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Video Game Play as Nightmare Protection: A Preliminary Inquiry with Military Gamers

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Abstract

Soldiers who play video games to varying degrees were solicited to fill out a survey on dreams and gaming. A prescreening filtered out those who were not soldiers, who did not game and who were suffering from various psychological problems in the last six months. The remaining soldiers filled out these inventories; general and military demographics, history of video game play, Emotional Reactivity and Numbing Scale (ERNS), and a Trauma Inventory. They were then asked to provide two dreams, one recent and one that was impactful from their military service. Following the military dream they filled out Impactful Dreams Questionnaire (IDQ) about that dream only. Dream content analysis was conducted using threat simulation, war content and lucid/control/gaming content. High and low end frequency gamer groups were identified and compared on these dream content scales. Because the nightmare literature shows that affect load and distress are predictors of nightmare suffering, ERNS and Trauma history were covariates in the ANCOVA's on gamer group x dream type. It was found that the high end gaming group exhibited less threat and war content in their military dreams than the low end group.

Keywords: nightmares, video game, threat simulation, military, war, dreams

Video Game Play as Nightmare Protection: A Preliminary Inquiry with Military Gamers

Gackenbach and colleagues have been investigating how video game play affects dreams (summarized in Gackenbach, Kuruvilla, Dopko, & Le, 2010; Gackenbach, in press). One type of dream that they have studied is the nightmare (Gackenbach & Kuruvilla, 2008a, 2008b; Gackenbach et al, 2009; Lee & Gackenbach, 2009). In early inquiries they found through content analysis that, while gamers did behave aggressively in dreams, this behaviour occurred far less often than with those who rarely gamed. On the other hand, when dream aggression happened for gamers, it was more intense. Gamers were also less likely to experience misfortune in dreams. This combination of selective but strong aggression and the lack of misfortune suggested that gamers did not see threat in a dream as frightening, but rather as empowering. This was supported in a follow-up study looking specifically at the threat elements in the dreams of gamers versus low-end players. Gackenbach and Kuruvilla (2008a) found that not only were gamers' dreams not associated with threat motifs, gamers did not consider these dreams as nightmares, nor did they see them as scary. In their study, threatening dream content was associated with watching violent TV or movies the night before the dream.

In a second follow-up, the Gackenbach group has looked at nightmares versus bad dreams, a distinction important in the dream literature (Zadra, Pilon, & Donderi, 2006). Zadra (2010) pointed out that nightmares are more likely to be characterized by physical aggression, whereas bad dreams are more often associated with interpersonal conflict. Thus this distinction seemed appropriate for further examination of gamers' nightmares. Lee and Gackenbach (2009) reported different emotional responses to these two types of dream as a function of gaming. Specifically, gamers did not feel anxiety in their nightmares but they did in their bad dreams. The rarely gaming group reported no difference in anxiety as a function of negative dream type. Thus, as had been found before by this research group, the unique response to nightmares evidenced by gamers seems not to be the same as their response to bad dreams, but is specific to the type of dream which most closely resembles their game life, the nightmare.

This lack of emotional responsivity to the nightmare may be due to the numbing-to-violence which has been found in the gaming and violence literature (Bushman & Anderson, 2009). But gamers' are also active in these dreams. Thus a possible chain of events is that heavy gamers who play first person shooter or action/adventure type genres, practice reacting quickly and violently to threat in a game. When they experience threat in a dream, rather

than being intimidated by the threat, they are empowered and fight back. Here is a dream showing this scenario from Gackenbach et al (2009):

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? And when I ran out of ammunition there was like pistol whipping and stuff going on (Subject 002, dream 6)

In part this response in dreams may be due to gamers' reports of more dream control and lucidity, knowing they are dreaming while they are dreaming, than has been found in those who rarely game (Gackenbach, 2006; 2009). In any case this unique gamer response to the classic nightmare scenario-- a sudden and unexpected threat appears in a dream; the dreamer feels helpless in the face of it and awakens due to the fear it induces -- offers potential nightmare inoculation to those who may face such threats in the real world. The segments of society who regularly face such threats are first responders, such as police and fire fighters, and those in the military.

Video game play may offer not only a type of training for learning to shoot targets or attend to peripheral cues in a dangerous environment, but also some inoculation to threats in nightmares. These dreams are the most common element of post-traumatic stress due to trauma. In a review and theoretical conceptualization of the nightmare literature, Levin and Nielsen (2007; 2009) pointed out that nightmares occur not only due to a daily stressor but also to affect distress predispositions. In their model they consider affect load, or situational events like interpersonal conflict and trauma, and affect distress, or dispositional traits which may be genetic or due to life history like attachment issues or unresolved trauma, as interacting to result in the experience of a nightmare. At its worst this process can become pathological by disturbing sleep in order to avoid the nightmare or in response to the nightmare. In addition, the psychological distress resulting from the nightmare can re-traumatize (Barrett, 2001).

In a more clinically oriented review of the post-traumatic nightmare literature, Phelps, Forbes, and Creamer (2007) point out that memory for traumatic events is stored in a different way than for every day events. These trauma memories are unprocessed. Thus the hallmark of the Post Traumatic Stress Disorder (PTSD) nightmare is "a repetitive, replay of the traumatic event, complete with accompanying cognitive, affective, physiological, and

behavioural response” (p. 342) and can occur for decades. Therapeutically Phelps et al. point out that “various studies emphasize the importance of ‘facing and conquering’ the feared nightmare, in order to eliminate it” (p. 352). This echoes what the Gackenbach group has found to be well learned and thus spontaneous for gamers.

The idea that virtual worlds might act as therapy and/or protection against such trauma affects has been addressed as well. Bushman and Anderson (2009) talk about how the numbing effects of violent media, including gaming and movies, inhibit helping. And on the flip side Anderson and Dill (2000) concluded that there was an increase in aggressive thoughts, feelings and behaviour associated with violent video game play. While not without criticisms (Ferguson, 2009), this work certainly supports the finding of some bleed of aggressive behaviour from gaming into dreams found by the Gackenbach group. Relatedly, virtual worlds has also been used in stress inoculation training for PTSD by Wiederhold and Wiederhold (2008) and thus is consistent with the current suggested inquiry.

In the present study of military gamers, it is hypothesized that those who game the most will experience less threat in dreams that occurred while in the military when affect distress and load are controlled. Additionally more dream control is expected among high-end military gamers.

Method

Participants

Individuals who are currently serving in the military or have served in the military constituted the research participants (N=377). They were contacted through announcements posted through social organizations or online websites; or they wrote the first author in response to media articles about her research program. Upon contact they were asked to participate in a research study examining the relationship between playing video games and being in the military. They were referred to the data collection website, where they were pre-screened. Those who fit the pre-screening criteria moved on to the research web site. All individuals who served or are currently serving in the military were eligible. Neither credit, nor payment was offered for participation.

The first level of pre-screening inquired about whether the potential participant had played video games. All but two responded affirmatively. They went on to the second level of pre-screening where several demographic questions were asked (e.g. age), as well as questions designed to determine whether the individual had suffering

stress-related symptoms in the last six months. If potential participants did not meet the demographic requirements or indicated stress-related symptoms in the previous six months, they were not moved on to the full questionnaire. Of the 377 who started the pre-screening, 115 indicated that they had not been in the military, 31 indicated that they were not yet 18 years of age, and 16 indicated that they did not have a high school education. Responses that were affirmative to the questions about stress in the previous six months indicated that 29 had been diagnosed with a mental disorder; eight had considered suicide; 58 had engaged in risky behaviours without concern for their mortality; and 20 had been addicted to drugs or alcohol. Thus 279 potential research subjects were eliminated: two as non-gamers; 162 due to demographic requirements; and 115 because of stress-related symptoms in the previous six months. The research questionnaire was completed by the remaining 98 soldiers.

Measures:

These are listed in the order they were administered online.

Prescreening Questionnaire: Eight questions constituted the two prescreening levels. The first level simply asked whether the potential participants had ever played video games. A positive response allowed participants to proceed to the second prescreening level where they were asked three demographic questions (i.e., military, age, education) and four mental health questions derived from Davis, Byrd, Rhudy, and Wright (2007). Skip logic on these questions did not allow moving on if a question was answered incorrectly. As noted, criteria for exclusion were less than 18 years of age, not having a high school education and not being in the military as well as indications of apparent diagnosed mental disorder, “active suicidality or recent parasuicidal behaviors, or current alcohol or drug dependence” (p. 190). This list is in line with a previous study on nightmares in trauma-exposed individuals seeking treatment (Davis, et al., 2007).

Demographic Questionnaire: This was adapted from Smith et al., (2007) and Hoge, Auchterlonie, and Milliken (2006). Both studies examined health behaviours associated with military deployment. Thus these 11 items asked for general demographic information; gender, age, education, marital status, race or ethnicity, and military specific information: country where served, military pay grade, service type component, branch of the service, occupational service category, deployment history and deployment experience.

Video Game Play History Questionnaire: This 18-item questionnaire was adapted from Gackenbach (2006; 2009; & Rosie, 2009; & Rosie, Bown, Sample, 2011). Questions inquired into the participants' life history of playing video games, including genres of preferred games. The questionnaire also asked about games played prior to filling out the questionnaire in order to get a recent sample of play behaviour. Types of question included frequency of play, length of play, number of games played, age begun play, age of peak play, and genres preferred at various times in the lifespan. These questions were followed by others inquiring into game(s) played immediately prior to filling out the questionnaires. Questions were also asked about physical game apparatus used as well as social elements of play.

Gackenbach and Bown (2011) report the following validity information for this scale. In their study, the four game group-defining variables were frequency of play, duration of typical play, number of games played in a lifetime, and age begun playing with younger coded as a 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 subjects 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 behaviour, in the 24 hours prior to filling out the research inventories" (p. 3).

Emotional Reactivity and Numbing Scale (ERNS). This 62-item scale was developed by Orsillo, Theodore-Okloka, Luterek, and Plumb (2007) because hyperarousability and numbing are known to be part of the experience of PTSD. However, while there are other emotional reactivity measures, they do not include the numbing aspect which has been found to affect PTSDs "development, maintenance, and treatment" (p. 830; Orsillo, et al., 2007). This scale was normed on U.S. military veterans and thus was most directly relevant to the current inquiry. Items are clustered into five subscales: positive subscale, sad subscale, general subscale, anger subscale, and fear subscale. Orsillo et al. report that these "demonstrated good to excellent internal consistencies with the following Cronbach α levels: positive subscale, $\alpha = 0.91$; sadness subscale, $\alpha = 0.88$; anger subscale, $\alpha = 0.87$; fear subscale, $\alpha = 0.81$;

general subscale, $\alpha = 0.81$ " (p. 3). This scale was also reported as having good test-retest reliability as well as convergent and discriminate validity.

Trauma Inventory: This 38-item scale was adapted from the *Loss/Trauma Questionnaire* of Eng, Kuiken, Temme, and Sharma (2005). The part used herein inquired about the incidence and intensity of nine types of trauma:

- Physical Assault: assault, incest, sexual assault, mutilation, physical abuse
- Recurrent Physical Assault: repeated physical assault (as defined above)
- Recurrent Emotional Abuse: repeated verbal aggression, humiliation, neglect, or isolation
- Criminal Victimization: armed robbery, burglary, kidnapping, drive-by shooting
- Negligent Injury: drunk driving resulting in physical harm, a serious car accident resulting in physical harm, inappropriate or negligent medical treatment resulting in physical harm
- Civil, Domestic, or Industrial Disaster: serious fires, collapse of a structure (e.g., bridge), crash of a transportation system (e.g., plane, train), technological accident (e.g., exposure to radiation), work-related accident (e.g., explosion)
- Cultural Violence: war, genocide, terrorism, torture
- Natural Disasters: earthquake, hurricane, tornado, avalanche, forest fire, flood
- Other trauma: e.g., life threatening illness, animal attacks, freak accidents

Each trauma was briefly defined and then followed by a yes/no question as to whether it had been experienced and at what age it was experienced. Two additional questions were asked about intensity of the effects of the experience and nightmare occurrence after the experience. Unfortunately, due to a problem with the software question formatting, these were not usable data.

Recent and Impactful Dream Recordings Scale: This questionnaire is adapted from Lee (2009). Respondents are asked first to supply the most recent dream they can recall and then an impactful dream which they believe deals with their military experience. An impactful dream is asked for rather than a nightmare in order to allow for a wider range of replies and not to assume that there were nightmares. In each case subjects are instructed to tell the dream in as much detail as they can. The dream recording instructions were the following:

Please pick the most recent dream that you recall, preferably from last night. Please describe this dream as exactly and as fully as you can remember it. Try to tell the dream story, from beginning to end, as if it were

happening again (and without any interpretation or explanation). Your report should contain, if possible, a description of:

- all the objects, places, characters, and events in your dream;
- the entire sequence of actions and events, from the beginning to the end of your dream;
- your moment-to-moment thoughts and feelings, from the beginning to the end of your dream;
- and
- any unusual, incongruous, or implausible dream thoughts, feelings, objects, places, characters, or events

After giving the time when the recent dream occurred subjects were then asked to provide a “Military Experience Impactful Dream”. These instructions were as follows:

An impactful dream is one that continues to influence your thoughts and feelings even after you have awakened. Please choose one such dream that is potentially related, either directly or indirectly, to your military experience.

The rest of the military impactful dream instructions were the same as the recent dream instructions.

Impactful Dreams Questionnaire (IDQ): This scale is adapted from Zadra, Pilon, and Donderi, (2006) and Busink and Kuiken (1996). The first part asked about 15 emotions and their intensity that the dreamer thought was experienced during the impactful dream, as per Zadra et al. (2006). However, there was a problem with the item structure due to software issues, thus this information was lost. Following these emotional evaluations of the dream was a list of 19 questions asking about the military impactful dream as per Busink and Kuiken originally and most recently restructured by Kuiken (2009) in order to classify the dream as nightmare, existential, or transcendental.

Procedure

Prior to the data collection phase of the study the research assistant participated in a private crisis intervention paraprofessional training. This student worked on the project as part of her undergraduate coursework at a western Canadian distance education university. This training was designed to sensitize her to potential problems in the subject correspondence phase of the study.

The sampling technique was convenience sampling. The next stage of the project was an exploration of possible local, regional and online places where current and former military personnel might be contacted. Calls for research participation were posted to several websites including military www.military.com, www.usmessageboard.com, www.army.ca, www.americasarmy.com, and gaming sites like www.militarygamers.net, www.gamers-forum.com, and comic book sites like <http://www.the-master-list.com/>. A major psychology research web site was also used to solicit potential subjects. A facebook page was created supporting the research project with cross posts which were made to two Canadian Forces pages, a US Army support page, a US Veteran and a World of Warcraft fan site. Brochures and bulletins were handed out and posted at military bases in western Canada and in southern California. Also support was sought from Military Family Resource Centres as well as some social gathering spots for the military around bases in these two regions. Finally, 55 possible participants wrote to the first author after a series of media articles appeared about this research laboratory wanting more information about the research and/or offering to help.

Some notices of the research included the web address of the questionnaire, i.e., the psychology research website, while other possible participants were contacted by the research assistant and asked if they would be interested in participating in a research study. Queries came to the assistant from the posters and brochures as well as from media attention to the research program. Participants were advised that related questionnaires to the study's purpose of examining gaming in the military would also be administered. At this juncture the explanation of these related surveys was kept broad, i.e. personality scales, life experiences, and dreams questions. Those who agreed to participate were sent the questionnaire web address. While IP addresses and referring URL's were gathered automatically by the survey software, 130 of those who entered the survey did not have a referring URL. This means that they entered from an email response or typed in the web address to their browser. The largest referring URL was the United States psychology research site (n=143).

If potential participants answered the first question about playing video games in the affirmative, they were presented with an electronic informed consent for the remainder of the prescreening questions. Only those who fulfilled the criteria were moved on to the second informed consent which described the entire study. If ever in doubt about a potential participant, the researchers did not move forward with that possible participant. For instance, there were a few cases where a soldier wrote the first author and indicated they he/she suffered from PTSD. In these

cases our response was an appreciation for their interest in our work but no invitation to participate was sent. Those who went through the brief prescreening questions and did not meet the criteria were taken to a debriefing statement explaining the hypothesis of the study and the background research findings. The emails that were received due to the media attention had been sent to the principle researcher and, where appropriate, they were forwarded to the research assistant who contacted these interested individuals and gave them the web address of the study. Thus, for some subjects who found out about the research through media, there was another initial screening by the principle researcher.

No individual identities were gathered in the questionnaire at any phase and there was no way to know which of the people who received emails actually went on to participate. Thus all specific responses to the online questionnaires were completely anonymous.

The participant was told in the informed consent prior to the full questionnaire, that there were six questionnaires to be filled out and that it should take between 1 and 1.5 hours. They were told that they would receive a debriefing about the study upon completion of the surveys and that they could put their name on a list to receive either the executive summary and/or the full report of the study's findings.

Upon entering the full questionnaire part of the website, each participant agreed electronically to participate after reading and agreeing to the informed consent. Upon completion of the survey they were shown a debriefing statement. This statement was placed at the bottom of each electronic page of the survey, "*We are aware of the sensitive nature of the information that we just requested. Please feel free to discontinue your participation or disallow the use of your responses at any time.*" If subjects decided to stop their participation before finishing the survey, they were encouraged in the informed consent to write the researcher and receive the debriefing statement.

Results

Those who made it through the pre-screening, N=98, were divided into gaming groups as a function of the frequency of their self reported current game play. The high end group (N=64) were those who reported playing daily or weekly while the low end group (N=22) were those who reported playing video games but less often (monthly, yearly or rarely). By way of verification, the high end group was compared to the low end group in terms of several other game play variables and were scored significantly higher in each case. These included length of play

($t(83)=4.17$, $p<.0001$), number of games played ($t(84)=3.195$, $p<.002$), and age began play ($t(84)=2.33$, $p<.02$). High end gamers play longer, played more games and started earlier in life than the low end gamers.

Further supporting these group definitions was the information about types of games. Ninety-six percent of the high end group preferred game genre that were typical of the classic hard core gamer, e.g., first person shooter, massively multi-player, action/adventure, simulation, fighting, and strategy. While the majority of the low end group also preferred these same classic genre (67%), a significant minority of the low end gamers (29%) preferred casual games¹. A small percentage of each group preferred sport and driving games (3% of the highs and 5% of the lows). Another question regarding game preferences was gathered where participants were asked if they had just played a video game prior to filling out the questionnaire. While the high end gamers were equally likely to say they had ($N=33$) or had not ($N=30$) been playing a video game just prior to filling out the questionnaire, the low end gamers were more likely to report not having played ($N=19$) than having just played ($N=1$) ($\chi^2(1) = 14.092$, $p<.0001$). These respondents listed a variety of games as played the most just prior to filling out the questionnaire. Role playing games, such as Mass Effect, were identified 19 times; Action Adventure, such as Dead Rising, identified 7 times; Shooters, such as Call of Duty Modern Warfare 2, identified 23 times; Strategy, such as Civilization 4, identified 11 times; Simulations, such as Madden 2011, identified 6 times; and Casual, such as Yohoho, identified 3 times. As in the examples just provided, most (67%) of the games just played were war or battle type games across genre.

Video game groups were then compared in terms of general and military demographics. Gender and education differed across groups for general demographics, with more women and higher educated individuals falling in the low end gamer group (Gender: $\chi^2(1) = 15.21$, $p<.0001$); Education: $\chi^2(3) = 17.07$, $p<.001$). There was no difference in marital status or racial/ethnic background. For military demographics there were relatively fewer enlisted soldiers in the low end gamer group ($\chi^2(2) = 6.45$, $p<.04$) but none of the other military demographics evidenced a gamer group difference (i.e., Country of military service, Service component, Branch of service, Occupational category while in the military). Of particular interest to the present study were any group differences in Military Deployment or Combat. None of these seven questions (i.e., sum of deployments ($t(84)=.06$);

¹ Casual games take less time to play and are cognitive and emotionally less engaging, i.e. lower in presence, than the traditional “hard” core games (Gackenbach & Bown, 2011).

deployed or not ($t(84)=-.524$); combat experience ($t(84)=-.15$); witnessed others being wounded or killed ($t(84)=1.49$); discharged a weapon ($t(84)=.09$); danger of being wounded ($t(84)=.85$), was wounded ($t(84)=1.62$); or felt in great danger of being killed ($t(84)=.10$) showed gamer group differences. Both groups reported on average 1 ½ deployments across their life spans and answered affirmatively to an average of two of the six combat questions.

In order to determine the possible effects of game play on dreams that might be nightmarish, covariates predictive of nightmares needed to be controlled. These were assessed in the present study. Affect distress was assessed using the Emotional Reactivity and Numbing Scale (Orsillo, et al, 2007; ERNS), with five subscale scores. Affect load was determined in terms of personal history, sum of lifetime traumas, and in terms of military experience, sum of combat experiences and whether they were deployed. Gamer group t-tests on each of these variables were computed and are portrayed in Table 1. It can be seen that three of the subscales of the affect distress measure (ERNS) showed group differences while none of the measures of affect load resulted in gamer group differences. Specifically, the low end gamer group were sadder, angrier and more fearful than the high end gamer group soldiers. ERNS subscale norms for both PTSD and none PTSD soldiers are also listed in Table 3. It can be seen that the current set of soldiers had some differences and some similarities to the veterans used in the ERNS samples. Specifically, both gamer groups fell between the PTSD and none-PTSD positive subscale scores. While for the sadness ERNS subscale both gamer groups fell below the two norm groups. The general, or emotional numbing, subscale scores for the gamer groups in this study were at or below those of the norm groups. Anger subscale scores were higher for the low end gamer group than the norms. Finally, the fear subscale scores for this sample were below the ERNS norm groups. In order to determine the effects of gaming on nightmarish content in dreams all affect distress and affect load variables were used as covariates in all analysis of dream content.

Dream Content Analysis

Dreams were content analyzed using three systems. First was Revonsuo's (2000; 2006; & Valli, 2000) threat simulation content analysis system. A threatening event in a dream is one which meets at least one of the following two criteria:

Objective threat: An event in a dream where, if the event was real, the physical or mental well-being of any person would be endangered or where any person's physical resources or territory would be jeopardized

(i.e. any event that would be considered threatening if it should really occur in the waking life). Such an event may be directly witnessed by the dreamer reporting the event or only indirectly heard about in the dream.

Subjective threat: An event in a dream that is interpreted or emotionally experienced by the dreamer (i.e. the dream Self) to be somehow dangerous. Any event in which the subject reports the feeling of danger or threat even if no objective threat (as defined above) is reported to accompany this feeling.

Then Wilmer's (1996) system of classifying dreams of Vietnam veterans was used to content analyze these dreams.

In this system dreams are classified as:

Category I is the characteristic terrifying nightmare of the actual event as if it were recorded by cinema ...

Category II or the "variable" nightmares contain plausible war sequences that conceivably could have happened but did not actually occur ... Category III dreams are like ordinary nightmares, but their identification with the specific trauma or place of the trauma, that is, the Vietnam war, is always present. (p. 87).

Along with Hartmann (1984), Wilmer holds that movement away from a literal replay of the dream, indicates healing, and integration with other autobiographical memories. Finally, the degree of lucidity/control and game play types of activities in the dreams was assessed.

Before the content analyses are discussed, the time when the dreams occurred was examined. An ANOVA of Dream Type (recent/military) x Gamer Group (high/low) was computed on time of dream. A main effect for dream type emerged ($F(1,72)=19.177$, $p<.0001$, $\text{partial } \eta^2=.210$). Military dreams were older than recent dreams. The military dream mean was "within the last 6 months" while recent dream mean was "last week sometime". Despite this difference this was not used as a covariate because the time difference was built into the questions about which dreams to report. Not all soldiers who participated were currently in the military so a military dream would be expected to have happened awhile ago. Within the last six months is actually rather recent, relatively speaking for how long ago it could have been. Likely the weeding out of individuals who never gamed resulted in this finding, that is, subjects would likely have been older and thus their military dreams longer ago.

Threat Simulation Dream Content Analysis

One judge was trained to rate the morning after dream reports using the “Dream Threat Rating Scale” (Revonsuo, 2000). Using this system, dream analysis is carried out in two phases. To begin, the researcher must identify and isolate the description of any threatening events that may occur in a dream report. A threatening event is one that meets at least one of the following two criteria as noted earlier, “objective threat” or “subjective threat”.

Next, the identified threatening events are rated on the eight following subscales: Nature of the threatening event, target of the threat, severity of the threatening event for the self, participation of the self in the threatening event, reaction of the self to the threatening event, consequences of the threatening event to self, resolution of the threatening event, and the source of the threatening event. Each of the subscales allow for further classification within them. For example, an event being analyzed using the “nature of the threatening event” subscale allows the researcher to further breakdown the event by classifying it as one of a variety of threatening events including escapes, accidents, diseases, catastrophes, etc.

To ensure an adequate level of training, the judge rated dreams from Gackenbach and Kuruvilla (2008) until she came up to an 80% agreement with the threat simulation coding on that original set of ten dreams. Gamer Group (high/low) x Dream Type (recent/military) ANCOVA's with five affect distress, ERNS subscales, and three affect load, trauma experiences, as covariates were computed on the continuous variables for the Threat Simulation Scales. A main effect for nature of threat coded in terms of aggressiveness (1= no harm, 2= nonaggressive harm, 3= aggressive harm) was significant for dream type ($F(1,51)=6.99$, $p<.011$, partial $\eta^2=.12$) such that more aggressive threat was coded in military dreams than in the recent dreams. There was also a significant gamer group by dream type interaction ($F(1, 51)=4.596$, $p<.037$, partial $\eta^2=.083$), which is portrayed in Figure 1.

Also significant was a dream type main effect ($F(1,51) = 10.186$, $p<.002$, partial $\eta^2=.166$) and interaction ($F(1,51) = 3.244$, $p<.078$, partial $\eta^2=.06$) for severity of threat recoded to be continuous (1= none, 2= trivial, 3= social/psychological, 4= life threatening). In both analyses the military dreams had more severe threat than the recent dreams which was accounted for primarily by the low end gamers. None of the other three threat simulation variables treated as continuous were significant for either main effects or interactions: threat simulation present; sum of the number of threats from target threat, and consequences of threat. For conceptual reasons it's important to point out that self participation was marginally significant when only ENRS were covariates (dream main effect:

$F(1,55) = 3.35, p < .07$, partial $\eta^2 = .06$; dream by gamer interaction: $F(1,55) = 2.97, p < .09$, partial $\eta^2 = .05$). Low gamers in military dreams were less likely for the dream ego to participate than the high gamers.

Two threat simulation variables were treated as repeated measures, source of threat (i.e., personal, media, fiction and unidentified) and resolution of threat (i.e., happy, unhappy, discontinuous, dream ends). Thus ANCOVA's for gamer group by dream type by each of the within subject threat simulation variables were computed with affect distress and affect load as covariates. Significant three way interactions were evident in each case (source of threat $F(1,50) = 4.64, p < .04$, partial $\eta^2 = .085$; and resolution of threat $F(1,48) = 3.90, p < .05$, partial $\eta^2 = .085$). For the resolution of threat it can be seen in Figure 2 that a different pattern of resolutions to the threat was evident for the high versus the low end gamer groups. For the low end group, consistent with previous findings on threat simulation, there were more abrupt awakenings in the military dreams than in the recent ones while the opposite was the case for the high end gamer group. There was no difference between dream types for happy resolutions for the high end gamers, while military dreams were less likely to end in happy resolutions for the low end gamers. Another distinction between the resolutions of the high versus the low end gamer groups, is that for the lows there was not much difference in types of resolution for the recent dream but big differences in the lows military dreams. While for the high end gamers there were different patterns of resolution for the two different types of dreams.

The source of threat three way interaction is portrayed in Figure 3, where it can be seen that the largest source was personal but that the direction of this threat differed as a function of type of dream for high versus low gamers. Specifically, high gamers evidenced more personal threat in their military dreams while low gamers personal threat source did not differ as a function of dream type. The other three possible sources of threat (i.e., media, fiction or unidentified) did not differ as a function of dream type or gamer group.

War Content in Dreams

Wilmer's scale is constructed to code for war type content, as well as instructions for categorization of dreams as one of three types of nightmares. He developed the scale during his work with Viet Nam veterans who sought therapy for PTSD. The war type content included act frequency counts for: Under attack, War/battle, The dead, Firefights, Killing women and children, Killing enemy, Killing Buddies, Captured, Somewhere in war/battle, Being wounded, Chase and running, Home, Being killed, Animals, Decapitation, Looming danger, Shot down, Atrocities/ mutilation, Return to war/battle. These were summed and a Gamer Group (high/low) x Dream Type (recent/military) ANCOVA with the same affect distress and affect load covariates was computed. Both main effects

and the interaction were significant. These F-values and means are portrayed in Table 2. Military dreams were higher in war type content overall as were low gamers' dreams, but the interaction makes this clearer. Specifically, it was the military dreams of the low end gamers that had the most war content, which is consistent with the threat simulation findings.

Wilmer also instructs classification of dreams into one of three types of nightmares: actual events, plausible events, and ordinary nightmares. A chi-square on this classification as a function of dream type ($\chi^2(2) = 9.33, p < .01$) was significant and as a function of gamer group ($\chi^2(2) = 4.90, p < .08$) was near significant. The numbers and percentages along with Wilmer's norms are portrayed in Table 3. The military dreams were most likely to be classified as actual or plausible event nightmares, while the ordinary nightmares were more likely to come from the recent dream offerings. In terms of the gamer group effect, there was no difference in terms of actual event nightmares but the plausible event nightmares were considerably higher (83%) among the low end gamers than among the high end gamers (55%). This was reversed for the ordinary nightmares with high end gamers dreams being classified more (39%) here than the low end gamers dreams (11%).

Lucid/Control and Gaming Dream Content Analysis

A dream coding system has been developed in this laboratory for coding lucidity and related variables as well as game play in dreams (Gackenbach & Rosie, 2009; & Rosie, Bown, Sample, 2011; Gackenbach et al, 2009). It was further refined for the current inquiry. In this iteration there were two sections, lucid/control type scales and game type scales. In the lucid/control scales codersⁱ were asked to rate the lucidity, knowing subjects were dreaming while dreaming, as well as pre-lucid content (i.e., talking about dream in the dream, false awakening, wondering if a dream only to conclude it was not, and out-of-body experience in dream). A version of Kahan and LaBerge's (1994) MACE scale was adapted for coders to code if each type of thinking was present in the dream. Dream control was coded in terms of self, dream characters, and dream environment. Finally, the dream ego's stance, i.e. first person to third person, was assessed. As the intent is not to examine nightmarish content the previous covariates of affect load and distress were not used as covariates. Thus, there were no covariates on these analyses.

In these ANOVA's of dream type x gamer group there was no significance: Lucid & Prelucid Dream²; Dream: (F(1,59)=0.23, ns); Group: (F(1,59)=0.90, ns); Dream x Group: (F(1,59)=1.45, ns); Dream Control (Self, character, & environment); Dream: (F(1,59)=0.64, ns); Group: (F(1,59)=0.14, ns); Dream x Group: (F(1,59)=1.08, ns); and Dream Ego Stance; Dream: (F(1,59)=0.38, ns); Group: (F(1,59)=0.38, ns); Dream x Group: (F(1,59)=.38, ns). The MACE subscale scores were mean evaluations by judges of items that logically clustered. These clusters were focus on attention, emotion, thinking and task. There was a MACE by Dream Type interaction which is portrayed in Table 4 with F-values. According to the judges, there was more attention used in the military dreams overall than in the recent dreams while there were no dream type differences in emotions evident, thinking, and task focus with emotions being rated the highest.

The game in dream coding was approached in a variety of ways. First distinctions were made between the ways that games might be portrayed in dreams ranging from the dream being a game to an offhand mention of gaming. Thus these variables were coded as present or absent and then summed with blanks converted to zeros:

- a. In the dream the dream ego is in the game world – the dream is the game (leave blank if none of these)
 1. stated in the dream transcript
 2. implied in the dream transcript
- b. In the dream the playing a video game (leave blank if none of these)
 1. Dream ego playing a video game
 2. Watching others play a video game
 3. Other (i.e., video game playing in the background as a movie etc)
- c. In the dream games are mentioned (leave blank if none of these)
 1. Non-video game (i.e., sports watching on TV or watching live or playing 'real' sports; casino gambling)
 2. Video game (i.e., shopping for a video game, dressed as a video game character but clearly NOT playing it, winning a x-box)

² Sum of recoded judges evaluations of lucid and prelucid content.

It can be seen in Table 6 that only in the case of the recent dreams for the high end gamers was there some indication of gaming in the dream. It should be noted that the similarity of military themed content to military games played by these soldiers may be confounding these results.

Gaming was also taken up in terms of the five subscales generally defined from the Hall and Van de Castle content analysis of dreams (1966). These were coded as present or absent and in terms of game content and included:

Characters: Self is game character, Other is game character, Self changes into game character, Self controls game character

Activities: Physical, Movement, Location Change, Verbal, Visual, Auditory, Thinking

Emotions: Positive emotions; Negative emotions; Neutral emotions

Settings: Locations

Objects: Architecture, Household, Food, Travel, Streets, Regions, Nature, Body Parts, Clothing,

Communication [including technological], Money, Miscellaneous. Look especially for weapons.

A sum score of these coded items was significant for the dream by group interaction, see Table 4. Again the interaction approached traditional levels of significance, in the same direction as the previous analysis of game content. Finally, the content of all dreams with or without game content were coded using a reduced version of the ESRBⁱⁱ classification criteria. These variables included violence, sex, drugs, language, humor and gambling. The presence or absence of each was coded and summed. There were no significant findings: Dream: ($F(1,59)=0.34$, ns); Group: ($F(1,59)=0.39$, ns); Dream x Group: ($F(1,59)=.28$, ns).

IDQ Results

The final set of statistical analyses were for questions on the IDQ. This was filled out by the respondent only in terms of their military dream. While not all respondents filled it out there were enough to look at the results. In t-tests on these items all but five of the 19 items resulted in no gamer group difference. The five that did evidence a gamer group difference are summarized in Table 5. It can be seen that the high end gamers rated their dreams as higher in all but avoiding harm which was rated higher by the low end gamers and is consistent with the judges dream content analysis.

Discussion

Does video game play inoculate soldiers against the negative effects of nightmares associated with war trauma? The results of this inquiry suggest a qualified yes, for those not currently suffering from PTSD symptoms. While there is much work to be done, and prescriptive suggestions are premature at this point, these results imply that video game play, especially of the war and battle type, may offer help in terms of practice in fighting the enemy in imaginal realms, in this case virtual, and in terms of the numbing towards violence that is oft cited in the aggression modeling literature on gaming.

In this inquiry, individuals who play video games and are or have been in the military were solicited to participate in an online survey. They were screened out for recent evidence of PTSD. Two dreams were collected from each participant: a recent dream and an impactful military dream. Two groups of gamer soldiers were identified in terms of their self reports of current game play frequency: high-end gamers who reported playing daily; or weekly and low-end gamers, who reported playing monthly, yearly or rarely. This group classification was verified in a number of ways. The high-end group played more games, started younger, played more often, and was more likely to have just been playing a game prior to filling out the survey, than was the low-end group. Additionally, while 67% of the low-end gamers preferred the classic hard core genre (i.e., first person shooters, Massively Multiplayer Online, strategy, action, adventure), 96% of the high-end gamers had the same preferences. Casual, driving and sport games (i.e., Farmville, baseball) were preferred by 34% of the low-end gaming group. One respondent reflected upon this game preference:

I would see many Soldiers, in combat, with PSPs or anything we could hook up to 220v electricity.

When Soldiers weren't on patrol, we often had violent war games on our systems. It was weird. Like we didn't get enough violence.

Indeed in a story about gaming on the frontlines, one informant wondered if the “combat-centric titles” might be associated with wanting to be in the military and went on to speculate that, “The average military member will never actually live out that exciting, epic firefight, the moment of a decisive battle, the heat of combat, or the thrill of knowing you just outwitted your mortal enemy and crushed them beneath your strategic might and skill, so gaming

definitely offers a way of living out that fantasy. Call it a strange form of escapism” (Ashcraft, 2011). In this sample, combat-centric titles were definitely preferred.

Because Levin and Nielsen (2007) concluded that nightmares are predicted by affect distress and affect load, information was also gathered on these two variables in order to control for these effects. Specifically, Orsillo, Theodore-Oklota, Luterek, and Plumb’s (2007) “Emotional Reactivity and Numbing Scale” (ERNS) was administered to ascertain affect distress. Affect load information was gathered through Eng, Kuiken, Temme, and Sharma’s (2005) “Trauma Inventory” and through questions adapted from Smith et al., (2007) and Hoge, Auchterlonie, and Milliken (2006) examining behaviours associated with military deployment. The gaming groups were compared on the ERNS subscales and on the affect load variables with no group differences in the latter but some in the former. Specifically, the low gamers scored higher on the sadness, anger, and fearfulness subscales but, interestingly, there were no group difference in the general (emotional numbing) or positive emotions subscales. There were no gamer group differences in any of the trauma indices, with both groups reporting from two to three traumas experienced in their life history out of the nine possible traumas presented to them in the study; two out of six combat experiences; and one and one-half deployments.

Dreams were content analyzed with three coding systems. Revonsuo’s (2000; 2006; & Valli, 2000) evolutionary based threat simulation content analysis system, Wilmer’s (1996) system of classifying combat in the dreams of Vietnam veterans, and a lucid, control, gaming coding developed for this study but based upon previous work (Gackenbach, Rosie, Bown, & Sample, 2011). The pattern of results for the threat simulation scales and the combat experiences coding was that the low gamer group reported more threat and combat in their military dreams than did the high-end gaming group. This was particularly evident in the severity and aggressiveness of threat. Here is an example of a high threat military dream from a low-end gamer:

I couldn't find my rifle and something was chasing me. I searched the entire forest until I did find my weapon. As i turned around to shoot what was hunting me - the trigger felt like it was a 1,000 lb trigger pull. The rounds I was shooting were delayed and where not hitting where I was aiming. (Subject #21)

While here is one from a high-end gamer:

i was told by my old Sargent to load up on the humvv in my gunners spot. he said we were going to roll out to fight some were in Baghdad. we drove down to the combat area where there was a brutal fight me and quite a few men against the insergants. i remember shooting and seeing men fall on both sides. i saw the faces of the dead eyes wide and staring at the sky soulless faces of friends. i walked dazed back to the humvv and woke up. (Subject #115)

Aggression and combat motifs are present in both dreams, but the high gamer is fighting back, even if “dazed” in the dream. Such active engagement may be indicative of practice in game play; this notion is supported by the marginal significance of the self participating in reaction to threat finding in military dreams. Resolution of the threat was more likely to be located in the dream ending for the military dream among the low-end gamers. However, the dream ending was more common in the recent dream for the high-end gamers.

The gaming effect is further illuminated in the finding by the ways in which the dream was resolved. Four possibilities were coded: happy, unhappy, discontinuity, and dream ends. Figure 2 demonstrates that, across dream types, high-end gamers had more happy endings and fewer unhappy endings for their recent dreams. Discontinuous endings did not differ for the high-end gaming group across dream types, but it did for the low-end gamers. Discontinuous elements in a dream are thought to be a type of dream bizarreness (Revonsuo, 2000). Previous research has found that bizarreness in dreams is higher for high-end gamers (Gackenbach, Kuruvilla, & Dopko, 2009; Gackenbach & Dopko, 2011). Finally, the dream ending is the typical resolution, if not the definition, of a nightmare; this was most true of the low-end gamers’ military dreams.

The low gamer group had significantly more combat content in their military dreams than the high gamer group, which is consistent with the threat simulation findings. Here is an illustration of a military dream, coded as high in conflict, from a low gamer:

i am securing an airport trying to get forgien nationalist out when a group of militia comes up and wants to get in. When they figure out they cant get by they get mad and be head a civilian and all i can do is watch.
(Subject #210)

By way of comparison, here is a military dream coded as low in conflict from a high gamer:

Had a dream that i was back in Iraq .not doing anything special just being there walking around. I was at our base camp walking around. don't remember talking to or seeing anyone there just the camp its self.i don' remember having any feelings about it other then i kind of missed it. (Subject #113).

Wilmer also suggests classification of combat dreams into one of three types of nightmare: actual, plausible, and ordinary. Chi-squares by type of nightmare for subjects' dreams, not surprisingly resulted in more military dreams being coded as the worst type of nightmare. Consistent with the rest of the data analysis for this study, low-end gamers had far more plausible nightmares (thus more severe) than the high gamers, although there was no difference in actual nightmares.

The final set of dream coding completed was for lucid and control type dream content, as well as for gaming content. Previous research has indicated that gamers are likely to report more lucid and control type dreams than non-gamers (Gackenbach, 2006; 2009). Game content analysis was conducted to discover whether self-reported game play differences in the groups of soldiers was reflected in the actual content of their dreams. There were no gamer group or dream type difference for any of the lucid, or control type, judges' assessments, with the exception of the MACE. The MACE subscales interacted with dream type such that dream type differences in attention accounted for the interaction. Not surprisingly, the military dreams were coded as requiring more attention than the recent dreams, while there was no difference between the dreams in terms of emotions, thinking, or task focus. This was true of both gaming groups. Furthermore, emotional focus items were coded by judges as the highest across dream and group, which of course fits with one of the major functions of all dreams and especially of nightmares (Levin & Nielsen, 2007; 2009). As for gaming referents in these dreams, it was found only for the high-end gamers in their recent dreams. This could be a reflection of the similarity between military action and its dream incorporation and the games that many of the soldiers were playing.

Finally, some of the respondents filled out the IDQ which followed the military dream request. While most of the items showed no gamer group difference, those that did show a difference, reflected the dream coding by judges discussed above. That is, three of the five items that showed a gamer group difference reflected a positive perspective on the dream (i.e., spreading warmth, vigorous and energetic movements and balanced and graceful movements); these were favoured by the high-end gamers. One item was neutral (i.e., sudden shift in visual perception) and again favoured by the high-end gamers; while one item was negative (i.e., avoid harm) which was

favoured by the low-end gamer group. This self-report indication is important, as it confirms the judges' evaluations. The high-end gamers seemed less bothered by their military dreams than the low-end gamers. The self-reported movement items reflect the previously noted active involvement in the dreams unfolding by the high-end gamers.

Limitations

The major limitations of this study are the sampling method, sample size and sample characteristics. Because this study was undertaken with no formal military sanction, it relied entirely on volunteers. Considerable effort was put into recruitment of volunteers and 377 did enter the survey site. However, due to pre-screening, only 98 actually participated with at least one dream. About 100 volunteers were lost because they were not in the military. Those who were left were high-functioning soldiers. On the other hand, due to the length of the survey, there was some survey fatigue; consequently, some items went unanswered. In addition, at the bottom of each page of the survey, a statement was placed encouraging the participants to stop if they felt any discomfort. Thus the length of the survey and the permissions to stop participating likely added to incomplete responses.

Conclusion and Future Directions

There is some preliminary indication that playing video games in the military may help inoculate soldiers against the negative effects (i.e., severe nightmares) of deployment. This result is supported by a report from the Offices of the Command Surgeon and of the Surgeon General (OCS/OSG, 2009) of the U.S. Army regarding troops deployed to Afghanistan. A survey of the off-duty activities of soldiers was conducted in order to understand resilience while deployed. Included in the survey were questions about surfing the internet, listening to music, physical training, reading and about the number of hours spent playing video games. This report indicates that moderate video game play was associated with fewer psychological problems. In their study, moderate game play was defined by hours per day (three to four hours) and did not allow for frequencies other than daily. Thus the investigators found that fewer hours per day (one hour) and more hours per day (six hours) were associated with psychological problems. Our study, on the other hand, asked about length and frequency of play as well as game play-related behaviours. These high-end gamers played 2 to 4 hours at a time (daily and weekly frequencies) while the low-end group played from less than an hour to 2 hours (rarer frequencies). Thus the data from this study is supported by that of the OCS/OSG study.

The next research question, if these results are duplicated, is what type of games are best for nightmare inoculation. While we gathered game play preferences and recent games played, this data was either long term or just prior to filling out the questionnaire. We did not have day before the dream game play information. However, gamers typically have favourite genres and games they are currently playing over several days or weeks. While there are big differences between specific FPS and role playing battle type games, what is the same, and relevant to the current inquiry, is the learned response of fighting back in the face of threat in imaginal/virtual worlds. This is common to the traditional “hard core” genre but not as much true of the rapidly growing casual genre (Gackenbach & Bown, 2011).

Additionally, one informant from this study wrote the first author and is now keeping a detailed dream/game diary in a follow-up study. Following a request from the researcher to rate each dream as to its similarity to the game played the day before, he responded, “I’m assuming you just want to measure how ‘game-like’ the dream was, rather than how specifically like a single game it was. Since usually, there is a mix of several games and I often play more than one game in a day” (Research Participant, personal communication June 16, 2011).

Indeed this dream from him illustrates the multimedia nature of at least high end gamer dreams:

Someone stole my pistol, so I went searching through the streets of Adamstown for them. Found someone (bad guys) in a van. Took a photo of them but they stole my iPhone. Ended up with my old Nokia phone and took a photo with that and then ran through all these backyards while they chased me to try and get this phone too, but I threw them off (good feelings here... like the old days: “no one can catch me”). Was going to tell the cops that had a station in this huge concrete bunker (awesome bunker: had big protruding chunks of concrete that stuck out so the it was a little like a modern ‘star’ shaped fortress), but then I realised I could just call NCIS and get them to help out. (Research Participant, personal communication May 20, 2011).

Not only is a game element mentioned (Modern star shaped fortress) but so too his phone (iPhone) and a TV show (NCIS). In multiple studies our group has found that high end gamers are high media consumers (Gackenbach, in press). Thus narrowing down what game or game element to play in order to be inoculated against nightmares will be a very complex process.

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Table 1

Affect Distress (ERNS Subscales with Norms) and Affect Load (Combat, Deployed, and Life Traumas) N's, Means and Standard Deviations.

Control Variable	video game groups	N	Subscale means	Std. Deviation	Norms PTSD Soldiers	Norms No PTSD Soldiers
ERNS positive subscale mean (#items=26)	High	69	93.29	13.63	90.33 ³	97.98
	Low	22	96.772	18.02		
ERNS sad subscale mean (#items=11)*	High	69	32.6667	8.51	43.21	39.35
	Low	22	36.5002	8.61		
ERNS general (numbing) subscale mean (#items=7)	High	69	23.6523	4.74	24.62	28.25
	Low	22	24.9088	6.21		
ERNS anger subscale mean (#items=11)**	High	69	37.4198	7.45	38.10	34.61
	Low	22	42.0453	6.92		
ERNS fear subscale mean (#items=6)**	High	69	15.3912	5.10	20.54	19.40
	Low	22	18.3636	3.58		
sum of experiences in combat	High	69	2.07	2.23158		
	Low	20	2.00	2.05196		
deployed (1=no;2=yes)	High	69	1.64	.48419		
	Low	20	1.75	.44426		
sum of all traumas	High	69	10.62	3.18		
	Low	22	11.45	2.22		

* p<.07 **p<.01

³ Norms differed between PTSD and none PTSD subjects for all ERNS subscales but fear.

Table 2

Means, standard deviations, N's and F-values for dream type x gamer group ANCOVA with affect distress and affect load controlled for sum of all war content

Dream Type	Video Game Group	Mean	Std. Deviation	N	F-Values
Recent	High	1.63	2.016	35	Main effect for dream type: $F(1,75) = 14.73$, $p < .0001$, partial $\eta^2 = .164$
	Low	1.27	1.272	11	Main effect for gamer group: $F(1,75) = 4.96$, $p < .03$, partial $\eta^2 = .06$
Military	High	2.41	2.408	32	Interaction dream x gamer: $F(1,75) = 5.31$, $p < .02$, partial $\eta^2 = .07$
	Low	4.22	2.774	9	

Table 3

Wilmer Classification of Type of Nightmare as a function of dream type and gamer group and norms

Dream category	Count and Column Percentage	Recent Dream	Military Dream	High Gamer Group	Low Gamer Group	Wilmer Viet Nam Veterans Norms
Actual Event Nightmare	Count	0	4	3	1	189
	Column %	.0%	12.5%	6.1%	5.6%	53%
Plausible Event Nightmare	Count	19	23	27	15	76
	Column %	55.9%	71.9%	55.1%	83.3%	21%
Ordinary Nightmare	Count	15	5	19	2	94
	Column %	44.1%	15.6%	38.8%	11.1%	26%

Table 4

Gamer Group (high/low) x Dream Type (recent/military) ANCOVA's with no covariates on Various Measures of Lucid/Control, Gaming Content in Dreams and Self Evaluations of Dreams (IDQ)

Variable	Finding for Dream Type (recent/military) x Gamer Group (high/low) with no covariates	Mean/SD/N Recent Dream High Gamers	Mean/SD/N Recent Dream Low Gamers	Mean/SD/N Military Dream High Gamers	Mean/SD/N Military Dream Low Gamers
Game Playing in Dream ⁴	Dream x Group Interaction: $F(1,55) = 3.91, p < .05$, partial $\eta^2 = .07$	0.43/0.84/23	0/0/8	0/0/21	0.13/0.35/8
Sum of HVDC Subscales for Game Elements	Dream x Group Interaction: $F(1,59) = 3.10, p < .08$, partial $\eta^2 = .05$	0.96/1.65/25	0.00/0/8	0.14/0.64/22	0.38/1.06/8
		MACE: Attend	MACE: Emotion	MACE: Think	MACE: Task
Judges evaluation of attention, emotion, thinking, tasks in dream (MACE)	Dream x group x MACE: 2 way interaction dream x MACE ($F(1, 59) = 3.30, p < .075$, partial $\eta^2 = .053$)	Recent: 1.42/.83/33 Military: 2.23/1.61/30	Recent: 2.76/1.77/33 Military: 2.87/1.81/30	Recent: 1.66/.80/33 Military: 1.56/.63/30	Recent: 2.56/1.35/33 Military: 2.48/1.62/30

⁴ Sum of game in dream includes dream is game (stated or implied), game being played in dream (playing, watching, mention), and games mentioned (video game other than played, other games). In this case only number of words in dream was a covariate.

Table 5

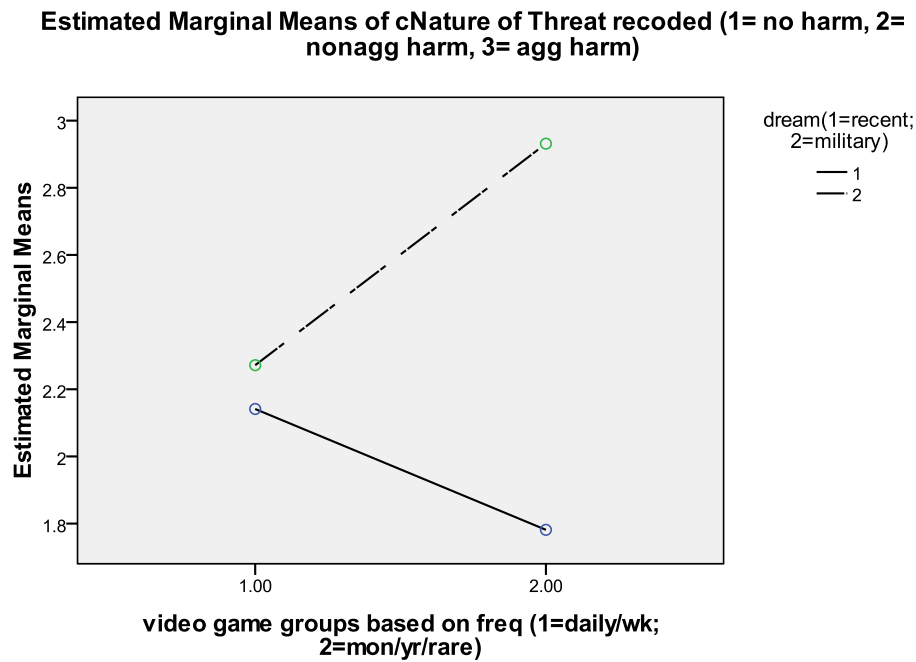
Means, SD, and N's for Significant Items from the IDQ as a function of Gamer Group

	video game groups	N	Mean	Std. Deviation
IDQ spreading warmth	High	33	1.52	1.176
	Low	11	.91	.302
IDQ repeatedly avoid harm	High	33	2.09	1.588
	Low	11	3.27	1.489
IDQ movements vigorous and energetic*	High	33	3.06	1.767
	Low	11	2.00	1.549
IDQ movements well balanced and graceful*	High	32	1.59	1.160
	Low	11	1.18	.405
IDQ sudden shift in visual perception	High	32	2.50	1.545
	Low	11	1.45	1.036

*Approached traditional significance levels at $p < .1$.

Figure 1

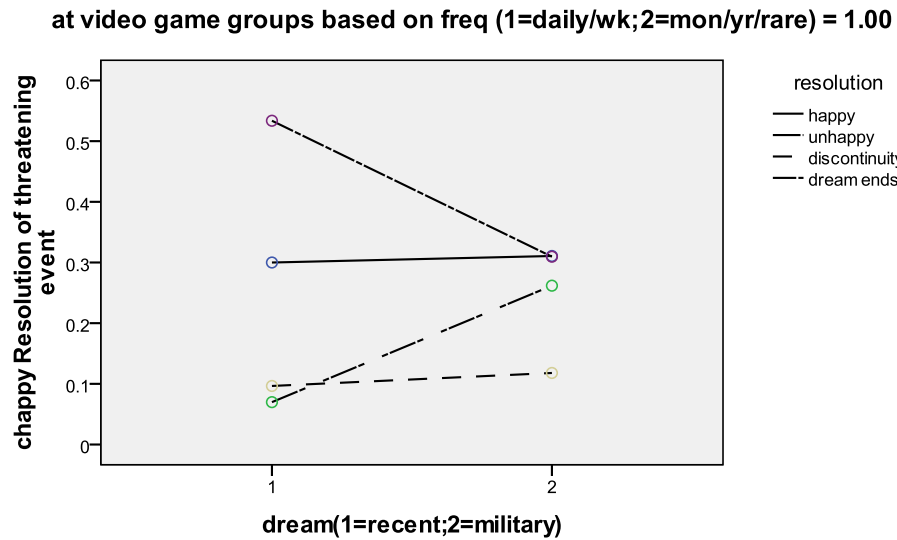
Aggressive nature of threat as a function of dream type and gamer group



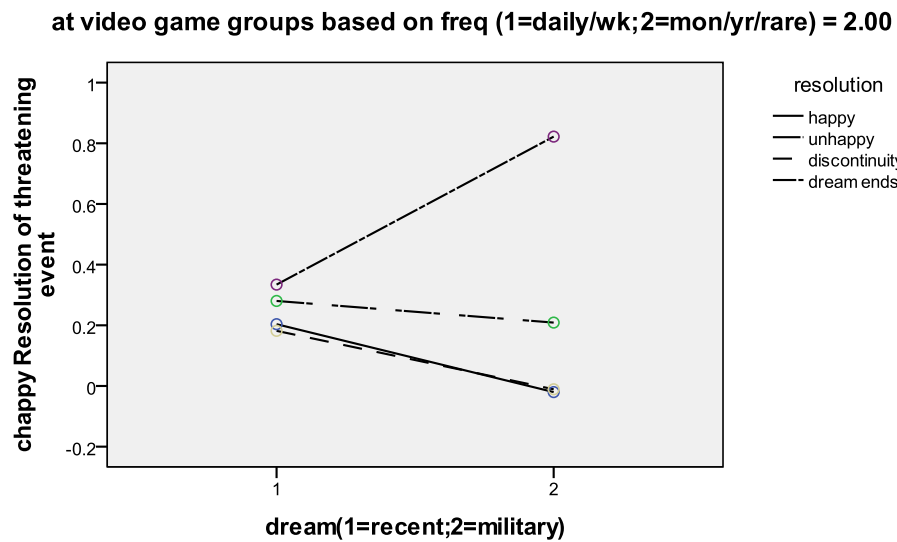
Covariates appearing in the model are evaluated at the following values: ERNS positive subscale mean = 3.6453, ERNS sad subscale mean = 3.0577, ERNS general subscale mean = 3.4308, ERNS anger subscale mean = 3.5556, ERNS fear subscale mean = 2.6905, sum of experiences in combat = 2.1587, deployed (1=no;2=yes) = 1.6508, sum of all traumas sans subs who had all blanks to trauma ques = 10.9841

Figure 2

Resolution of threat as a function of gamer group and type of dream



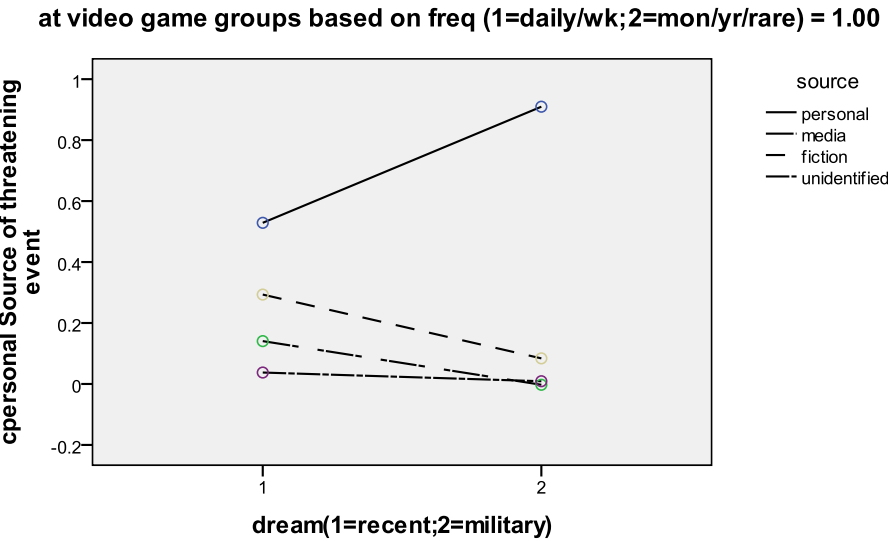
Covariates appearing in the model are evaluated at the following values: ERNS positive subscale mean = 3.6269, ERNS sad subscale mean = 3.0333, ERNS general subscale mean = 3.4357, ERNS anger subscale mean = 3.5667, ERNS fear subscale mean = 2.6806, sum of all traumas sans subs who had all blanks to trauma ques = 11.1000, sum of experiences in combat = 2.1167, deployed (1=no;2=yes) = 1.6333



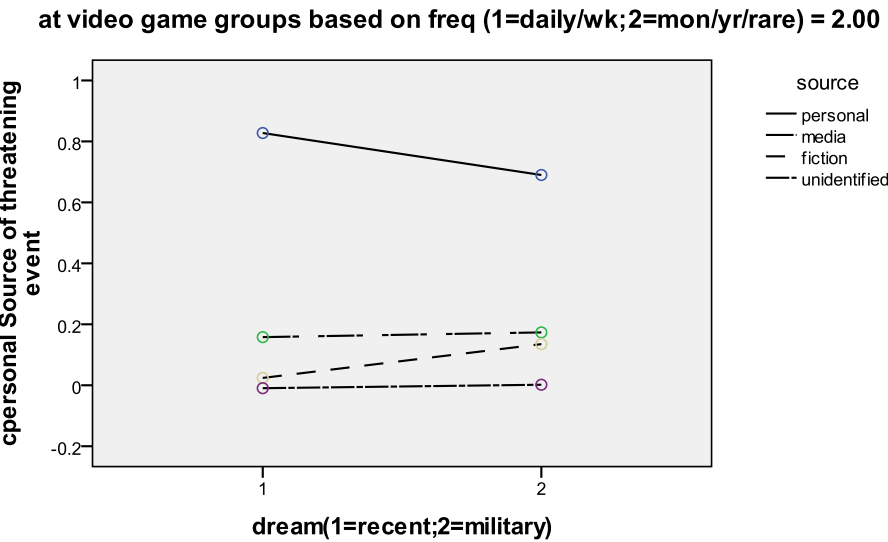
Covariates appearing in the model are evaluated at the following values: ERNS positive subscale mean = 3.6269, ERNS sad subscale mean = 3.0333, ERNS general subscale mean = 3.4357, ERNS anger subscale mean = 3.5667, ERNS fear subscale mean = 2.6806, sum of all traumas sans subs who had all blanks to trauma ques = 11.1000, sum of experiences in combat = 2.1167, deployed (1=no;2=yes) = 1.6333

Figure 3

Source of threat as a function of gamer group and type of dream



Covariates appearing in the model are evaluated at the following values: ERNS positive subscale mean = 3.6514, ERNS sad subscale mean = 3.0733, ERNS general subscale mean = 3.4355, ERNS anger subscale mean = 3.5557, ERNS fear subscale mean = 2.7016, sum of all traumas sans subs who had all blanks to trauma ques = 10.9677, sum of experiences in combat = 2.1774, deployed (1=no;2=yes) = 1.6452



Covariates appearing in the model are evaluated at the following values: ERNS positive subscale mean = 3.6514, ERNS sad subscale mean = 3.0733, ERNS general subscale mean = 3.4355, ERNS anger subscale mean = 3.5557, ERNS fear subscale mean = 2.7016, sum of all traumas sans subs who had all blanks to trauma ques = 10.9677, sum of experiences in combat = 2.1774, deployed (1=no;2=yes) = 1.6452

ⁱ We'd like to thank Katherine Wisniewski and Mary-Lynn Ferguson for their help on this part of the project and Grant MacEwan University for a grant to support this coding.

ⁱⁱ The ESRB is the Entertainment Software Review Board that classifies games for consumer information.