 about getting

annoyed at anonymous gaming others, which were “Agree”). This suggests the possibility of subcultural variation among gamers regarding *negative* aspects of play.

To identify potential sources of subcultural variability, we regressed respondents’ competence scores from the 57 item analysis on a variety of predictors including covariates known to be associated with variation in online gaming experience (e.g., age and gender), respondents’ preferred online game (with MMORPG as the baseline (=0) category), level of online gaming involvement (again, self-rated on a 1-7 ordinal scale, with 1=“Casual gamer” and 7= “Hardcore gamer”), and whether respondents agreed or disagreed with survey item 55 about online gaming being experienced “more like a draining job than something one loves,” which showed the lowest number of respondents who agreed with the item (Agree=16.7%). The logic of using item 55 as a predictor was that those who agreed with this item might form a potentially deviant subculture, whose members might have their own unique cultural answer key, and thus be relatively low in competence with respect to the mainstream gamer culture. In this case, this sub-group of individuals experience online gaming “grinding” (i.e., repetitive completion of typically relatively simple tasks in order to accrue in-game wealth and thus to advance) and related activities more like a negative work experience rather than simple play.³ As seen in Table 4, age, level of gaming involvement, whether one plays a real-time strategy game (RTS) such as *Starcraft 2*, and how one answered question 55 showed statistically significant results, with older players, those less heavily involved in gaming, those gamers who prefer RTS games, and those who agreed with survey item 55 all displaying *less* cultural competence.

As how one responded to question 55 showed a particularly pronounced effect in our regression model—with notable responses too in how numerous interviewees spoke about such work-like draining play—we also conducted a separate cultural consensus analysis on the

negative consequences items only, in this case using only those individuals who agreed that survey item 55 (on gaming becoming like a draining job) was an important potential negative consequence of online gaming. These 112 individuals—16.7% of our sample, which recall we thought might reveal a deviant subculture—showed shared understandings within this group (eigenvalue ratio: 3.55; $\rho_{CCU} = 0.32$; mean competence: .48). In this group's case, the culturally correct answer for each and every 21 negative consequences items was “*Agree*.”

6. Discussion

6.1. Results

Our research suggests broad gamer agreement on what constitutes online gaming *involvement* and the potential *positive consequences* of such involvement. The cultural consensus answer key for all these items but one (question 20) was “Agree” (Tables 1 and 2). However, our gamer respondents consensually “Agree” that only *six* of our 21 *negative consequences* items capture their experiences, with their more common shared response being “Disagree” on these negative items, as indicated in Table 3.

Based on psychiatric anthropological scale development research in other contexts (Fielding-Miller et al., 2016; Kaiser et al., 2013; Kohrt & Hruschka, 2010), one implication of this is that researchers could construct an ethnographically grounded gaming experiences measure from all our 15 online *involvement* items and from 20 of our 21 *positive consequences* items. Gamers themselves would recognize in this measure their own culturally shared meanings, understandings, and experiences. In validity language characteristic of the psychiatric, medical, and broader social scientific literature, our method—that is, initial relatively open-ended ethnography in naturalistic gaming settings, followed by semi-structured interviews that captured respondents' descriptions of their experiences in their own words, and culminating in more

structured cultural consensus analysis of survey data—helped us to identify scale items potentially missed by other approaches, and also to exclude items not in concert with our informants’ experiences, thus providing greater *content* validity. Framed in terms familiar to cultural insiders, our scale items also have more chance of appearing acceptable to respondents, thus possessing greater *face* validity (Kardefelt-Winther, 2015b), or what anthropologists would refer to as *ethnographic* validity.

In strictly cultural insider terms, we might feel justified in using only those six *negative consequences* items that had “Agree” as their culturally correct answer. Only those items would have the content and face/ethnographic forms of validity described above. Of note, as Table 3 shows, *none* of these six items are ones commonly used in other internet gaming disorder or “addiction” scales such as cognitive salience, withdrawal, and tolerance. Rather, they are more closely related to other ethnographically derived experiences, which include references to Yee’s tripartite motivational framework, with one describing negative psychological experiences related to mood deterioration (item 38), another about feeling mentally and physically drained (item 40), one describing boredom and thus a lack of deeply *immersive* in-game experiences (45), two *social* (51 and 52), and one related to *achievement* aspirations (item 56).

Likewise, respondents were much less likely to agree that our survey’s versions of nine classic internet gaming disorder scale items described important and typical experiences compared with our scale’s other twelve *negative consequences* items (a per item average agree response of 38.8% in the former case vs. 49.9% in the latter case). This leads us to question the cultural appropriateness of assessing online gamers’ negative experiences with items drawn from frameworks developed to understand problematic substance use and gambling. Such symptomology is not recognized by cultural insiders as notable or important. Of note,

“tolerance” seems particularly poor ethnographically, with only 24.1% of our sample agreeing it describes important and typical negative gaming experiences, which was confirmed in interviews where many respondents vocally rejected this concept’s appropriateness for framing their negative experiences. Further, cultural consensus modeling and our ρ_{CCU} measure show that our survey’s nine classic gaming disorder questions tend to produce greater prediction errors compared to our more purely ethnographic ones (an average of 292.5 vs. 283.0 errors per item). This suggests more cultural variability in relation to those items’ acceptability to gamer insiders and thus less clarity in terms of their cultural appropriateness as online gaming experience measures.

Nevertheless, Table 4’s regression model shows that older players, those less heavily involved in gaming, those gamers who prefer RTS games, and those who agreed with survey item 55 all possess significantly *lower* cultural competence and thus subscribe less to the conventional gamer perspective on experiences represented in our sample. Likewise, we find cultural consensus on the negative consequences items among those 112 individuals who thought that survey item 55 (on gaming becoming like a draining job) was an important potential negative consequence of online gaming, with the culturally correct answer for this group being “Agree” on each of the 21 negative consequences items. Such findings suggest that some smaller sub-groups of (culturally deviant in our cognitive anthropological analytical terms) respondents might agree that even all 21 negative consequences items are good measures of problematic online gaming experiences, with such usefully assessing their problematic play experiences.

6.2. Our Method In Relation to Other Approaches

Though ethnographically based, Yee’s tripartite motivational approach also grounds our understanding of both online gaming involvement and the positive and negative consequences of

such involvement (Yee, 2006a). And we did not break entirely from earlier theories of problem play (Griffiths, 2005; Pontes & Griffiths, 2015; Pontes et al., 2014), as demonstrated by the inclusion of nine problematic play items that are akin to other commonly used online gaming disorder questions. Nevertheless, our study's *negative consequences* items do not correspond exactly with other similar online gaming disorder measures, from which they are partially drawn. Rather, we aimed to use ethnographic methods to frame common online gaming addiction items in a language more amenable and acceptable to gamers, without compromising core features of those theory-based scales.

Cultural approaches such as ours reveal potential problems with problematic gaming scale measures built upon substance use and gambling disorders, as others have also argued (Griffiths et al., 2015; Kardefelt-Winther, 2015b, 2015c). As we note, *none* of the commonly used internet gaming disorder items are judged by gamers themselves to be important negative consequences. Rather, the shared and consensual judgement of those commonly used items is "Disagree." "Tolerance" seems particularly problematic from gamer perspectives, a point noted by other researchers (Griffiths et al., 2015; Kardefelt-Winther, 2015a; Van Rooij & Prause, 2014). This suggests to us that researchers should use caution in employing similar items to assess negative "addictive" and "disordered" gaming, as they are judged by gamers themselves to not correspond with their own understandings of such experiences and thus do not possess face and content validity. In fact, given that we ethnographically adapted such items to our measures, we think that the rejection of other online addiction scales such as those proposed by Griffiths would potentially face even *greater* gamer resistance, resulting in potentially biased assessments of gamer "addiction" and "disordered" experiences.

Nevertheless, our subsequent subcultural analyses suggest that certain sub-groups of respondents generally agree that each of these 21 items capture common and important negative gaming experiences. We see this for example in those 18% of respondents who agree with survey item 55 and subsequently have a CCA answer key of typically “Agree” responses. Likewise, older players, those less heavily involved in gaming, those gamers who prefer RTS games, and those who agreed with survey item 55 all display less cultural competence, pointing to cultural variability. This suggests to us the utility of retaining the negative scale items for at least some populations, as they do seem close to at least certain sub-groups’ shared, socially learned, and thus in some important sense “cultural” conceptions. This is especially the case given that all queries about negative gaming experiences, no matter how sensitively framed, will surely meet some level of resistance by gamers. We might imagine, for example, that players never having suffered from such experiences might deny their importance. Or, by contrast, gamers commonly suffering from them might do so, with psychological denial potentially shielding gamers from negative judgments about themselves and their habits.

Finally, our study demonstrates that problem gaming is on a continuum with—and indeed not always easily distinguishable from—positive play experiences, as others have also argued (Charlton & Danforth, 2007; Griffiths et al., 2015; Hussain et al., 2015; Jansz & Van Rooij, 2012; Kardefelt-Winther, 2015b). Readers have surely noted how our *positive and negative consequences* scales are conceptually closely related, with us led to these scales’ items by gamers on descriptions of their experiences. As such, our study documented online gaming experiences as a whole, with an aim to understanding how problem play might be connected with more everyday—typically pleasurable and engaging—gaming experiences, for which the games study research community has called (Charlton & Danforth, 2007; Hussain et al., 2015).

6.3. Study Limits and Future Directions

Our survey items are simplified proxies—rather than exact equivalents—for more complex cultural frames of meaning related to online gaming. And our non-random convenience sample is not representative of all online gamers. As such, other studies using our methods would arrive at somewhat different scale items, though we’d anticipate overlap.

To solidify the *construct* validity of our scale, the research described in this paper needs to be followed by a second “cultural consonance” survey phase, in **which we’d investigate “the degree to which individuals approximate widely shared cultural models in their own beliefs and behaviors”** (Dressler & Bindon, 2000). Here, we’d ask gamer respondents to reply to questions based on their own individual experiences rather than what they perceive to be common to gamers more generally. Now under way (<http://goo.gl/forms/wD3sxmeRnstWCqVb2>), this cultural consonance phase of research will allow us to test in theory-driven ways how our new scales predict other known correlates of engaged or problematic play. For example, we’d expect our *negative consequences* scale to be somewhat aligned with other established gaming distress measures, such as a Pontes and Griffiths’ recent 9-item scale (Pontes & Griffiths, 2015), which we’ve included in this second survey. Such alignment would support the *convergent validity* of our measure. By contrast, we wouldn’t expect our *negative consequences* scale to be as closely aligned to our *positive consequences* scale (even though our research to this point suggests that a small minority of gamers do experience simultaneously high positive and negative gaming consequences). This would point to the *discriminant validity* of this *negative consequences* measure, how it could distinguish disordered from engaged gaming (Charlton & Danforth, 2007; Griffiths et al., 2015; Hussain et al., 2015).

Finally, our claims hold over a range of online games—MMORPGs, MOBAs, FPS, RTS, and others—as we found only relatively minor response variation based on main game type. Still, online gaming experiences do vary somewhat according to game type, which additional research could clarify. Likewise, additional local cultural and linguistic factors—such as variable cultural norms about the value and acceptability of online gaming, which might vary according to one’s country or world region—surely shape the more global gaming community cultural factors we’ve traced in this article. To test such ideas and refine our measures for specific cultural populations, we’re translating our consonance survey into French, Portuguese, Spanish, Hindi, Chinese, and other languages, with additional cross-cultural fieldwork and interviews also planned (e.g., XXX).

7. Conclusion

Drawing from cognitive and psychiatric anthropological perspectives, our study aimed to develop theory-driven ethnographic alternatives to more commonly employed online “disorder” and “addiction” scales, with our measures more closely aligned with gamers’ actual experiences, both positive and negative. Based on gamer resistance to some commonly used internet gaming disorder items, we think that those who study problem gaming should pay greater attention to how online play experiences are shaped by “culture”—in the sense of *socially shared and transmitted cognitions, social networks, and frameworks for interpreting experience* (Bennardo & De Munck, 2014; D’Andrade, 1995; Ross, 2004). As our study reveals, ethnographic methods provide critically important insight into gamer insiders’ idioms of pleasure and distress (Kleinman, 1988; Nichter, 1981), frames of meaning that both motivate gamers and also provide them and researchers alike with a foundation from which to assess experiences as being

alternately worthy or impaired (Castronova, 2008; Chen, 2012; Nardi, 2010; Snodgrass, Lacy, et al., 2016; Stromberg, 2009).

Despite affinities with other approaches, our simultaneous consideration of both positive and negative gaming experiences—and thus potentially the balance between the two—does provide an important shift in perspective about how researchers might approach so-called “internet gaming disorder.” As one possible extension of our approach not fully considered in this article, so-called “disordered” or “addictive” play might be re-conceptualized as a fusion of more neutral gaming *involvement* with *low positive* and *high negative* play *consequences*. In this instance, we might be particularly concerned psychiatrically speaking with gamers who demonstrate deep online *involvement* combined with few positive rewards and many reported problems. By contrast, highly involved players who demonstrate more balance between almost equally high *positive and negative consequences*—with the former potentially even surpassing the latter—shouldn’t raise the same level of alarm from a health perspective.

Minimally, including positive online gaming experience items in surveys alongside the negative ones can signal to gamers that researchers understand the full scope of online gaming experiences. This is important given that only a small minority of gamers (estimated at ~5%) play problematically (Pontes et al., 2014). Signaling knowledge of positive online experiences might produce less resistance to surveys and thus elicit more honest and thus valid responses to both the survey as a whole and also to the negative items more particularly, as qualitative comments recorded on our survey suggest.

To conclude, our research suggests pathways toward reconciling anthropological and epidemiological approaches toward problem play and so-called “internet gaming disorder.” Given the issues discussed in our study limits subsection, we would not propose our scales as

alternatives to current gaming disorder scales. Indeed, many items commonly employed in other internet gaming disorder studies performed as well as some of our ethnographic ones, and we have successfully used similar scales in past research (XXX). Too, a minority of gamers find culturally acceptable *all* of our negative items, *including the classic ones*. Instead, we would point to the importance of a consensus approach such as ours—designed to determine if gamers have statistically similar understandings of intensively involved gameplay and the positive and negative consequences of such play—as a component of developing gaming experience proxies that are simultaneously culturally-sensitive and yet also attentive to other theory-driven concerns. Not yet final, we see our scale measures as potential complements or supplements to existing ones, with the exact contours of future scales still to be determined.

Table 1. Descriptive Statistics for Online Gaming Involvement Survey Items

Item	Descriptor	% Responding “Agree”	Answer Key	pCCU Errors
1	Time and energy (involvement)	97.3	Agree	151
2	Way of life (involvement)	69.2	Agree	247.7
3	Gaming like work (involvement)	77.7	Agree	219.6
4	Play when tired (engagement)	79.5	Agree	212.4
5	Preoccupation (engagement)	87.8	Agree	182.2
6	Prefer gaming (engagement)	89.6	Agree	178
7	In-game focus (immersion)	51.2	Agree	321.9
8	Lose track of time (immersion)	81.3	Agree	204.3
9	Escape (immersion)	85.6	Agree	185.1
10	Improvement (achievement)	93.3	Agree	163.9
11	Research (achievement)	95.2	Agree	156.4
12	Need to succeed (achievement)	63.2	Agree	265.4
13	Team/ community (social)	89.7	Agree	167.2
14	Help online friends (social)	88.5	Agree	174.7
15	Connection (social)	78	Agree	209.4
Average	Items 1-15	81.8	Agree	202.6

Table 2. Descriptive Statistics for Online Gaming Positive Consequences Survey Items

Item	Descriptor	% Responding “Agree”	Answer Key	ρccu Errors
16	Positive anticipation	93.3	Agree	159.3
17	Mood improvement	84.8	Agree	183.8
18	Life focus and purpose	66.5	Agree	247.3
19	Adrenaline and energy rushes	95.8	Agree	154.2
20	Positive testing of limits	34	Disagree	287.1
21	Calm and controlled	94.9	Agree	156.5
22	Positive routine	57.7	Agree	282.7
23	Testing limits	94.5	Agree	157.8
24	Enjoyable repetition	76.8	Agree	216.8
25	Preferred hobby	89.7	Agree	172.6
26	Positive distraction	82	Agree	192.8
27	Growth and evolution	96.6	Agree	151.7
28	Social connection	78	Agree	207.1
29	Expanded POV	82.1	Agree	192.6
30	Social belonging	86.8	Agree	176.9
31	Positive anonymity	49.4	Agree	336.3
32	Strengthened relationships	78	Agree	212.8
33	Positive social obligation	85.1	Agree	180
34	Satisfying labor	95.7	Agree	153
35	Increased confidence	66.8	Agree	246.8
36	Career and life advancement	73.7	Agree	223.7
Average	Items 16-36	79.2	Agree	204.4

Table 3. Descriptive Statistics for Online Gaming Negative Consequences Survey Items

Item	Descriptor	% Responding “Agree”	Answer Key	ρccu Errors
37*	Negative cognitive salience	47	Disagree	326.5
38	Mood deterioration	74.7	Agree	234.6
39*	Regret	43	Disagree	301.7
40	Draining	59.4	Agree	294.4
41	Push selves too far	46.9	Disagree	324.5
42*	Withdrawal	36.6	Disagree	287.3
43*	Bad habit/ play despite problems	36.6	Disagree	281.6
44*	Loss of control/ relapse	48.5	Disagree	329.8
45	Boring routine	55.1	Agree	318.3
46*	Loss of interest in other activities	33.6	Disagree	276.5
47*	Avoidance/ mood modification	48.9	Disagree	334.3
48*	Tolerance	24.1	Disagree	233.3
49	Social isolation	37.5	Disagree	286.4
50	Need for social approval	35.9	Disagree	285.2
51	Toxic community	59	Agree	296.1
52	Negative anonymity	65.3	Agree	267
53*	Conflict	31	Disagree	261.6
54	Negative social obligation	36.6	Disagree	288.8
55	Draining job	16.7	Disagree	204.2
56	Loss of confidence	63.4	Agree	273.7
57	Perceived failure	48.4	Disagree	321.6
Average	Items 37-57	45.2	Disagree	287.0

*Versions of commonly used internet gaming disorder items.

Table 4. Regression of Cultural Competence Scores (on the 57-Item Model) on Covariates.

	Cultural Competence
Age	-0.003 ^a (0.001)**
Female (=1)	0.006 (0.016)
Online Gaming Involvement	0.024 (0.006)**
MOBA ^b	-0.019 (0.020)
RTS	-0.078 (0.033)*
FPS	0.070 (0.055)
Sports	0.003 (0.100)
MMORPG + MOBA	0.028 (0.029)
MMORPG + MOBA + FPS	0.012 (0.027)
MOBA + FPS	0.045 (0.049)
Other games	-0.017 (0.022)
Agree Q55 (=1)	-0.055 (0.018)**
Constant	0.511 (0.046)**
R^2	0.07
N	669

* $p < 0.05$; ** $p < 0.01$

^a Cell entries are unstandardized slopes, with standard errors in parentheses

^b For main online game, the baseline category (=0) is MMORPG, or “massively multiplayer online role-playing games” such as *World of Warcraft*; MOBA refers to “multiplayer online battle arenas” like *League of Legends*; RTS is “real-time strategy games” such as *Starcraft 2*; FPS = “first-person shooters” including Team Fortress 2; a Sports games example is FIFA Soccer/Football; respondents could also list multiple main preferred games, such as both MMORPGs and MOBAs, etc..

References

- American Psychiatric Association. (2013). *DSM 5*. American Psychiatric Association.
- Bartle, R. (1996). Hearts, clubs, diamonds, spades: Players who suit MUDs. *Journal of MUD Research*, 1(1), 19.
- Bennardo, G., & De Munck, V. C. (2014). *Cultural Models: Genesis, Methods, and Experiences*. New York: Oxford University Press.
- Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., & Heeren, A. (2015). Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. *Journal of Behavioral Addictions*, 4(3), 119–123.
- Block, J. (2008). Issues for DSM-V: Internet addiction. *American Journal of Psychiatry*, 165(3), 306–307.
- Caplan, S., Williams, D., & Yee, N. (2009). Problematic Internet use and psychosocial well-being among MMO players. *Computers in Human Behavior*, 25(6), 1312–1319.
- Castronova, E. (2008). *Synthetic worlds: The business and culture of online games*. University of Chicago Press.
- Charlton, J. P., & Danforth, I. D. (2007). Distinguishing addiction and high engagement in the context of online game playing. *Computers in Human Behavior*, 23(3), 1531–1548.
- Chen, M. G. (2012). *Leet noobs: The life and death of an expert player group in World of Warcraft*. Peter Lang.
- D'Andrade, R. G. (1995). *The development of cognitive anthropology*. Cambridge University Press.
- D'Andrade, R. G., & Strauss, C. (1992). *Human motives and cultural models* (Vol. 1). Cambridge University Press.
- Dressler, W. W., & Bindon, J. R. (2000). The health consequences of cultural consonance: Cultural dimensions of lifestyle, social support, and arterial blood pressure in an African American community. *American Anthropologist*, 102(2), 244–260.

- Fielding-Miller, R., Dunkle, K. L., Cooper, H. L., Windle, M., & Hadley, C. (2016). Cultural consensus modeling to measure transactional sex in Swaziland: Scale building and validation. *Social Science & Medicine*, 148, 25–33.
- Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory. Strategies for Qualitative Research*. Aldine Publishing Company.
- Goodenough, W., Levinson, D., & Ember, M. (1996). Encyclopedia of Cultural Anthropology. *Henry Holt, New York*, 291–299.
- Gravlee, C. C., Dressler, W. W., & Bernard, H. R. (2005). Skin color, social classification, and blood pressure in southeastern Puerto Rico. *American Journal of Public Health*, 95(12), 2191–2197.
- Griffiths, M. (2005). A “components” model of addiction within a biopsychosocial framework. *Journal of Substance Use*, 10(4), 191–197.
- Griffiths, M. D., van Rooij, T., Kardefelt-Winther, D., Starcevic, V., Király, O., Pallesen, S. ale, ... others. (2015). Working towards an international consensus on criteria for assessing Internet Gaming Disorder: A critical commentary on Petry et al (2014). *Addiction*.
- Groleau, D., Young, A., & Kirmayer, L. J. (2006). The McGill Illness Narrative Interview (MINI): an interview schedule to elicit meanings and modes of reasoning related to illness experience. *Transcultural Psychiatry*, 43(4), 671–691.
- Handwerker, W. P. (2001). Quick ethnography: A guide to rapid multi-method research. Walnut Creek, CA: AltaMira.
- Holland, D., & Quinn, N. (Eds.). (1987). *Cultural Models in Language and Thought*. Cambridge: Cambridge University Press.
- Hruschka, D. J. (2009). Culture as an explanation in population health. *Annals of Human Biology*, 36(3), 235–247.
- Hussain, Z., Williams, G. A., & Griffiths, M. D. (2015). An exploratory study of the association between online gaming addiction and enjoyment motivations for playing massively multiplayer online role-playing games. *Computers in Human Behavior*, 50, 221–230.

- Jansz, J., & Van Rooij, A. (2012). The Perils and Pleasures of Playing Videogames (by Rutger Leukfeldt and Wouter Stol). In *Cyber safety: An introduction* (pp. 227–235). Eleven International Publishing.
- Johnson, J. C., Weller, S. C., & Brewer, D. D. (2002). Systematic Data Collection and Analysis. *Field Methods*, 14(1), 3–5.
- Kaiser, B. N., Kohrt, B. A., Keys, H. M., Khoury, N. M., & Brewster, A.-R. T. (2013). Strategies for assessing mental health in Haiti: Local instrument development and transcultural translation. *Transcultural Psychiatry*, 50(4), 532–558.
- Kardefelt-Winther, D. (2014a). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior*, 31, 351–354.
- Kardefelt-Winther, D. (2014b). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior*, 38, 68–74.
- Kardefelt-Winther, D. (2015a). A critical account of DSM-5 criteria for internet gaming disorder. *Addiction Research & Theory*, 23(2), 93–98.
- Kardefelt-Winther, D. (2015b). Making the case for hypothesis-driven theory testing in the study of Internet Gaming Disorder. *Addictive Behaviors*.
- Kardefelt-Winther, D. (2015c). Problems with atheoretical and confirmatory research approaches in the study of behavioral addictions. *J Behav Addict*, 4(3), 126–129.
- Király, O., Griffiths, M. D., & Demetrovics, Z. (2015). Internet Gaming Disorder and the DSM-5: Conceptualization, Debates, and Controversies. *Current Addiction Reports*, 1–9.
<http://doi.org/10.1007/s40429-015-0066-7>
- Kirmayer, L. J., & Sartorius, N. (2007). Cultural models and somatic syndromes. *Psychosomatic Medicine*, 69(9), 832–840.
- Kleinman, A. (1988). *Rethinking psychiatry: from cultural category to personal experience*. New York, NY, USA: Free Press.

- Kohrt, B. A., & Hruschka, D. J. (2010). Nepali concepts of psychological trauma: the role of idioms of distress, ethnopsychology and ethnophysiology in alleviating suffering and preventing stigma. *Culture, Medicine, and Psychiatry*, 34(2), 322–352.
- Kohrt, B. A., Hruschka, D. J., Kohrt, H. E., Panebianco, N. L., & Tsagaankhuu, G. (2004). Distribution of distress in post-socialist Mongolia: a cultural epidemiology of yadargaa. *Social Science & Medicine*, 58(3), 471–485.
- Koster, R. (2013). *Theory of fun for game design*. O'Reilly Media, Inc.
- Kuckartz, U. (2007). MAXQDA: Qualitative data analysis. Berlin: VERBI Software.
- XXX. Analyzing Cultural Consensus with Proportional Reduction in Error (PRE) Beyond the Eigenvalue Ratio. *Field Methods*, 28(2), 153–169.
- Lafreniere, M.-A. K., Vallerand, R. J., Donahue, E. G., & Lavigne, G. L. (2009). On the costs and benefits of gaming: The role of passion. *CyberPsychology & Behavior*, 12(3), 285–290.
- Lende, D. H. (2005). Wanting and drug use: A biocultural approach to the analysis of addiction. *Ethos*, 33(1), 100–124.
- Longman, H., O'Connor, E., & Obst, P. (2009). The effect of social support derived from World of Warcraft on negative psychological symptoms. *CyberPsychology & Behavior*, 12(5), 563–566.
- McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. Penguin.
- Nardi, B. (2010). *My life as a night elf priest: An anthropological account of World of Warcraft*. Ann Arbor: University of Michigan Press.
- Nichter, M. (1981). Idioms of distress: Alternatives in the expression of psychosocial distress: A case study from South India. *Culture, Medicine and Psychiatry*, 5(4), 379–408.
- Panter-Brick, C., Eggerman, M., Mojadidi, A., & McDade, T. W. (2008). Social stressors, mental health, and physiological stress in an urban elite of young Afghans in Kabul. *American Journal of Human Biology*, 20(6), 627–641.

- Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H.-J., Mößle, T., ... others. (2014). An international consensus for assessing internet gaming disorder using the new DSM-5 approach. *Addiction*, 109(9), 1399–1406.
- Pontes, H. M., & Griffiths, M. D. (2014). Assessment of internet gaming disorder in clinical research: Past and present perspectives. *Clinical Research and Regulatory Affairs*, 31(2-4), 35–48.
- Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*, 45, 137–143.
- Pontes, H. M., Kiraly, O., Demetrovics, Z., & Griffiths, M. D. (2014). The conceptualisation and measurement of DSM-5 Internet Gaming Disorder: The development of the IGD-20 Test. *PloS One*.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. Simon and Schuster.
- Raikhel, E., & Garriott, W. (2013). *Addiction Trajectories*. Duke University Press.
- Rehbein, F., Psych, G., Kleimann, M., Mediasci, G., & Moble, T. (2010). Prevalence and risk factors of video game dependency in adolescence: results of a German nationwide survey. *Cyberpsychology, Behavior, and Social Networking*, 13(3), 269–277.
- Romney, A. K., & Weller, S. C. (1988). *Systematic data collection* (Vol. 10). Sage Publications, Incorporated.
- Romney, A. K., Weller, S. C., & Batchelder, W. H. (1986). Culture as consensus: A theory of culture and informant accuracy. *American Anthropologist*, 88(2), 313–338.
- Room, R. (2003). The Cultural Framing of Addiction. *Janus Head*, 6(2), 221–234.
- Ross, N. (2004). *Culture and cognition: Implications for theory and method*. Sage.
- Schüll, N. D. (2006). Machines, medication, modulation: Circuits of dependency and self-care in Las Vegas. *Culture, Medicine and Psychiatry*, 30(2), 223–247.
- Seay, A. F., & Kraut, R. E. (2007). Project massive: self-regulation and problematic use of online gaming. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 829–838).

- Singer, M. (2012). Anthropology and addiction: an historical review. *Addiction*, 107(10), 1747–1755.
- Snodgrass, J. G., Batchelder, G., Eisenhauer, S., Howard, L., Dengah, H. J. F. I., Thompson, R., ... Powell, Colton. (2016). A Guild Culture of “Casual Raiding” Enhances Online Gaming Experience: A Cognitive Anthropological and Ethnographic Approach to World of Warcraft. *New Media and Society*, 1–18. <http://doi.org/10.1177/1461444816644804>
- Snodgrass, J. G., Dengah, H. F., Lacy, M. G., & Fagan, J. (2013). A formal anthropological view of motivation models of problematic MMO play: Achievement, social, and immersion factors in the context of culture. *Transcultural Psychiatry*, 50(2), 235–262.
- Snodgrass, J. G., Dengah, H. F., Lacy, M. G., Fagan, J., Most, D., Blank, M., ... Leavitt-Reynolds, A. (2012). Restorative magical adventure or warcrack? Motivated MMO play and the pleasures and perils of online experience. *Games and Culture*, 7(1), 3–28.
- Snodgrass, J. G., Dengah, H. J. F. I., Lacy, M. G., & Fagan, J. (2011). Cultural consonance and mental wellness in the World of Warcraft: Online games as cognitive technologies of “absorption-immersion.” *Cognitive Technology*, 16(1), 11–23.
- Snodgrass, J. G., Dengah, H. J. F., & Lacy, M. G. (2014). “I Swear to God, I Only Want People Here Who Are Losers!” Cultural Dissonance and the (Problematic) Allure of Azeroth. *Medical Anthropology Quarterly*, 28(4), 480–501. <http://doi.org/10.1111/maq.12116>
- Snodgrass, J. G., & Dengah II, H. F. (2016). NSF Award Search: Award#1600448 - EAGER: A Biocultural Study of the Functional Genomics of Intensive Internet Use. Retrieved May 7, 2016, from http://www.nsf.gov/awardsearch/showAward?AWD_ID=1600448&HistoricalAwards=false
- Snodgrass, J. G., Lacy, M. G., Dengah II, H. F., Fagan, J., & Most, D. E. (2011). Magical flight and monstrous stress: Technologies of absorption and mental wellness in Azeroth. *Culture, Medicine, and Psychiatry*, 35(1), 26–62.
- Snodgrass, J. G., Lacy, M. G., Dengah II, H. J., Batchelder, G., Eisenhauer, S., & Thompson, R. (2016). Culture and the Jitters: Guild Affiliation and Online Gaming Eustress/ Distress. *Ethos*, 44(1), 50–78.

- Snodgrass, J. G., Lacy, M. G., Dengah II, H. J., Eisenhauer, S., Batchelder, G., & Cookson, R. J. (2014). A vacation from your mind: Problematic online gaming is a stress response. *Computers in Human Behavior*, 38, 248–260.
- Snodgrass, J. G., Lacy, M. G., Francois Dengah, H. J., & Fagan, J. (2011). Enhancing one life rather than living two: Playing MMOs with offline friends. *Computers in Human Behavior*, 27(3), 1211–1222.
- Spiro, M. E. (1987). Collective representations and mental representations in religious symbol systems. *Culture and Human Nature: Theoretical Papers of Melford E. Spiro*, 161–184.
- Spradley, J. P. (1999). *You owe yourself a drunk: An ethnography of urban nomads*. Waveland Press.
- Steinkuehler, C. A., & Williams, D. (2006). Where everybody knows your (screen) name: Online games as “third places.” *Journal of Computer-Mediated Communication*, 11(4), 885–909.
- Strauss, C., & Quinn, N. (1997). *A cognitive theory of cultural meaning* (Vol. 9). Cambridge University Press.
- Stromberg, P. (2009). *Caught in play: How entertainment works on you*. Stanford University Press.
- Turner, N. E., Paglia-Boak, A., Ballon, B., Cheung, J. T., Adlaf, E. M., Henderson, J., ... Mann, R. E. (2012). Prevalence of problematic video gaming among Ontario adolescents. *International Journal of Mental Health and Addiction*, 10(6), 877–889.
- Van Rooij, A., & Prause, N. (2014). A critical review of “Internet addiction” criteria with suggestions for the future. *Journal of Behavioral Addictions*, 3(4), 203–213.
- Weller, S. C. (2007). Cultural consensus theory: Applications and frequently asked questions. *Field Methods*, 19(4), 339–368.
- Yee, N. (2006a). Motivations for play in online games. *CyberPsychology & Behavior*, 9(6), 772–775.
- Yee, N. (2006b). The demographics, motivations, and derived experiences of users of massively multi-user online graphical environments. *Presence: Teleoperators and Virtual Environments*, 15(3), 309–329.

- Yee, N. (2006c). The psychology of massively multi-user online role-playing games: Motivations, emotional investment, relationships and problematic usage. In *Avatars at work and play* (pp. 187–207). Springer.
- Young, K. S. (1999). Internet addiction: symptoms, evaluation and treatment. *Innovations in Clinical Practice: A Source Book*, 17, 19–31.

Appendix A: Modified MINI Protocol, “Positive and Negative MMO Play Experience”

We’re interviewing individuals who play online videogames intensively. We’re trying to get a sense of whether you experience this intense play as a positive or negative thing. All responses are confidential. See cover letter.

Section 1. INITIAL NARRATIVE

1. When did you experience a period of particularly intensive/frequent online videogaming for the first time?

[Substitute respondent’s terms for ‘intensive/frequent play’ in this and subsequent questions.]

[Let the narrative go on as long as possible, with only simple prompting by asking, ‘What happened then? And then?’]

2. We would like to know more about your experience. Could you tell us approximately when and how you realized you were playing online videogames in a particularly intense manner?

3. Can you tell us what else was going on in your life when you started to play in this way?

4. Did something else happen in your life? *[Repeat as needed to draw out contiguous experiences and events.]*

5. Did this intensive play feel like a positive experience or a problem or both?

5.1. If it was a good thing, please explain why, that is, how it impacted your life positively. Please be specific as you can in explaining the positive dimensions of this experience.

5.2. If it was a problem, tell us about that. Again, please be specific in your description of any negative aspects of your intensive play.

5.2.a. If it was a problem, how did you deal with it? For example, did you seek help for this problem?

5.2.b. If you experienced problem play, why did you keep playing in that way?

5.3. If intensive online gaming was both positive and negative, please explain that.

6. Weighing the good and bad in this activity, did you see it more as a good thing or a problem?

Section 2. PROTOTYPE NARRATIVE

7. In the past, have you ever experienced anything that you consider similar to this intensive videogaming? [If answer to #7 is Yes, then ask Q.8]

8. In what way is that past experience similar to or different from your current experiences?

9. Did a person in your family ever experience a situation similar to yours? [If answer to #9 is Yes, then ask Q.10]

10. In what ways do you consider your experiences to be similar to or different from this other person’s?

11. Did a person in your social environment (friends or work) experience a desire to play videogames in this manner similar to yours? [If answer to #11 is Yes, then ask Q.12]

12. In what ways do you consider your experiences to be similar to or different from this other person’s situation?

13. Have you ever seen, read or heard on television, radio, in a magazine, a book or on the Internet of a person who had these same experiences as you? [If answer to #13 is Yes, then ask Q.14]

14. In what ways is that person’s situation similar to or different from yours?

Section 3. EXPLANATORY MODEL NARRATIVE

- 15. Do you have another term or expression that describes your intensive playing of videogames?
- 16. According to you, what caused you to play videogames in this way? [List primary cause(s).]
 - 16.1 Are there any other causes that you think played a role? [List secondary causes.]
- 17. Why did this form of play start when it did?
- 18. What happened inside your body that could explain you playing in this way?
- 19. Is there something happening in your family, at work or in your social life that could explain your intensive videogaming? [If answer to #19 is Yes, then ask Q.20]
- 20. Can you tell me how that explains your play patterns?

Section 4. IMPACT ON LIFE

- 21. How has your intensive gaming changed the way you live?
- 22. How has your online play changed the way you feel or think about yourself?
- 23. How has your gaming changed the way you look at life in general?
- 24. How has your gaming changed the way that others look at you?
- 25. Have periods of particularly intensive play been during a positive or a difficult period of your life?
 - 25.1. If positive, explain that.
 - 25.2. If difficult, what has helped you through this period in your life?
 - 25.2.a. Have your family or friends been helpful?
- 26. Is there anything else you would like to add?

Section 5. HELP SEEKING

- 27. Have you ever tried to do anything to change these patterns of intensive online gaming? Can you tell us about that? Please be as specific as possible.
- 28. How is that going?
- 29. What has allowed you to make these changes or not?
- 30. Was there something that made this difficult to change?
- 31. What other changes have you sought out?

Section 3. EXPLANATORY MODEL NARRATIVE (cont.)

- 32. Do you think of this videogame play like other hobbies or pastimes, with which one becomes particularly engaged or interested?
[INTRODUCE POPULAR LABEL]
- 33. Can you give me some examples?
- 34. What does it mean to be engaged with a hobby?
- 35. What are some of the benefits of having such a hobby?
- 36. What happens to people who get engaged in that way?
- 37. How do others react to them?
- 38. Do you know people like that?
- 39. In what way are you with your videogaming similar or different to them?
- 40. Is taking on a hobby like that typically linked to something happened in that person's life?
- 41. Can you tell me more about those events and how they are linked to your particularly intensive online videogaming?

42. By contrast, some people have spoken of some forms of online play as like an addiction. Have you considered that you might be “addicted” to videogames? *[INTRODUCE POPULAR SYMPTOM OR ILLNESS LABEL]*

43. What does *addiction* mean to you?

44. What usually happens to people who have addiction? *What symptoms do they display?*

45. What is the best response or even treatment for people who have addiction?

46. How do other people react to someone who has addiction?

47. Who do you know who has had addiction?

48. In what ways is your online play similar to or different from that person’s problem?

49. Overall, is your online play somehow linked or related to specific events that occurred in your life?

50. Can you tell me more about those events and how they are linked to your online gaming?

51. Anything else you’d like to add to the positive and/or negative dimensions of your online play?

Appendix B: Interview Analysis

Our interview coding scheme emerged from previous ethnographic analysis of ours, which had confirmed in particular the importance of Yee's tripartite motivational scheme, as related to on/offline game-worlds (XXX). Preliminary read-throughs of interview transcripts led us to develop a codebook that stayed true to Yee's original motivational scheme, while also informed by emergent ethnographic insights from our own study. Our codebook included four primary overarching codes, each accompanied by sub-codes: *online involvement* (sub-codes: *immersion*, *online social circle*, *achievement*, and *preference for life online*); *offline involvement* (sub-codes: *gamer identity*, *offline social circle*, *offline achievement*, and *integrated on/offline life*); *positive gaming benefits* (*psychological*, *physical*, *behavioral*, *interpersonal*, and *achievement*); *negative gaming consequences* (*psychological*, *physical*, *behavioral*, *interpersonal*, and *achievement*). Finally, a fifth overarching *involvement* code led us to focus on key insider metaphors and speech gamers used to frame their experiences, with this code capturing speech where gamers compared their play to, for example, work, sports, and poison (toxicity).

Generally, we aimed to link code themes to discernable *chunks* of related discourse, where "chunk" refers to a discussion thread in which a topic was introduced, pursued, and eventually either dropped or concluded. Practically, such discursive chunks ranged from a single sentence to a passage typically no longer than a few sentences or a short paragraph. Coders were trained to maintain consistency across respondents, ensuring that chunks of text were consistently recognized and coded. We did periodically check such consistency, adapting where necessary, though not in a formal, quantitative manner. Typically, we coded as either positive or negative, rather than both positive and negative, passages which in our estimation seemed dominated *overall* by one of the two valences, even when the other valence might be implicated in some sense. Thus,

a passage emphasizing the thrill of a boss kill would receive a positive code, while one dwelling on months of frustration leading up to such a kill a negative valence. The parenthetical numerals presented below in relation to each code theme refers to the total number of times that theme appeared across all twenty informants.

As seen in Supplementary Table 1, for *online involvement*, the most prominent theme was *achievement* (appearing 272 times in our 20 interviews), where gamers spoke about their commitment and dedication to improving their play skill and knowledge, progressing through their games' various content, and even winning against the game itself or other players. *Online social circle* was almost equally prominent (248 times), with gamers speaking largely about solving problems collaboratively with online play groups such as in-game associations of players termed *guilds*. In *immersion* passages (194), players described getting so absorbed in their play as to lose touch with time, the offline world, and even their own physical bodies, in the process developing vivid and emotionally powerful gaming memories. We also learned that many players had a *preference for life online* (115), often finding virtual worlds fairer, freer, more fun, and also more beautiful than offline life, which meant they often thought about them even while engaged in so-called “real-world” activities.

For offline involvement, the *integrated on/offline* theme was most prominent (276), showing how our interviewees' offline and online lives had become complicatedly intermingled, even becoming, as many gamer respondents told us, the center of their lives as a whole. In fact, their *offline social circle* (207) was composed of largely gamer friends, with whom they shared much in common. This in turn led them to speak of their *gamer identity* (149)—which our interviews led us to conceptualize as an offline form of imaginative *immersion* in gaming realities—as core to their broader self-conceptions. Finally, respondents compared online to

offline achievement (83), noting that they often found themselves able to achieve even greater things as a quicker pace in online gaming realities.

As Supplementary Table 2 shows, positive and negative gaming experiences are relatively balanced (890 total positive versus 930 total negative codes), with *psychological* being the most common positive experience (423 coded passages), *social* the most frequent negative consequence (319). In regards to *positive psychological benefits*, many players spoke about how games relaxed them and relieved stress and frustration, allowing them to escape if only temporarily their offline problems. They also told us gaming led to positive anticipation, increased their confidence, and even lent their lives greater focus and meaning. But players also noted *negative psychological consequences* (234), such as how being preoccupied with gaming made it difficult to remain present in their offline lives, leading to feelings of guilt and regret like they should have used their time otherwise. Others told us how frustrating play and also the play “community” could be, which often put them in a bad mood, even leading them to lose confidence in themselves. It should be noted that negative experiences such as frustration are not in themselves bad, as we were told, given that they can reflect in-game challenge that leads ultimately to satisfying play. For *positive social benefits* (209), interviewees described how online play-groups such as guilds could provide rewarding collaborative experiences and also companionship, satisfying dedication, potentially lasting friendships, community, and even romantic possibilities. Many spoke of collaborative gaming as rewarding in the same way as being a member of a sports team—they enjoyed working with others to defeat tough in-game challenges and opponents, even learning important leadership skills in the process. Others told us that they often felt a seemingly “instant” connection with other gamers, also finding that gaming with offline friends and family enhanced those relationships. But play groups also required large

amounts of time and deep feelings of responsibility, with gamers describing sometimes getting pulled into collaborative endeavors that required more time than they had to give, crowding out and thus coming into conflict with other valued activities and relationships, which they no longer found time to enjoy, producing diverse *negative social consequences* (319). Too, online communities could turn extremely competitive and even “toxic”—a prominent phrase in our interviews, especially among MOBA players—with oftentimes anonymous players “trolling” rather than supporting each other. Or, MMORPG “guild drama” disrupted even longstanding online communities and relationships, which many gamers found sometimes humorous but also frustrating and distressful.

For *achievement*, respondents—and especially *hardcore gamer* ones—compared their play to work, drawing attention to the time and energy commitment needed in order to succeed in gaming at a high level. Such work could provide satisfying feelings of accomplishment and also enhance one’s social status in the process—“like a job you love,” according to one respondent—pointing to the *positive achievement* dimensions (135 mentions) of online gaming. Or, achievement-oriented play could feel like repetitive drudgery, taken much too seriously and producing way too much stress and pressure to perform, even draining time and energy away from more meaningful life and work pursuits (to paraphrase others’ descriptions), illuminating the *negatives* of playing to win and advance (118). Players also spoke of how games gave their lives meaningful structure and regularity as would any good hobby, and thus a better alternative compared to other harmful activities such as using and even abusing alcohol or other substances, prominent *positive behavioral benefits* (87 coded passages). But they could also compulsively over-play online games, even feeling like the games were bad habits that were taking over their lives, more obligation and routine than actual fun. Here, interviewees spoke of being “addicted”

in a bad way to their play, unable to minimize or stop gaming even when they wanted, playing more to avoid other responsibilities than out of enjoyment, and playing at inappropriate times when they had other important things to do, prominent *negative behavioral* themes (199). To a lesser extent, players spoke of *physical benefits* (36) like satisfying adrenaline-fueled arousal alternating with periods of relaxed calm, with such benefits seeming as much psychosomatic as purely physical. Others spoke of how games provided convenient, accessible, and comfortable way to enjoy themselves, other physical pleasures of a sort. Still, gamers also spoke of how long play sessions in particular could feel not just mentally but physically draining, pushing their bodies beyond their physical limits, not eating or sleeping right and generally neglecting to take care of themselves, or how they'd get fidgety when unable to game, *prominent negative physical consequences* (60).

Finally, our overarching *involvement* code (377) led us to focus on key insider metaphors and speech gamers used to frame their experiences, with this code capturing speech where gamers compared their play to, for example, work, sports, and poison (toxicity). Of note, the *hardcore* (95) and *casual* (45) *gaming* emerged as a key pole that our respondents used to speak of the complicated nexus of emotions, motivation, and community that drove gamers to push their play to even extreme limits.

Supplementary Table 1. Online Gaming Involvement (via MINI N=20)

Online Involvement	Code Frequency	Offline Involvement	Code Frequency
Immersion	194 (23.4%)	Gamer Identity	149 (20.8%)
Online Social Circle	248 (29.9%)	Offline Social Circle	207 (29%)
Online Achievement	272 (32.8%)	Offline Achievement	83 (11.6%)
Prefer Life Online	115 (13.9%)	Integrated On/Offline	276 (38.6%)
	829 (100%)		715 (100%)

Supplementary Table 2. +/- Online Gaming Consequences (via MINI N=20).

Positive Consequences	Code Frequency	Negative Consequences	Code Frequency
Psychological	423 (47.5%)	Psychological	234 (25.2%)
Physical	36 (4%)	Physical	60 (6.5%)
Behavioral	87 (9.8%)	Behavioral	199 (21.4%)
Social	209 (23.5%)	Social	319 (34.3%)
Achievement	135 (15.2%)	Achievement	118 (12.7%)
	890 (100%)		930 (100%)

Appendix C: Survey Items.

Rate each of the following questions below in terms of how much you agree the item applies to "intensively involved" online videogamers.

1. Spend a great deal of time and energy playing and thinking about online games.
2. Feel that gaming is a way of life and not just recreation.
3. Game in ways that can feel like work.
4. Regularly continue playing even when tired.
5. Think about online gaming even when involved in offline activities.
6. Like online gaming as much as they do offline activities.
7. Get so immersed in the game that they don't notice things happening around them in the offline world.
8. Get so involved in their play that they lose track of time.
9. Find that gaming can help them to forget about offline concerns.
10. Feel committed to improving their play, striving to be the best player they can be.
11. Seek to improve their game even when not actually playing, for instance, by visiting online forums and learning from other players.
12. Care as much about success in online gaming as they do about succeeding in other areas of their life.
13. Feel like a member of a team or community through their online play.
14. Feel committed to helping online gaming friends have fun and meet their goals.
15. Find it easier to connect with gamers compared to non-gamers.

Rate each of the following questions below in terms of how much you agree the item points to an important potential benefit of playing online games in an intensive manner.

16. Look forward to when they'll next play with anticipation and enthusiasm.
17. Find that online gaming helps them relieve frustrations and improve their mood.
18. Feel that gaming can give them focus and even purpose in life.
19. Experience positive rushes of adrenaline and energy when they play, especially when defeating tough enemies and opponents.
20. Find it satisfying and even exhilarating to push their bodies by gaming long hours.
21. Feel calm, relaxed, and in control at certain points in the game.
22. Find that online games provide their lives with important regularity and structure.
23. Enjoy having their skills pushed to the limits.
24. Find it satisfying to repeat challenging gaming actions over and over again until they are nearly perfect and automatic.
25. Enjoy gaming for fun over other hobbies and habits.
26. Find that gaming takes their mind off of problems they're facing in their life.
27. Put effort into improving their game in order to grow and evolve as a player.
28. Experience an easy and sometimes instant connection with other gamers.
29. Find that connecting to diverse people via the Internet expands their social circle and perspective on life.
30. Enjoy the sense of belonging that comes with being a part of a community of gamers.
31. Worry less about how their actions and words might be perceived by others because online gaming and the Internet provide greater opportunities for anonymity.
32. Find that playing online games with offline friends and family strengthens those relationships.
33. Form strong bonds with other online gamers, feeling that they can rely on them and are willing to offer them help.
34. Feel satisfaction in sticking with a gaming goal until it is completed, even though this might entail a lot of hard work.

- 35. Find that overcoming difficult gaming challenges helps build their confidence to deal with life's problems.
- 36. Develop important skills through gaming that helps them advance in both careers and life.

Rate each of the following questions below in terms of how much you agree the item points to an important potential problem of playing online games in an intensive manner.

- 37. Find it difficult to concentrate on other activities because they are thinking about gaming.
- 38. Feel frustrated and disappointed and get in a bad mood when they don't play well.
- 39. Feel that gaming isn't the best use of their time and wish that they could have done something more productive or useful.
- 40. Feel mentally and even physically drained after long and intense gaming sessions.
- 41. Push their bodies too far, not eating or sleeping right, when they are gaming.
- 42. Get fidgety and irritable when they can't get online to play.
- 43. Get obsessed in a bad way about a game, even feeling like the game is taking over their life.
- 44. Find it difficult to control or limit their online play, gaming too much and at inappropriate times.
- 45. Reach a point where gaming can be more of a boring routine than actual fun.
- 46. Find that gaming a lot makes it more difficult to enjoy other activities in their lives.
- 47. Use gaming to avoid challenges in their lives rather than deal with them directly.
- 48. Have to play more and more to get similar feelings of enjoyment and satisfaction.
- 49. Game so much that they find themselves isolated and lonely.
- 50. Get too caught up in other gamers' opinions, perspectives, and demands.
- 51. Keep gaming even if they think other gamers are producing a "toxic" rather than supportive community.
- 52. Get annoyed and angry when anonymous players don't take responsibility for their words and actions.
- 53. Find that playing online games leads to conflicts with friends and family.
- 54. Feel that they have to play for their online friends even when they don't want to.
- 55. Experience online gaming more like a draining job than something one loves.
- 56. Get upset and even feel bad about themselves and their abilities when they lose or don't play well.
- 57. Think they could be more successful in life if they didn't spend so much time and energy gaming.

¹ Importantly, these questions aimed to elicit whether informants thought each item represented an experience typical of the positive and negative experiences reported by players, but *not* whether each experience was itself common. This is important, as we wanted to understand whether, for example, each negative item corresponded with problems reported by players suffering from problematic patterns of play. But we understood well that so-called "online gaming disorder" was only experienced by a small minority of players and thus was not at all common. Though we were explicit in our survey's language on this point, it is not clear that all respondents understood this distinction.

² To expand on these technical matters, the CCA analyst, first, factors an informant-by-informant correlation matrix, which demonstrates associations of each respondent with every other respondent on the survey items in question. This factoring yields eigenvalues, where the first eigenvalue is the sum of the squared loadings on the first factor for all informants. The relative size of this value abstractly summarizes the extent to which the first factor mathematically captures the patterns in the agreement matrix. The larger the ratio of the first eigenvalue is to that associated with the second factor, the more clearly a single underlying dimension of cultural competence shapes informants' agreement. By convention, if the eigenvalue ratio of the 1st to the 2nd factor of the factored matrix is greater than 3:1, then there is evidence of high consensus and thus of a single posited cultural frame of understanding. Where the eigenvalue ratio is less than 3, again by convention, researchers see evidence of a lack of consensus and thus no single cultural understanding.

Second, each respondent also receives an individual "competence score," identifying their relative agreement with the culturally agreed upon correct responses or answer key. Under the popular factoring approach, the loadings on the first factor analysis yield the individual competence scores, which, as probabilities, fall between 0 and 1. Thus, for example, an informant with a cultural competence score of 0.86 is presumed to know the correct or consensual response to 86% of all possible questions within a cultural domain.

Third, a CCA statistical procedure uses these competence scores and informants' observed responses to derive an "answer key," given in Romney et al. (1986) as a probability distribution for each question's correct answer. This answer key or sheet serves as the culturally agreed upon best model for the tested domain. For most CCA data, the "correct" response will clearly stand out, with a probability of essentially 1.0.

Finally, in this paper, we extend CCA in a number of important ways. First, we employ an alternate method to assess the goodness of fit of our CCA analysis. This alternative approach derives from the “Proportional Reduction of Error” or “PRE” family of statistical procedures, which we describe in detail elsewhere (XXX). Among other things, this approach allows us to assess the relative goodness of individual consensus items, which is not possible within traditional CCA. Second, to search for potential subcultural variation, we employ additional techniques on our survey data, including linear regression and statistical testing to identify potential sub-group answer keys.

³ See our interview analysis in Appendix B for more detail on such experiences.