Gamer links to dream bizarreness and lucidity: A failure to replicate

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Summary. Two studies examined the relationship between measures of video game play, dream bizarreness and dream type, with a conceptual emphasis on dream lucidity. The varimax rotated factor analyses with some variables of each type replicated across studies, showing no association between gaming, dream bizarreness and dream lucidity. Of additional interest is that the oft claimed association between dream bizarreness with lucidity was also not supported with one analysis showing a negative association. This may call into question methods of lucid dream induction that recommend attention to oddities while awake as practice to notice oddities in dreams as a way to get lucid in sleep.

Keywords: video game play, bizarreness; lucid dreaming

1. Introduction

Despite research showing most dreams to be relatively plausible simulations of daily life (Domhoff, 2007), bizarreness in dreams continues to be investigated owing to its theoretical and intrinsic interest (Revonsuo, 2006). Hunt (1989) point out that what we now call "bizarreness" was central to traditional "dream centered" tribal societies. Different types of bizarreness have been examined, including Hunt's distinction (1982) between clouding and hallucinations (including a sub-factor for archetypal mythological content) and Hobson's (1988) two step distinction between discontinuity and incongruity, the latter being elaborated on by Revonsuo and Salmivalli (1995) in their assessment of bizarreness.

Using the Hall and VandeCastle system of content analysis of gamer's dreams Gackenbach and Kuruvilla (2008) found that gamers reported more characters of a bizarre type. In more elaborate analysis of dream bizarreness, both Gackenbach, Kuruvilla and Dopko (2009) and Gackenbach and Dopko (2012) found a positive association between video game play and dream bizarreness. However, neither considered the type of dream (lucid or not), in their analyses. This dream type data is not available for Gackenbach and Dopko (2012) but is for Gackenbach, Kuruvilla and Dopko (2009). The current analysis re-examines this data, focusing upon the gamer-lucidity linkage (previously identified in Gackenbach, 2006; 2009) and how it may or may not be related to dream bizarreness. The Revonsuo and Salmivalli (1995) method of dream bizarreness content analysis was utilized. Following this additional analysis another data set, which offers an examination of video game play, dream bizarreness and dream type, is also considered (Gackenbach, Ferguson, Mathewson, & Darlington, 2012).

It is expected that there may be a relationship between lucidity and bizarreness for gamers due to their high exposure to bizarre waking experiences. While some video games are true to waking reality, most have relatively unusual, odd, or bizarre content. This can be in characters (i.e., being able to fly), settings (i.e., being on a distant planet) or situations (i.e., the players avatar becomes the hero in a mythic journey). Thus if a gamer has been playing video games for several hours a week over much of their lifetime their waking exposure to relatively bizarre waking experience which are virtually mediated is quite high relative to those who not game as frequently. It is not unreasonable to expect such waking exposure to translate into dream bizarreness when evaluated by independent judges. Previous research has found that one third of the time lucidity emerges due to a bizarre dream events (Snyder & Gackenbach, 1988). More importantly, noticing oddities while awake is sometimes offered as a type of training for recognition of an experience being a dream while asleep, lucid dream (LaBerge, 1985).

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2. Study 1

2.1. Method

From a pool of 890 questionnaires (see Gackenbach, Kuruvilla, & Dopko, 2009 for more detail), 232 students at a western Canadian college were identified as high- or low-end gamers and were further selected based upon the minimal number of words in their dreams. A recent dream was collected, followed by a series of questions about participants' video game playing habits and their history of dreaming. Participants were also asked about their reported dreams including how long ago it happened, how many hours of sleep they had that night, and how many hours of sleep they normally need in order to feel rested. There were also questions about their recent dream's lucidity, observer perspec-

Table 1. Varimax rotated factor analysis of selected gaming, dream bizarreness and dream type variables.

	1	2	3	4	5
Frequency of playing video games	.910	.033	.042	.059	.013
Length of playing session	.847	.083	.169	-.003	-.023
Number of video games played	.775	.030	.135	-.150	.055
Age of first gaming experience (hi#=younger)	.428	.005	.132	-.496	-.199
Video game play the day before the dream (2=yes;1=no)	.763	.010	-.048	.138	.082
Nonbizarreness mean	-.089	.648	-.194	.312	.078
Bizarreness: vague variables mean	.202	.499	-.013	-.021	.018
Bizarreness: Discontinuous mean	-.149	.628	.004	.090	-.285
Bizarreness: Incongruous Distorted sum	.142	.229	.073	.683	.007
Bizarreness: Incongruous exotic sum	.086	.655	.191	-.040	.139
Bizarreness: Incongruous Impossible sum	.102	.112	.470	-.284	-.177
Dreamer Classification of Recent Dream: Lucidity	.100	.066	-.774	-.037	-.292
Dreamer Classification of Recent Dream: Observer	.148	-.037	.133	.192	.735
Dreamer Classification of Recent Dream: Control	.229	.022	.686	.119	-.060
Dreamer Classification of Recent Dream: Nightmare	-.181	.239	-.357	-.419	.562

Note. When sex of subject was entered into the analysis it simply loaded with the video game variables inversely and made no difference in other factors. Thus as noted gamers tend to be male.

tive, control and if it was a nightmare. The final part of the questionnaire inquired about electronic media use the day before the dream.

The gaming history questions have been continuously used in the research program by Gackenbach have been shown to be valid:

> *The four game group defining variables were frequency of play, duration of typical play, number of games played in a lifetime, and age began playing with younger as higher number. Validity for these general history of game play questions was determined in terms of their relationship to questions about their game play immediately prior to the research participation. The number of games they reported playing prior to participating in the study was associated with typical gaming session duration r=.247,p<.009 and number of different games played in lifetime r=.204, p<.032. In terms of these four group defining history of play item responses to the length of the prior to research participation gaming sessions (game frequency r=.294, p<.0001; gaming session duration r=.496,p<.0001; number of different games played in lifetime r=.325, p<.0001). Thus history of gaming was related in various ways to actual play behavior in the 24 hours prior to filling out the research inventories (p. 116; Gackenbach & Bown, 2011).*

Dream content analysis for bizarreness was conducted using the system developed by Revonsuo and Salmivalli (1995). Theirs is a cognitively motivated content analysis which distinguishes between types of bizarreness and allows for a bizarreness baseline. This procedure involves two steps, the first being Element identification. Fourteen elements are identified in each dream and include: self, cognition, place, sensory experiences, time, objects, persons, events, animals, emotions, body parts, language, plants, and actions. The second step is the bizarreness coding of these elements along several dimensions. First the element is identified as bizarre or not and those that are identified as bizarre are further classified in terms of incongruity and vagueness. Additionally, each of these classifications, including the non-bizarre elements, is further identified in terms of discontinuity. Incongruous elements further break down into internally distorted/contextually incongruous elements, exotic elements, or impossible elements. This procedure allows a comparison across content categories (e.g. elements) for the three major types of bizarreness (discontinuousness, vagueness, and incongruity) which have been identified in the literature (Hobson, 1988). Two judges were trained together on this system and reached acceptable levels of inter-judge reliability (.80 agreement).

2.2. Results and Discussion

For inclusion in this analysis both high- and low-end gamer groups were identified based on previous research (Gackenbach, 2006; 2008). In order for a dream to be selected, it had to have a minimum of 50 words in the dream (M = 118; SD = 81.6). This was done due to concerns that word length might confound bizarreness coding as it may take more words to describe a bizarre element (Hunt, 1989). Also the major content analysis system (Hall and VandeCastle, 1966) recommends analysis of dreams of 50 words or more. There were no gamer group differences in number of words per dream, $t(230)$ = -0.65, ns (high-end gamers M = 123.8; low gamers M = 116.0).

Average age was less than 25 years (51%). Gender was unevenly distributed between gamer groups (as is typical in the gaming literature, low-end gamers were primarily female and high-end gamers were primarily male). There were 54 men and 177 women in this sample with one respondent not indicating their sex. Most dreams were from the previous night or week (78%) and most participants had the amount of sleep they needed to be rested (69%). There were no

group differences in terms of when the dream occurred (sometime between last night and last week), $F(1,226) = 0.56$, ns; partial $\eta^2 = .002$) or in the hours of sleep they had the night before the dream, $F(1,223) = 2.65$, $p = .105$; partial $\eta^2 = .012$). However, there was a gamer group difference in terms of number of hours they reported they needed to feel rested, $F(1,226) = 6.23$, $p = .01$; partial $\eta^2 = .027$, high-end gamers reported a need for less sleep. These variables may have implications for ease of dream recall. Additionally, the subsequent factor analysis is based upon these 232 dreams and not the entire sample from which they were selected.

Since the focus of this analysis is to further illuminate the gamer-lucidity-bizarreness connection a principle component factor analysis with a varimax rotation was computed. The items for this factor analysis were chosen as they are also available in the second study and thus allow a direct comparison of results between the two studies. There were five video game play questions and one asking about gaming the day before the dream. Six dream bizarreness variables were entered as well including nonbizarreness, vagueness, discontinuous, and three types of incongruous; distorted, exotic and impossible. Finally, self-reports of dream types in response to the recent dream recorded included lucid, control, observer and nightmare. This analysis is portrayed in Table 1.

Only factors with eigen values above one were kept in the analysis with these percentages of the variances for each factor: Factor 1 is 20.91%, Factor 2 is 10.86%, Factor 3 is 10.56%, Factor 4 is 7.82%, and Factor 5 is 7.55%. Interpretation is fairly clean using a .4 cutoff. The first factor loaded all the gaming variables while the second loaded most of the dream bizarreness variables. The third factor was high impossible content associated with a lack of lucidity and the presence of dream control. Factor 4 was the only one showing associations between all three types of variables with a lack of nightmares associated with distorted bizarreness type in the dreams and starting playing video games at an older age. The final factor was observer dreams.

3. Study 2

3.1. Method

This study was part of Gackenbach, Ferguson, Mathewson, and Darlington (2012). Only selected variables will be examined in this inquiry in order to add to the information gathered in Study 1.

3.1.1 Participants

During the academic year 2011-2012, 508 individuals entered the survey; 267 in the fall term and 241 in the winter term. The full sample demographics were 313 women and 152 men with the remaining not providing gender information. Their ages were 19 years of age or younger for 261 and another 172 were 20 to 25 years old. Forty-three did not provide age information and the rest were older than 25. The average dream recall of the sample was between once a week to 2 to 3 times a month.

3.1.2 Instrument

Demographics: The first part of the online survey asked about general demographic information including gender, age, typical dream recall and motion sickness vulnerability.

Video Game and Dream Recall History: This part of the questionnaire asked about the research participants video game play history. Questions asked dealt with frequency of play, length of typical play session, number of games played over a life time and age began playing. The validity of this measure is as pointed out for Study 1 (Gackenbach & Bown, 2011).

Dream Collection Questions: Subjects most recent dream was collected followed by several questions about the type of dream they reported, as well as emotions felt during the dream. Here a refined question regarding both virtual reality in dreams as well as degree of lucidity in the dreams have been added which were not asked in previous research in our lab.

Daily Activity: This has several parts beginning with video game play the day before the most recent dream they recall. Other media used and other daily activities are also inquired about as indicated in the research literature as relevant to dream incorporation. While there is an emphasis on media use, and especially computer and video game play use, there are also questions about activities with significant others. While daily activities have been gathered before there are questions on this survey that have not been asked in our laboratory. A subset of questions were asked about in terms of the time engaged in the activity the day before the dream and the emotional valence of the activity.

3.1.3 Procedure

Students were given access to the online survey through their participation in Introductory Psychology mass testing research pool at a western Canadian university. Their credit was awarded, 2% of the final grade in their course, by entering the computer management system. Thus when they were directed to the survey all identifiers were stripped and they participated completely anonymously. They first had to agree to participate by agreeing to an informed consent. They were told that there would be no loss in credit if they decided to not participate or if they dropped out at any time. Once they finished the survey or closed it choosing not to continue they were presented with a debriefing statement.

As with the first study, dream bizarreness was assessed by independent judges using the Revonsuo and Salmivalli (1995) procedure.

3.2. Results and Discussion

As with study one only selected variables are examined herein. They were selected to address the question of any relationship between gaming, dream bizarreness and dream type. In order to directly compare the results of this data collection effort to the previous one a limited number of variables were selected.

There were five video game play questions with four dealing with history of gaming and one with gaming the day before the dream. Six dream bizarreness variables were entered as well including non-bizarreness, vagueness, discontinuous, and three types of incongruous, distorted, exotic and impossible. Finally, self-reports of dream types in response to the recent dream recorded included lucid, control, observer and nightmare. This rotated factor table can be seen in Table 2.

Only factors with eigen values above one were kept in the analysis with these percentages of the variances for each factor: Factor 1 is 18.26%, Factor 2 is 14.56%, Factor 3

Table 2. Varimax rotated factor analysis on selected gaming, dream bizarreness and dream type variables.

	1	2	3	4
Frequency of playing video games	.838	.048	.159	-.035
Length of playing session	.685	-.006	.073	.095
Number of video games played	.764	.045	.077	-.057
Age of first gaming experience (hi#=younger)	.520	.038	-.263	-.119
Video game play the day before the dream (2=yes;1=no)	.771	.130	-.019	.037
Nonbizarreness mean	.024	.712	.039	-.181
Bizarreness: Vague mean	.126	.552	-.190	.270
Bizarreness: Discontinuous mean of sums	.021	.758	-.060	-.097
Bizarreness: Incongruous distorted mean	-.120	.247	-.082	-.593
Bizarreness: Incongruous exotic mean	-.044	.510	.080	-.389
Bizarreness: Incongruous impossible mean	.190	.647	.245	.223
Dreamer Classification of Recent Dream: Lucid dream	.011	.000	.651	.141
Dreamer Classification of Recent Dream: Observer dream	-.119	.083	.271	.544
Dreamer Classification of Recent Dream: Control dream	.041	.066	.761	.000
Dreamer Classification of Recent Dream: Nightmare dream	-.181	.153	-.445	.527

is 9.97%, and Factor 4 is 8.60%. A .4 cutoff was used for interpretation. As with the first factor analysis in study one the first factor was all gaming variables while the second one captured all but one of the dream bizarreness variables. The last two factors were somewhat different in this data set. Specifically, the third factor is all dreams but the observer loaded while for the last factor observer dreams and nightmares loaded with the lack of distorted incongruous bizarre items.

4. General Discussion

Two past studies were examined to see if the previous association which was found between video game play and dream bizarreness (Gackenbach & Kuruvilla, 2008; Gackenbach, Kuruvilla, & Dopko, 2009; Gackenbach & Dopko, 2012) was mitigated by dream type, especially lucid dreaming. One of the ways that dreams become lucid, according to past research (Snyder & Gackenbach, 1988,) is due to recognizing an oddity in the dream. Additionally, of related importance is training to recognize oddities while awake which presumably translate to their recognition while sleeping and thus is one type of lucid dreaming training technique (LaBerge, 1985). Thus it was hypothesized that if gamers do have more odd dreams and at times they have been reported to have more lucid dreams, then it was hypothesized that these three factors should all be associated, i.e. gaming, dream bizarreness and lucidity.

Factor analyses in each study was done in order to compare results across studies. While both studies were done at the same western Canadian university, the data collection efforts were several years apart although both from the Introductory Psychology pool of research participants. In the first factor analysis from each study the same gaming, judges dream bizarreness rating and self-report dream type variables were collected. In both studies the gaming variables loaded all together in the first factors while the second factors were predominantly judge's bizarreness ratings. In terms of the hypothesis these two factor analysis did not support an association between gaming and dream bizarreness. Nor do they support an association between dream lucidity and dream bizarreness. In fact in study one the lack of lucidity was associated with impossible type of dream bizarreness. The third and fourth factors were different across these two studies.

The limitations of these inquiries are of course that they are self-report estimates and thus the various biases associated with self-report must be kept in mind. However, there is validity data on both the video game history scales and the procedure for coding dreams along bizarreness dimensions. Thus these inquiries are grounded. The self-report of a dream as lucid however is less secure. However, due to increasing media exposure (i.e. films like "Inception") this generation of students is less likely to confuse dream lucidity with dream recall as had been the case in our original work (Snyder & Gackenbach, 1988). Secondly, the findings are purely associations so no claim to causality can be made. Finally, the sex of research participant problem remains. The majority in both samples were female. Gender and gaming history are consistently inversely related in our work despite industry claims of increasing female presence in the gaming communities. It might be that if purely male samples were considered that a different set of findings might result. .

The central thesis of an association between gaming and dream bizarreness is not supported with one caveat. That is, some association seems to be there for age of beginning play across in Study 1 but not Study 2. However, also of interest is that the claim of dream bizarreness associated with lucidity was also not supported. In Study 1 there was an inverse relationship between one type of bizarreness and lucidity while in Study 2 there was no relationship between any type of bizarreness in dreams and lucidity. The relationship between gaming, dream bizarreness and lucidity remains unknown if none-existent and requires further inquiry.

Authors Note

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References

Domhoff, G.W. (2007). Realistic simulation and bizarreness in dream content: Past findings and suggestions for future research. In D. Barrett & P. McNamara (Eds.), The New Science of Dreaming: Content Recall, and Personality Characteristics (Vol. 2, pp. 1-27). Westport, CT: Praeger Press.

Gackenbach, J.I. (2006). Video game play and lucid dreams: Implications for the development of consciousness. Dreaming, 16(2), 96-110.

Gackenbach, J.I. (2008). Video game play and consciousness development: A transpersonal perspective. Journal of Transpersonal Psychology, 40(1), 60-87.

Gackenbach, J.I. (2009). Video game play and consciousness development: A replication and extension. International Journal of Dream Research, 2(1), 3-11.

Gackenbach, J.I. & Bown, J. (2011). Mindfulness and video game play: A preliminary inquiry. Mindfulness, 2(2), 114-122.

Gackenbach, J.I. & Dopko, R. (2012). The Relationship between Video Game Play, Dream Bizarreness, and Creativity. International Journal of Dream Research. 5(1), 23-36.

Gackenbach, J.I., Ferguson, M., Mathewson, K., & Darlington, M. (2012, June). History of gaming and daily activities as predictors of nightmares. Poster presented at the annual meeting of the International Association for the Study of Dreams, Berkeley, CA.

Gackenbach, J. I., Kuruvilla, B., & Dopko, R. (2009). Video game play and dream bizarreness. Dreaming, 19(4), 218-231.

Gackenbach, J.I. & Kuruvilla, B. (2008). Video game play effects on dreams: Self-evaluation and content analysis. Eludamos. Journal for Computer Game Culture. 2(2), 169-186.

Hall, C., & Van de Castle, R. (1966). The content analysis of dreams. East Norwalk: Appleton.

Hobson, J.A. (1988). The dreaming brain. New York: Basic Books

Hunt, H. (1982). Forms of dreaming. Perceptual and Motor Skills, 54, 559-635.

Hunt, H. (1989). Multiplicity of dreams: Memory, imagination, and consciousness. Westford, MA: Yale University Press.

LaBerge, S. (1985). Lucid Dreaming: The power of being aware and awake in your dreams. NY: Ballentine.

Revonsuo, A. (2006). Inner presence: Consciousness as a biological phenomenon. Cambridge: MIT Press.

Revonsuo, A., & Salmivalli, C. (1995). A content analysis of bizarre elements in dreams. Dreaming, 5(3), 160-187.

Snyder, T. J. & Gackenbach, J. I. (1988). Individual differences associated with lucid dreaming. In J. I. Gackenbach & S. LaBerge (Eds.), Conscious mind, sleeping brain: Perspectives on lucid dreaming, N.Y.: Plenum.