Chapter 16

VIDEO GAME PLAY: WAKING AND DREAMING CONSCIOUSNESS

Jayne Gackenbach, Ian Matty, Beena Kuruvilla, Ashley Nicole Samaha, Alexis Zederayko, Jordan Olischefski and Heather Von Stackelberg

ABSTRACT

Hard-core video game players have developed a culture of their own, which has become large and potentially influential in today's society. While much of the research and media attention into the effects of gaming have focused on the negative consequences, there are also numerous positive effects, including those on various aspects of consciousness. The focus of this chapter is an exploration of various states of consciousness, including dreams, through interviews of 27 hard-core college student gamers. Video game play is found indeed to affect dreams, though there are still more similarities to than differences from the dream norms. The differences may be significant in their implications for the relationship between waking conscious experience of video game play and dreams.

INTRODUCTION

Despite the familiarity with gaming by early childhood for most in the industrialized West, the average age of serious gamers is now mid-20s to mid-30s. With the explosion of gaming into the wider population, we also see video game playing among middle-aged women immersed in "casual" games such as Tetris as well as among elderly adults playing other games such as Wii. Although gaming is moving out of its core market, the focus of this chapter, and indeed most research into gamers, is the hard-core gamers – that is, men or women for whom playing video games constitutes a large part of their lived world.

The effects of video game play on these hard-core gamers are frequently discussed in the literature, including examinations of aggression (Andersen et al., 2003), various cognitive

skills (Greenfield & Cocking, 1996; Huh, Rosen, Sherry, & Bowman, 2006), socialization (Lim & Lee, 2007), and addiction (Griffiths & Davies, 2005). Also widely discussed are the various attributes of games that make them attractive to players (Wood, Griffiths, Chappell, & Davies, 2004). Less often analyzed is the effect of game play on states of consciousness.

The concept of waking consciousness has been reduced in the past to the simple idea of paying attention, but, more recently, researchers have come to appreciate that there is much more to it. Not only do current consciousness researchers talk about different states of consciousness (i.e., waking, sleep, arousal), but they also increasingly consider the study of consciousness from a variety of perspectives (i.e., perception, emotion, philosophy, biology) (Blackmore, 2004).

Game play has been found previously to be associated with changes in consciousness. Waking consciousness and gaming may be thought of in a variety of ways. Frequently examined are attentional demands (Green & Baveller, 2003) and degree of presence or immersion in the virtual reality of gaming (Calleja, 2007). Related to these two are absorption and flow. Attention might be thought of as a focus on what is immediately on our minds; however, the capacity of attention can be altered through gaming (Green & Baveller, 2003).

Video games can capture the players' attention if they have features that increase the sense of presence in the game. When presence is accomplished, which, of course, is the goal of video game designers, players not only talk about being absorbed in the game but also about being in the flow of the experience.

Altered states of consciousness (ASCs) also have been examined previously as associated with video game play. Glicksohn and Avnon (1997-1998) found that some of their participants reported experiences during video game play indicative of ASCs (e.g., drifting, flying, or changes in visual or auditory perception). This is not very surprising, as virtual reality (VR) has been used to bring about ASC experiences (Preston, 1998, 2007). In this inquiry, informants were asked whether they experienced an array of ASCs based upon Glicksohn and Avnon's, and Gackenbach's (2008) previous work. Research had found that there were some, but not many, self-reports of ASCs such as precognitive, mystical, and out-of-body experiences, so in this instance direct questions were expected to result in only a few positive responses.

Dreams could be thought of as another altered state of consciousness, even though recent research has shown that most dreams are a reflection of waking experience. In this instance, video gamers' dreams are considered in the wider context of game play and the experiences of consciousness associated with it.

There are a number of theories about the psychological function of dreams in humans (discussed in Barrett & McNamara, 2007). These include adaptation to stressful events (Wright & Koulack, 1987) or a result of a lack of adaptation, as in the case of post-traumatic stress nightmares (Barrett, 2001). Other theories include emotional regulation (Kramer, 2007), memory consolidation (Nielsen, Kuiken, Alain, Stenstrom, & Powell, 2004), and the evolutionary theory that dreams center around ancient and current survival threats (Revonsuo, 2006). Dreams may also involve play or practice for later events (Bulkeley, 2004), or they may perform more than one of these functions simultaneously or sequentially. In fact, it has been suggested that dreams offer a better model of the nature of consciousness itself than the currently favored visual attention model (Revonsuo, 2006).

The function of dreams as play or practice is especially relevant to this chapter, as dreams and virtual reality simulations such as games are both experiences of an artificially generated

world (biologically generated in dreams, technologically generated in VR). These models of the self in the world (dreams, VR, waking reality) impact each other, sometimes in profound ways, such as the nightmares of trauma victims that arouse them from sleep and make it difficult for them to cope with the trauma, not to mention getting back to sleep. Sometimes the impact is less profound, such as in playing a video game for so long that, when you stand up from the sofa, you are a bit dizzy, as you acclimate to the new "world" of waking reality from that of the virtual game reality.

Some previous research on video gaming and dreams has found this type of a relationship between the two. Specifically, Van den Bulck (2004) found that computer games were less likely to show up in nightmares than television, but that computer games were also present in children's pleasant dreams. Players of the puzzle-type game called Tetris reported intrusive, stereotypical, visual images of the game at sleep onset (Stickgold, Malia, Maguire, Roddenberry, & O'Connor, 2000). Bertolini and Nissim (2002) recognized fragments or characters from the video games in the material of children's dreams. Finally, Nielsen, Saucier, Stenstrom, Lara-Carrasco, and Solomonova (2007) found that a VR maze task showed increased incorporation into dreams when someone was actively engaged and used a computer mouse, as compared to passively watching it on TV.

These studies suggest that video game content appears in dreams, but it is important to consider the implications. So, for instance, Schredl, Anders, Hellriegel, and Rehm (2008) reported that "interindividual differences in nightmare frequency were not explained by interindividual differences in TV viewing or computer game playing habits" (p. 69) of children. In other words, contrary to popular lore associated with watching movies, playing computer games does not automatically cause nightmares in children.

The present inquiry, a different approach to the game play experience and its impact, follows from a series of studies conceptualized by Gackenbach and Karpen (2007) and summarized by Gackenbach (2008) that examine the effects of gaming on consciousness and especially on dreams. They found that a dream change that seems to be occurring as a function of video game play is the emergence of lucidity in gamers' dreams (Gackenbach, 2006, 2008; Gackenbach & Reiter, 2007). That is, gaming as well as high use of interactive media is associated with knowing you are dreaming during the dream. The Gackenbach group has also found that gamers exhibit more dream control. Both lucidity and control, one could argue, come directly from practice in the world simulation during waking of VR (game play), translating into the world simulation of dreams that night. In other words, if one is used to knowing that one is in an artificial reality while gaming, it is not surprising that such awareness becomes learned and then later relevant in sleep in the other artificial reality called dreaming.

The finding of more lucid dreaming in gamers is not surprising, because there are several aspects in common between lucid dreaming and gaming. Spatial skills are high for lucid dreamers (Gackenbach, Heilman, Boyt, & LaBerge, 1985) and gamers (Greenfield, Brannon, & Lohr, 1996), and both lucid dreamers and gamers seem to be much less prone to motion sickness (Gackenbach, Snyder, Rokes, & Sachau, 1986; Preston, 1998). Finally, meditation, as a type of focused attention, has been shown to be associated with lucid dreaming (Gackenbach & Bosveld, 1989; Mason et al., 1995), and focused attention is a very necessary part of serious game play (Maynard, Subrahmanyam, & Greenfield, 2005).

In the present inquiry 27 hard-core gamers were interviewed about their waking consciousness during gaming as well as about their experiences of altered states of consciousness associated with such play and their subsequent dreams.

METHOD

Participants

Students at a Western Canadian college were asked through emails and posters if they would be interested in being interviewed about their experiences of game play. Potential participants were also informed that they would be asked about their dreams. In order to be interviewed they had to say "Yes" to these four questions:

- Do you play video games on average several times a week?
- Is your typical playing session more than two hours?
- Have you been playing video games since before grade three?
- Have you played 50 or more video games over your lifetime?

Twenty-seven individuals were interviewed, involving 25 men and 2 women. This gender imbalance is, in fact, characteristic of most research in the field – that is, while women do play video games, the vast majority of hard-core gamers are male (Griffiths, Davies, & Chappell, 2004). The majority (85%) of participants were 25 years of age or younger.

When interviews were scheduled, by either phone or email, the selection criteria were confirmed. The interview was semi-structured, beginning with questions about the players' favorite and most frequently played game types. Following these closed-ended questions, a series of open-ended questions were asked in the same order. Each question was followed by prompts, which may or may not have been used depending on how forthcoming the interviewee was with the initial answers. The order of the questions progressed from the least psychologically invasive to the most. Thus, the questionnaire started with confirmation of game play questions, gender, and age, moved on to the type of game play preferred, and followed with various open-ended inquiries into the gamers' experiences of consciousness during play. Then a series of questions regarding dreams was posed, with questions about waking altered states of consciousness while playing being left to the last.

The 27 interviews ranged in length from 30 minutes to an hour. All interviews were tape-recorded and subsequently transcribed. Analyses of this copious data set were undertaken using both qualitative and quantitative methods for the waking questions, a combination that is increasingly recommended by qualitative researchers (Patton, 1990). Two types of quantitative content analyses were used to examine the dreams. Finally, quantitative methods were used to compare the waking and dreaming components. This combination of types of analyses was accomplished through previously established content analysis system for dreams, the evaluation of responses by independent judges using a questionnaire based on the interview questions, and a grounded theory qualitative analysis of the responses to the waking consciousness questions. The discussion of the outcomes and conclusions of the interviews will be general herein.

WAKING CONSCIOUSNESS ANALYSIS

In discussions about the types of games they preferred, interviewees made it clear that the preference for role-playing/strategy-type games emerged as they matured. Many commented that, while they still liked the first-person shooters (action games), their preference shifted to more complex game types as they left high school. One gamer explained:

> I really like [action games] and I like them because they are like a good book. It's basically like reading but you're more involved, and I read a lot of books.

The remainder of the questions regarding the nature of consciousness during play dealt with various aspects including emotions, thinking processes, physical responses, sense of time, and sense of self, as well as various alterations in consciousness. While this part of the study will not be gone into in detail, Table 1 summarizes the general responses.

Table 1. Major components of waking consciousness queried in interview and responses

Self-Consciousness Query	Primary Responses
Emotions	Joy, frustration, anger (rarely to sometimes)†; excitement, sadness, fear (never to rarely)
Thinking	Absorption most intense (high); time passing awareness (rarely); problem solving (sometimes)
Body	Awareness (sometimes); motion sickness (almost never, except in the case of eye strain); discomfort (rarely)
Self	General self-awareness (sometimes)
Altered states	Never to rarely for all questions

† Frequency was rated as often, sometimes, rarely, or never, while intensity was rated none, low, medium, or high.

This finding of the centrality to game play of focused attention reflects research on gaming and its relationship to attention (Green & Baveller, 2003), absorption (Wood, Griffiths, Chappell, & Davies, 2004), and flow (Sherry, 2004). All of these contribute to the felt sense of being there, or presence. Indeed, this theme came out at various places in the interviews. These findings will be integrated with the dream content findings later in this chapter.

DREAM ANALYSES

The content of the 56 dreams that were gathered was analyzed in two ways. First, the Hall and Van de Castle (1966) system as described by Schneider and Domhoff (2006) was used. This was followed by an analysis based upon previous research on lucid/control dreaming (Gackenbach, 1988).

In the Hall and Van de Castle classic system of dream content analysis, eight general categories are coded, based on the assumption that frequency equals intensity. They are:

- Character (Number, Gender, Identity, Age)
- Social Interactions (Aggression, Friendliness, Sexual)
- Activities (Movement, Verbal activity, Visual activity)
- Striving (Success, Failure)
- Misfortune/Good Fortune (Sickness, Falling, Winning)
- Emotions (Apprehension, Confusion, Happiness)
- Physical Surroundings (Settings and Objects)
- Descriptive Elements (Color, Size, Velocity)

Dreams: Hall and Van de Castle Analysis

Table 2 lists the various subscales from the Hall and Van de Castle dream content analysis system as calculated using the Schneider and Domhoff (2006) method. The percentage results in each category are shown relative to the male norms, as there were only two female respondents. The first column is the results of this study in percentage, the second the comparison percentage of norms from the content analysis system. When these percentages differ significantly it is indicated by an asterisk next to the variable name. The third column is the total number of instances found in this study, and the last column that of the total number found in the process of creating the male norms.

The biggest differences in the dreams of these video game players relative to the Hall and Van de Castle norms were in the frequency of dead and imaginary characters, the aggression/friendless percentage, and physical aggression. The higher incidence of dead and imaginary characters showing up in dreams seems to be typical of the virtual world of many of today's games. In fact, in interviews one gamer commented that there is no reason to be a human in a game, as humans have fewer powers than other types of creatures. Here is an illustration of an imaginary dream character:

> I dreamt I was a character in Underworld 2; it was a werewolf character, and then I became a third person. It was the two main characters; it was the vampire girl and a hybrid werewolf character.

Significant differences were also found in gamers' dreams, which were lower in bodily misfortunes and lower in experiencing at least one instance of friendliness; also, gamers' dreams had more familiar but fewer friendly characters. There were also fewer instances of aggression, sexuality, and both misfortune and good fortune. It can be seen in Table 2 that, while gamers' dreams had significantly less of both misfortune and good fortune, the absolute difference was considerably larger for misfortune (7% versus 36%) than for good fortune (0% versus 6%). The difference in misfortune may be more meaningful, as it might imply that lower instances of misfortune equals lower instances of nightmares (Barrett, 2001).

Bodily misfortunes include any accident in which a person is hurt, experiences an illness, or has other unexpected negative events. Since misfortune is a typical feature of nightmares, it

is interesting that, even though some of these dreams are filled with violence, the dreamers have a very different perspective on that violence. They appear to take it in stride, often viewing battles or altercations as a challenge.

Table 2. Hall and Van de Castle Content Analysis Results

Subscale	Interview Series	Male Norms	N for Inter-views	N for Male Norms
Characters				
Male/Female Percent	67%	67%	45	873
Familiarity Percent*	58%	45%	81	1108
Friends Percent**	16%	31%	81	1108
Family Percent	15%	12%	81	1108
Dead & Imaginary Percent*	21%	00%	92	1180
Animal Percent	04%	06%	92	1180
Social Interaction Percents				
Aggression/Friendliness Percent**	100%	59%	25	546
Aggressor Percent	33%	40%	18	253
Physical Aggression Percent**	86%	50%	35	402
Settings				
Indoor Setting Percent	47%	48%	43	586
Familiar Setting Percent	56%	62%	32	320
Self-Concept Percents				
Self-Negativity Percent*	84%	65%	25	809
Bodily Misfortunes Percent*	00%	29%	4	205
Negative Emotions Percent	81%	80%	16	282
Dreamer-Involved Success Percent	40%	51%	10	141
Torso/Anatomy Percent	27%	31%	22	246
Dreams with at Least One:				
Aggression*	32%	47%	57	500
Friendliness**	02%	38%	57	500
Sexuality**	00%	12%	57	500
Misfortune**	07%	36%	57	500
Good Fortune**	00%	06%	57	500
Success	09%	15%	57	500
Failure	09%	15%	57	500
Striving	18%	27%	57	500

The asterisk signs (* & **) indicate significant p values at .05 and .01 levels respectively.

In this way, playing a game during the day may transfer to a game-playing attitude in the dream world. The majority of the interviewees expressed a preference for role-playing games with a battle motif, with World of Warcraft most frequently mentioned. First-person shooters

were also mentioned often by these gamers. However, this interpretation flies in the face of the higher self-negativity percent for gamers. Perhaps this is an instance of gamers reprimanding themselves for errors made while dreaming as they would in an actual game.

In terms of aggression, a closer analysis shows that, although there was more physical aggression in their dreams overall and a higher aggression/friendliness percent overall, when examined in terms of the number of dreams reporting at least one instance, there were relatively fewer aggressive dreams in this sample than in the norms. In part, this may be due to the low sample size of dreams, but it may also be that, when gamers dream of aggression, there is more of it in those dreams, but they do not dream of it as often. Here is an example of high-end aggression when it did appear:

> So I went outside with my cat and shot these criminals that were trying to eat my dad, and they were on top of my dad trying to eat his arms, and he was fighting them off, and they were trying to hold him down and bite his shoulders, and there was blood and stuff. And it was a very graphic shootout for a dream; it was very blood and guts, ya know?

In terms of positive social interactions, gamers' dream characters were more likely to be familiar, but compared to the male norms they were not so likely to be friends. In the end, no clear-cut theme of a positive or negative social nature emerged for this group of hard-core gamers relative to the norms.

Dreams: Lucid/Control Analyses

The second dream content analysis was based upon the interview question prompts regarding dream lucidity and control. These were asked about because of previous research into gamers' dreams (Gackenbach, 2006).

Only 10 of the 56 dreams were seen as lucid by the judge, with one of those rated as "unsure." Since lucid dreams usually involve the dreamer having control within the dream, evaluating lucidity or dream control was done in terms of control of the dream self, events, characters, and scenery. Control of self in the dream was deemed as high in 39 of the 56 dreams, while control of events was non-existent. Control of characters was rarely noted, as was control of scenery. Of particular interest in these dreams was the dreamer perspective. It was originally investigated due to the Gackenbach and Bosveld (1989) model of consciousness in sleep. They point to two levels of such consciousness: one is lucidity, which is engaged in the dream activity, and the other is witnessing, which is detached from the dream activity. Accessing this information required some probing by the interviewer, although some dreams were spontaneously reported as having been experienced from the position of a watcher (i.e., the third-person perspective). However, contrary to the Gackenbach and Bosveld (1989) idea that this represents a detached perspective, there still tended to be an emotional attachment to the events as they progressed. This suggests that the third-person perspective was developed in gamers due to their game play experiences directly translating into the dream.

Video Game vs. Non-video Game Dreams

Since dreams are generally viewed in the dream research literature as reflecting daily concerns, it was thought useful to examine the dreams of these hard-core video game players as a function of whether or not a video game was featured in the dream. This was intended to shed some light on whether the dream effects found were a function of gaming exposure per se in the case of video game dreams, or simply characteristic of the gamer's life in the case of non-video game dreams. Here is a clear example of the translation from waking gaming activity to the dreamed game:

> I had played a game called Bomber Man where you just run around and put bombs down and explode areas so that you can leap past…. There's, like, monsters running around that can kill you or you have to blow them up, and I remember in the dream I was down, like in 3D, I was the bomber man type guy, and there were these monsters on these blocks, and I was running around, and my whole family was there actually, and we were running away from them as fast as we could.

Of the 56 dreams shared in the interviews, and based on the gamer's own classification, 33 were identified as video game dreams and another 21 as not being gaming dreams, with two classified as unsure. There were significantly more words used to describe the video game dreams (mean = 210) than those classified as not video game/unsure (mean = 122). Since higher word count generally indicates better recall of the dream, and better recall generally indicates a more intense experience and a higher likelihood of lucidity, the number of words was used as a statistical control in the analysis comparing video game and non-video game dreams.

Both the video game and the non-video game dreams were analyzed further using the Hall and Van de Castle system. Only two scores showed a significant difference in the two sets of dreams: emotional references and use of modifiers in descriptions. For both scores, it was the non-video game dreams that had more emotional references and more modifiers, implying a more emotionally engaging experience. More importantly, the inclusion of a game motif in a dream for the most part did not alter the nature of the dream.

The second round of analysis compared the two sets of dreams in 10 ways relating to lucidity and control. In this case, three dream content lucid/control type variables were found to be significant. They were balanced emotions, control of environment, and control of characters. In all three cases, video game dreams were rated higher than non-video game dreams – that is, emotions were more balanced, not dominated by highs and lows, in video game dreams, and there was more control of both environment and characters in them than in non-video game dreams.

It is important to note that in both analyses there were more similarities between dream types than differences, although the differences were illuminating. Specifically, it was assumed that the ability to control the game world in video game play was related to dream control; the analyses comparing the two types of dreams seems to support this assumption. The more emotional non-gaming dreams compared to those with game elements suggest that it is non-gaming dreams that do the emotional regulation work often ascribed to dreams (Kramer, 2007; Nielsen & Lara-Carrasco, 2007).

ALTERED STATES OF CONSCIOUSNESS QUESTION ANALYSIS

The final set of questions dealt with other altered forms of consciousness associated with video game play while awake.

Over half said they had the experience of still playing when they left the game. Regarding the latter, one young man told a story of having spent an afternoon playing a game and then going out to the barn on the family farm to do his chores. He found himself initially trying to make button moves when he tried to pick up a bucket.

Some had the experience of feeling as if they were outside themselves, which is nicely explained by this young student:

> You're just kinda there, and then you know that you're there, but it's almost kind of a delayed reaction. Like, you know that you're physically there, but you know that you're physically in your body, but for me it's a more mental point of view, for others it could be more of a spiritual point of view, like you're outside of yourself and you realize, like, you can't look into your eyes but you feel, I guess, that you're looking from an inch to the left, or an inch to the right kinda thing, so you're sort of outside yourself.

Another explained: "It's almost like that thing where you lose feeling with your body and it's almost like you're splitting up." Over half were judged to have said they lost awareness of themselves and their surroundings while playing.

Finally, the potential transcendental nature of game play is captured by this gamer: "There were a lot of times where they would be hiding just around the corner, and I would somehow know that they were there and be able to … even though they were waiting and getting ready to shoot me, I'm able to get them first, not because I was faster or better but because I knew what they were going to do."

THE RELATIONSHIP BETWEEN WAKING INTERVIEWS AND DREAM CONTENT ANALYSES

The interview included questions regarding the gamer's waking consciousness experience of gaming; these answers were analyzed in comparison with the content analysis of their dreams. The comparison of these data sets was conceptually organized using a statistical technique called factor analysis. This technique allows researchers to determine correlations between factors, though not necessarily the specific relationship between them, such as causation. Separate analyses were computed around questions related to aggression, emotions, physical body, thinking, time, watcher perspective, and altered states of consciousness.

Five of the seven factor analyses showed associations between waking interview content and dream content. These were aggression, thinking, time, watcher perspective, and mystical questions. For aggression, all subscale totals from the Hall and Van de Castle dream content analysis, as well as the frequency and intensity of expressions about gaming excitement, frustration, and anger expressed during the interviews, were entered into the factor analysis. Only waking expressions of frustration showed an association with any of the dream content variables, and these expressions of frustration while awake were associated with the

dreamers' lack of involvement in aggression in their dreams and the absence of an aggressor in the dream. This would seem to support the idea that gaming has already fulfilled an emotional need and is thus not needed again in sleep.

In another factor analysis, four dream control variables showed a correlation with the intensity of attention while playing. This analysis also showed an association between dream verbal activities and gaming problem-solving frequency and intensity; however, thinking in dreams did not show a correlation with those two factors. Thus the more gamers solved problems in gaming, the more their dreams were associated with verbal but not thinking activities. It must be kept in mind that this is not a causal relationship.

A third analysis connected a lack of lucid dreams with the first-person perspective in the dream, as opposed to the third-person perspective, outside of the dream ego. In the final analysis related to dream control, lucid dreaming correlated with both verbal and thinking activities within the dreams, and with high attention skills in the gamers when they were gaming while awake. It is this analysis in particular that seems to show the connection between intense attention in gaming and lucid dreaming, suggested in other research (Gackenbach, 2006, 2008).

The next two factor analyses were fairly small, with Time loading only four variables and Watcher loading five. In both cases, at least one factor loaded both waking- and dreaming-type variables. In the case of the Time factor analysis, time references in the dream were associated with the intensity of reporting being aware of time during gaming in the interview. A lack of time sense in gaming has been associated with a high sense of being immersed in a game world (Kurita, 2005). In this case, then, the opposite of immersion in VR – that is, being aware of time passing – was associated with similar time references in dreams. This could be an individual difference variable or one related to the type of game played. Interviewees unanimously reported more awareness of time in first-person shooter type games as compared to role playing/adventure games such as World of Warcraft.

In the Watcher factor analysis, two sets of associations emerged. The first connected neutral emotions in the dream by the third-person perspective (Watcher dream ego) with reports of experiences of still playing a game after you were done while awake, having out-of-body experiences during play, and not being aware of the body during play. This correlation seems to indicate that the disengagement of emotions in the dream when in the third-person perspective is linked to the player's disengagement with his/her body during or after game play. The second factor loaded the same dreamer emotional neutrality positively with self as located primarily within the third-person perspective during a dream; these two dream variables loaded negatively with "still feeling like you are playing when you are done." This is perplexing, as one would think that the blend of realities suggested by the "still thinking you are playing when you are done" question would lead to a disengagement of self from the dream body, as indicated in the first factor, but the opposite was the case here. This could be due to the wide array of answers to the question of whether the gamer felt like he was still playing after he stopped. It was asked to see if the gamer's perspective of oneself had changed during or after gaming, but some answered the question with regard to whether they were still thinking about the game afterward, rather than if they were still feeling the game.

The last factor analysis computed was on items that could be considered to be mystical. The significant correlation found here was a connection between lucid dreaming with the first-person perspective in dreams, and the absence of feelings of unity. Explanations for lucid dreaming have included those that embrace it as a stage in the process of enlightenment, in

other words mystical in nature (Varela, 1997), to others that see it as merely a cognitive skill (LaBerge, 2007). This association of a lack of unity feelings, which is a classical aspect of mystical experiences, to lucidity in the first person argues for a cognitive skill interpretation.

CONCLUSION

Does game play while awake impact nighttime dreams? As expected, gamers reported that they do dream about gaming. Well over half of the dreams reported included easily recognized references to games. Thus, a simple answer to the research question is "Yes, gaming impacts dreams."

Since emotional regulation is thought to be a central feature of dreams, gaming emotions that range from joy to anger and sadness were investigated in their social contexts with mixed results. Although gamers showed more self-negativity in these dreams, other indications of positive emotional environments were found, such as fewer misfortunes and more familiar characters. In sum, while gamers had more negative social/emotional elements (n = 7) than positive ones (n = 4), 12 social/emotional elements resulted in no gamer/norm differences. Thus, one might say that these dreams are managing the emotional regulation needed for gamers, while not dramatically distorting their dream lives from the norms. This conclusion is supported by the analyses comparing video game to non-video game dreams. That is, most content variables showed no difference.

However, some of the differences are noteworthy, in addition to what has been discussed. The higher number of imaginary and dead dream characters in gamers' dreams was replicated by Gackenbach and Kuruvilla (2008a). Additionally, in a follow-up, Gackenbach and Kuruvilla (2008b) found that gamers' dreams collected shortly after they happened were evaluated as more bizarre on two of three major dimensions of a major system of bizarre dream content analysis (Revonsuo, 2006). There is some indication that this may be due to higher creativity in gamers (Dopko & Gackenbach, 2009).

Secondly, the aggression/misfortune finding – that is, a lower number of aggressive dreams but more aggression in a dream – if it appears combined with less misfortune, implies that gamers take their honed battle skills into their dreams. This too was largely replicated in Gackenbach and Kuruvilla (2008a). In a related study from this group, Gackenbach and Kuruvilla (2008b) showed that the function of dreams as practice on reacting to threats to survival (Revonsuo, 2006) may be fulfilled in waking video game play and thus not so likely to appear in dreams.

The hypothesis that gamers would show more dream control and more lucid dreams as indicated by an earlier study (Gackenbach, 2006) was somewhat supported in the analysis. Dream control and lucidity were not initially asked for explicitly in the interviews, in order to ensure a spontaneous report. However, when probed, 10 of the 56 dreams were lucid, which is a higher incidence than that discussed by Snyder and Gackenbach (1988). In addition, in 39 dreams control over the dream self was evident.

Game play can shift from first- to third-person perspective in order to improve game performance. This third-person perspective, which is not even scored for in most dream content analysis systems, including that of Hall and Van de Castle, was seen in some of these dreams. It may be that more people's dreams have this third-person perspective; it is just not

noticed unless carefully looked for, and it may be a product of increased media absorption today relative to when the dream content analysis system was initially developed (i.e., the 1950s and 1960s). Other research by this group has found more of this watcher perspective among gamers (Gackenbach, 2006). The question is, Why? It could be sheer practice, as many games are best played from the third-person perspective, or it could be, for some at least, the emergence out of lucidity of detached witnessing dreams. This concept, put forth by Gackenbach and Bosveld (1989), is that there are two types of dream awareness: lucidity, an active and engaged awareness that one is dreaming, and witnessing, a quieter and detached third-person perspective. As noted earlier, the lucidity/gamer connection is not too surprising, given the other relevant correlations to each, i.e., spatial skills, lack of motion sickness, and focused attention during waking. However, these analyses do not support the gamers' lucidity as much as the higher detached form called "witnessing" by Gackenbach and Bosveld (1989).

One of the limitations of this study is the small number of interviewees and dream reports. In addition, the self-report nature of the data collection is always a cause for concern. That is, both the game-playing experiences and the dreams were recalled retrospectively. While this study is a good first step in understanding a particular phenomenon, it was clear that the interviewees were sensitive to the negative stigma often associated with gaming and expressed their awareness with various self-conscious remarks about playing too much. At the same time, the interviewer endeavored to make the interviewees comfortable and relaxed in order to obtain the most honest responses possible.

In conclusion, the flow model of consciousness (Csikszentmihalyi, 1990) in gaming (Sherry, 2004) is the best way to understand the nature of waking consciousness during play. That is, there is sufficient challenge to engage, with not so much as to frustrate. As a result, flow or deep absorption is the primary characteristic of the experience of gaming and may be responsible in part for some of the dream effects, especially lucidity.

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