

# Video Game Play: Effects on Nighttime Dreams

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## ABSTRACT

Two sets of content analyses were computed on 56 dreams of 27 hard core video game players gathered during semi-structured interviews in the winter term of 2006 at a Canadian college. The standard dream content analysis system from Hall and VandeCastle [19] was used to analyze these dreams as was another content analysis focused upon lucid/control dreaming. As expected gamers dreamt about gaming and indeed well over half of the dreams reported included easily recognized references to games. Since emotional regulation is thought to be a central feature of dreams, emotions of gaming which range from joy to anger and sadness were investigated in their social contexts in dreams with mixed results. Although gamers evidenced more self negativity in these dreams other indicators of positive emotional environments were present. If hard core gaming created distorted world views at a deep level of consciousness (i.e., in dreams) then this would be expected to appear in their dreams. However, despite the differences from norms, the overall picture is one of dreams reflecting game play while not dramatically distorting their emotional lives as depicted in dreams.

## Categories and Subject Descriptors

A.1 [General Literature] General - *introductory and survey*

## General Terms

Human Factors, Theory

## Keywords

Video games, dreams, lucid dreams, consciousness

## 1. INTRODUCTION

Video game play effects have been viewed from a variety of perspectives. These range from the concerns regarding aggression in real life [1] to the claims of enhanced cognitive skills [12]. Few researchers have examined their effects on night time dreams. In part this is due to western cultures shunning of dreams as an unimportant element in the life of the mind [22].

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However, scientific research in the last half century has established that dreams are important for memory consolidation, emotional regulation and general information processing. Even though most people in North America do not remember their nightly dreams [3] they all dream every night from 4 to 5 times and this nighttime mentation is doing its job. The question in this paper is what are the effects of hard core video game play on these experiences of the night? Are the effects simply alterations in dream content or are their more substantial effects? Finally what are the implications of any effects on dreams for waking life?

The importance of nighttime dreams has come a long way since the days of Freud's 1900 "Interpretation of Dreams" where he claimed that dreams were the royal road to the unconscious. Although Freud did a lot for introducing the serious study of dreams into a culture that rejected them as unimportant, he also labeled dreams as the area where the individual's unconscious instinctual impulses are stored. Since the discovery of rapid eye movement and the development of sensitive electrophysiological recording techniques, this one sided view, which essentially pathologizes dreams, has changed. In the last half century a body of work, while not absent of controversy, has generally shown that nighttime dreams are functional to the life of the brain.

Various researchers have postulated dream functions and these include adaptation to stressful events [24] or the lack thereof as in the case of post traumatic stress nightmares [2]. Emotional regulation has been viewed as a central function of dreams beyond just stress response integration [13]. Evidence for memory consolidation comes most recently from a virtual maze task which was then dreamt about that night and a week later [17]. An evolutionary theory is that of Revonsuo [19] who postulates that themes concerned with ancestral and current survival threats should be prevalent in dreams. Finally, dreams as practice for later events, is a view which has also received empirical and theoretical attention [6].

Furthermore, it has been suggested that dreams offer a better model of the nature of consciousness itself than the currently favored visual attention model [19]. This function is particularly important in this inquiry as Revonsuo suggests that both dreams and virtual reality (VR) simulations are world simulations that result in models of self in the world. In other words, Revonsuo notes that we can conclude from our experience of dreams and VR, where self is in an artificially generated world (biologically driven in dreams and technologically driven in VR), that normal waking reality is also a "world simulation". This is one of various bodies of work that have taken the position that self in the world is a creation [5]. In any case, these models of self in

the world (dreams, VR, waking reality) impact each other and sometimes in profoundly. For instance, the nightmares of trauma victims often wake them from sleep, making it difficult to cope with the trauma, no less get back to sleep. Sometimes the impact between these experiences of self as a construction is less profound, such as in playing a video game for so long that standing up from the sofa results in dizziness as one acclimates to the new “world” of waking reality from that of VR.

In the present inquiry the dreams of hard core video game players were examined in order to see if their dream content was potentially affected by game play and if so how. Also of concern are the implications of any dream changes resulting from game play. Some previous research on video gaming and dreams has found such a relationship. Specifically, [24] found that computer games were less likely to show up in nightmares than television but that computer games were also present in pleasant dreams for the children. Players of the puzzle type game called Tetris reported intrusive, stereotypical, visual images of the game at sleep onset [22]. Bertolini and Nissim [4] recognized fragments or characters from the video games in the material of children’s dreams. Finally, Nielsen, et al, [16] found that a VR maze task showed increased incorporation into dreams when actively engaged in with a computer mouse than when passively watched on TV.

While these studies suggest that yes video game content is incorporated into dreams it is important to consider the implications of such incorporation. So for instance, Schredle, et al [21] reported “that interindividual differences in nightmare frequency were not explained by interindividual differences in TV viewing or computer game playing habits” of 11 to 13 year olds. In other words, contrary perhaps to parental concerns about excessive game play, playing computer games in children does not cause nightmares as watching some types of horror movies which does affect subsequent dreams in children [7]. Nielsen et al’s [16] finding has implications for memory consolidation in terms of various time based cycles. Bertolini and Nissim [4] concluded that due to this radical change in children’s play patterns, i.e. playing video games, they must now incorporate such game play into their child therapy practice. Thus video games seem to be affecting dreams and these affects have theoretical as well as practical implications.

Another dream change that seems to be occurring as a function of video game play is the emergence of lucidity in gamers’ dreams [9]. That is, gamers report knowing they are dreaming during the dream more so than others. This dream experience can be viewed as a metacognitive skill or as an example of enhanced self awareness [14]. Relatedly, Gackenbach [9] has also found that gamers evidence 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 you are used to knowing you’re in an artificial reality while gaming it’s not such a stretch that such awareness becomes learned and then applied in sleep to the artificial reality called dreams. Based upon previous research it is hypothesized that hard core gamers will evidence gaming related images in their dreams and that such images will illustrate the emotional regulation dream function. Secondly, fundamental structural characteristics of their dreams will also occur. That is, they will

be more likely to know they are dreaming and to control their dreams.

## 2. METHOD

The type of inquiry used in this study is a qualitative approach which allows a relatively open ended inquiry with limited assumptions [15]. The limits of this type of inquiry is that one must always be aware of experimenter bias which becomes part of the data collected in the form of notes by the researcher. However the strength is that it allows information to be gathered without the constraints of typical quantitative data gathering approaches.

Subjects were solicited through posters placed around campus which listed the selection criteria (see below) and explained that participants would be interviewed both about their video gaming experiences and their nighttime dreams. Twenty-seven hard core college student gamers were interviewed in a face to face setting in the first authors office. Four of the 12 interview questions dealt with dreams and thus 56 dreams were collected from 27 high end gamers.

The gamers who were interviewed had to report playing video games several times a week with a typical playing session of about 2 hours. They also had to have played 50 or more games and to have begun such video game play in grade 3 or earlier. Thirty three individuals answered the advertisements for participants over a two month period in early 2006. They agreed to be interviewed with 27 actually being interviewed. These included 25 men and two women with 85% of those being 25 years of age or younger; 12 participants were 19 years old or younger and 11 gamers were 20 to 25 years of age. Three of the interviewees were between 25 and 30 and one was between 30 and 39 years of age.

When interviews were scheduled, either by phone or email, the selection criteria were confirmed. They were again confirmed, after signing an informed consent, upon the participant’s arrival in the first authors’ office for the face to face actual interview. The interview was semi-structured beginning with questions about the players favorite and most frequently played games. 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 their answers. The order of the questions was from the least psychologically invasive to the most. Thus the questionnaire started with confirmation of game play frequency type questions, gender and age. Type of game play preferences information was next followed by various open ended inquiries into the gamers experiences of self during play. Then a series of question regarding dreams was asked and finally ones about altered states of consciousness while playing were inquired about. The dream questions included: Do video games come up in your dreams? If so how?; Tell me your most recent dream.; Tell me your most recent dream which in some way included video games.; Finally, would you tell me you’re most noteworthy video game dream?

It is important to note that while lucidity and control, among other things, were probed for (i.e., When did you have this dream? Were video games in some way part of the dream? Was it lucid? Could you control it? Were you watching the action?), it was only after the dream was told to the interviewer. There

were no direct inquires for gamers to report lucid or control dreams.

The entire audio taped interviews were transcribed including the dream portions. For the purposes of the present inquiry the dream portions, including discussions of the dreams and follow-up prompts were separated out for content analysis.

### 3. RESULTS

These dreams were content analyzed in two ways. First the Hall and Van de Castle system as delineated by Schneider and Domhoff [20] was used. Analyses were computed using the latter’s DreamSAT spreadsheet which analyzes the codes and automatically generates percentages and group-profiles. Since all but two of the interviewees were male, norm comparisons were for males only. Two coders were trained on eight dreams until they attained congruence in coding. Percent matches averaged 77% agreement. The remainder of the dreams were randomly assigned to each coder for the remaining dream coding.

The second content analysis was done by a third coder based upon a system of coding taken from the interview questions and elaborated upon from the literature on dream lucidity and dream control (i.e., summarized in Gackenbach [8]). In this content analysis, the same 56 dreams from these hard core gamers were coded in terms of palpable sensations, balance, video game or media content, lucidity, control and observer perspectives. These were content variables not available in a Hall and VandeCastle approach to content analysis.

#### 3.1 Hall and VandeCastle Analysis

The most comprehensive analysis is presented in Table 1 below which lists some of the various subscales of the Hall and VandeCastle approach with the percent of each category evidenced in the gamer interview dreams relative to male norms. The number of instances for each set of dreams is also given as “N”. Finally the p values are listed comparing these hard core gamers to male norms.

	Subscale	Interview series	Male Norms	<i>p</i> vs. males	N for Inter-views	N for Male Norms
<b>Characters</b>						
	Male/Female Percent	67%	67%	.937	45	873
	Familiarity Percent	58%	45%	* .026	81	1108
	Friends Percent	16%	31%	** .002	81	1108
	Family Percent	15%	12%	.429	81	1108
	Dead & Imaginary Percent	21%	00%	** .000	92	1180
	Animal Percent	04%	06%	.485	92	1180
<b>Social Interaction Percents</b>						
	Aggression/Friendliness Percent	100%	59%	** .000	25	546
	Aggressor Percent	33%	40%	.598	18	253
	Physical Aggression Percent	86%	50%	** .000	35	402
<b>Settings</b>						
	Indoor Setting Percent	47%	48%	.805	43	586
	Familiar Setting Percent	56%	62%	.560	32	320
<b>Self-Concept Percents</b>						
	Self-Negativity Percent	84%	65%	* .028	25	809
	Bodily Misfortunes Percent	00%	29%	* .024	4	205
	Negative Emotions Percent	81%	80%	.941	16	282
	Dreamer-Involved Success Percent	40%	51%	.496	10	141
	Torso/Anatomy Percent	27%	31%	.720	22	246
<b>Dreams with at Least One:</b>						
	Aggression	32%	47%	* .023	57	500
	Friendliness	02%	38%	** .000	57	500
	Sexuality	00%	12%	** .000	57	500
	Misfortune	07%	36%	** .000	57	500
	Good Fortune	00%	06%	** .000	57	500
	Success	09%	15%	.165	57	500
	Failure	09%	15%	.142	57	500
	Striving	18%	27%	.102	57	500

**Table 1:** Hall and VandeCastle Content Analysis Results

The largest effect size for these video game players' dreams was evidenced in higher dead and imaginary characters, aggression/friendless percentage and physical aggression than the Hall and Van de Castle norms. Large effect sizes were also found where gamer's dreams were lower in bodily misfortunes and lower in dreams with at least one instance of friendliness.

Several other variables also showed significant deviations from the norms. Gamer's dreams had more familiar but fewer friendly characters. In addition to what has been mentioned, dreams with at least one element, which differed significantly from the norms, included fewer aggression, sexuality, misfortunes and good fortunes. Interestingly although there was more physical aggression in their dreams overall and a higher aggression/friendless percent overall, when examined in terms of the number of dreams reporting at least one instance there were significantly fewer aggressive dreams with one instance of aggression than the norms. In part this may be due to the low sample size of dreams but it may also be that when gamer's dream of aggression there is more of it in those dreams but they don't dream of it as often. However, this aggressiveness theme is also evidenced in the fewer friends relative to the norms. Interestingly, the fewer bodily misfortunes would seem to indicate that they are winning at their aggressive dream battles. This is not surprising given all their practice while awake in virtual reality battles. That is, the majority of the interviewees expressed a preference for role playing games with a battle motif (i.e., World of Warcraft) or first person shooters. However, this interpretation is somewhat at odds with the gamer higher self-negativity percent.

In terms of the positive social interactions, gamers dream characters were more likely to be familiar but they were not as likely to have friends in their dreams as with the male norms. Importantly, no difference was found in the incidence of family members in the dreams. Additionally, gamers had fewer friendly, sexual and good fortune themes in at least one dream than norms. But they also had fewer dreams with aggression and misfortune with no difference in success, failure or striving, one incident per dream, from the male norms. Thus no clear cut theme of a positive or negative social nature emerged for this group of hard core gamers.

Another interesting finding is the higher incidence of dead and imaginary characters. This certainly seems to characterize the virtual world of many of today's games showing up in their dreams. In fact, in interviews one gamer commented that generally there is no reason to be a human in a game as they have fewer powers than other types of creatures.

### 3.2 Lucid/Control Analyses

In terms of the second set of content analyses chi squares on each content variable were significant with the exception of control of events. Specifically very few dreams had palpable sensations while none had an explicit reference to physical balance, emotional balance was more often absent than present but most often not mentioned. Given that the subjects were

explicitly asked about their video game dreams not surprisingly over half of the dreams reported included such. Other media were less often mentioned. Only 10 of the 56 dreams were seen as lucid by the judge with one of those unsure. Dream control was evaluated along several dimensions including control of dream self, events, characters, and scenery. Control of self in the dream was seen as high in 39 of the 56 dreams while control of events ranged across the five frequency categories. Control of characters was rarely seen while control of scenery was as often reported as not. Of particular interest in these dreams was the stance of the dream ego. This information was obtained due to the probing of the interviewer and resulted in some dreams as being reported as experienced outside the dream ego in a position of a watcher. Additionally, when in the watcher position, there still tended to be an emotional attachment to the events as they progressed.

A limited factor analysis was then computed on the major variables of interest in the lucid/control content analysis. This is portrayed in Table 2 below.

Variables	1	2	3	4
words in dream (hi is lot)	.071	.789	.283	.095
palpable recoded (hi is lot)	.187	.669	-.115	-.517
balance emotions (hi is lot)	.889	.045	.213	.096
video game dreams (hi is lot)	-.454	.306	.517	-.121
media dreams (hi is lot)	.203	-.124	.785	.003
lucid dreams (hi is lot)	-.079	.714	.027	.262
sense of self location in dream (hi is watcher & lo is self in body)	.026	.206	-.131	.869
emotions of watcher in dream (hi neutral)	.945	.076	-.048	-.156
mean of control variables ((hi is lot)	-.016	.377	.659	-.096

**Table 2:** Factor Analysis of Selected Lucid/Control Dream Content Variables

It can be seen in this varimax rotation that the first and most important factor loaded balanced emotions and emotions of the watcher as neutral along with a lack of video game content and might be called emotional detachment. Factor two loaded the number of words in the dream with palpable sensations, video game content, lucidity and control and constitutes the hypothesized relationship between video game dreams and lucid/control dreaming. This is called lucid/control gaming. The third factor also loaded video game content along with media dreams and control of dreams and might be labeled media. Finally factor 4 was marked by a lack of palpable sensations associated with a sense of self as a watcher which makes sense in that to watch from the third person perspective presumably would entail losing some sense of the dream egos body sensations.

## 4. DISCUSSION

Two sets of content analyses were computed on 56 dreams of 27 hard core video game players gathered during semi-structured interviews in the winter term of 2006 at a Canadian college. The standard dream content analysis system from Hall and VandeCastle [20] was used to analyze these dreams as was another content analysis focused upon lucid/control dreaming.

As expected gamers dreamt about gaming and indeed well over half of the dreams reported included easily recognized references to games. Since emotional regulation is thought to be a central feature of dreams, emotions of gaming which range from joy to anger and sadness were investigated in their social contexts in dreams with mixed results. Although gamers evidenced more self negativity in these dreams other indicators of positive emotional environments were present. Specifically, less misfortunes and more familiar characters were high. In sum, while there were more negative social/emotional elements (n=7) than positive ones (n=4) favoring gamers, 12 social/emotional elements resulted in no gamer-norm differences. Thus one might say that these dreams are doing the emotional regulation needed for gamers while not dramatically distorting their dream lives from norms. If hard core gaming created distorted world views at a deep level of consciousness then this would be expected to appear in their dreams. However, despite the differences from norms, the overall picture is one of dreams reflecting game play while not dramatically distorting their emotional lives as depicted in dreams.

The lucid/control hypothesis was supported in the second set of content analysis although not asked for explicitly in the interviews. This was in order to ensure a spontaneous report. When probed 10 of the 56 dreams were lucid and 39 were seen as evidencing control of the dream self. The third person perspective which is not even scored for in most dream content analysis systems, including the Hall and VandeCastle, was seen in some of these dreams. It may be that more people's dreams have this third person perspective, it's just not noticed unless carefully looked for.

The factor analysis on these content variables resulted in the hypothesized relationship between lucidity/control and video games. Factor 2 loaded these three dream variables with palpable sensations and number of words. The last is a rough approximation of dream recall which is typically high for lucid dreams [8]. Gackenbach, et al [11] have shown that kinesthetic/vestibular sensations are better in lucid dreamers and more prevalent in lucid dreams [8]. However, no mention of physical balance was part of these dreams but there were palpable sensations mentioned. Indeed the general lack of motion sickness reported by the present group of gamers while gaming would indicate more presence in gaming and thus a sense of spatial orientation requiring the vestibular sense might translate later into the altered, but constructed, reality of dreams [18] and thus their recognition (i.e. lucidity).

The limitations of this study are that this was a small number of interviewees and thus a small set of dreams. Although the interviewees were told in advance that their dreams would be asked about in addition to other game playing related experiences, some came to the interview with little to no dreams to report. This is consistent with the low recall characteristic of

most people in terms of nightly dream recall but also if you ask someone for any dream from any time they typically remember something. The query into "most recent" dream was at times a night before dreams and at other times one form years earlier.

Another limitation is the self report nature of the data collection which is always a cause for concern. Data is currently being analyzed looking at 152 dreams from the night before they were recorded as well as media use data from the previous day. In preliminary analysis of this data set [10] lucid/control dreaming was associated with gaming but also with all media use. This factor analysis found that the more interactive the media the more lucid/control elements entered the dream in morning after reports. Content analysis of these morning-after dreams is now being done and dream diary research is planned on these questions.

In conclusion, dream content shows a moderate change associated with gaming supporting the idea that dreams are emotionally regulating the intense experiences of gaming experienced in the daytime. Although these experiences of play show up in gamers dreams their dreams are not generally significantly more disturbed than male norm dreams. Additionally, the lucid/control association to video game play is indirectly supported with the association of these dream structural dimensions to video game content as well as to palpable sensations and dream recall.

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