Culture, gender, and media use predictors of dreams among Canadian students

Sarah Gahr & Jayne Gackenbach

Grant MacEwan University, Edmonton, Canada

Summary. The predictability of culture, gender, and media use for dream type information in Canadian students was the focus of this inquiry. Independent variables were gender (sex of subject and relative masculinity and femininity) culture; (ethnic identity and self-construal of independence versus interdependence) and media use (various gaming, social media, and cell phone questions). These were regressed onto several dream content related dependent variables. These were gathered using the Dream Intensity Scale and research participant and judges evaluations of a recent dream. Gender variables were better able to predict content of self-report dream measures while gender variables showed no difference from media use or culture in predicting judge's evaluations of dream content.

Keywords: culture, video games, gender, dream content, dream history, self-construal, ethnic identity, social media

1. Introduction

Usage of video games has been rapidly growing in society due to the advancements in technology making games easier, cheaper, and more portable. Advancement in technology has resulted in increases in the amount and diversity of people playing video games. This increased diversity is best exemplified with casual genre games such as CandyCrush or Tetris. They require less time to achieve goals (higher/harder levels) and have little to no learning curve, which make them more enjoyable. These are the types of games grandparents, older adults and younger children can play. They are all downloadable onto your cellphone and you can play them anywhere. Now video games of the non-casual genre, especially first person shooters genre, do seem to receive a lot of negative backlash for their violence, graphic and addictive content. There are studies that suggest that these types of video games will increase aggressive and risky behavior, decrease mental health and interfere will personal relationships and responsibilities (Arriaga, et al., 2014; Kastenmuller, Fischer & Fischer, 2014; Subramanian, Wise, Davis, Bhandari & Morris, 2014). Although other studies do not support the negative relationship between video game play and aggression (Hollingdale & Greitemeyer, 2014), or poor problem solving and academic skills (Adachi & Willoughly, 2013), there continues to be a need for concern around these effects and other physical health issues (Melchior, Chollet, Fombone, Surkan, & Dray-Spira, 2014). However, Ferguson (2010) argues that when all variables which are known to contribute to violence are considered, i.e. vio-

lent home, use of drugs, violent society, gender, aggressive personality, etc) then the effects of gaming on violence are very small.

A major review of current video game play research by Jones, Scholes, Johnson, Katsikitis, and Carras (2014), made the case that video game play has much to offer in the realm of mental health, even going so far as to say it can help a person to flourish. This review argued that moderate, and sometimes low, levels of video game play can have a positive influence on well-being. They conclude that video game play has been shown to: improve mood, reduce emotional anxiety, improve emotional regulation, increase feelings of relaxation, and reduce stress. Most importantly, moderate play has been shown to be linked with better health outcomes than either excessive video game play or no play at all.

Culture is a variable of interest for this study because of culture's role in a potential disorder regarding excessive gaming for the newest version of *The Diagnostic and Statistical Manuel* (American Psychiatric Association, 2013). The mention of a Video Gaming Disorder in the DSM5 was highly influenced by the growth of gaming addiction in China and Korea (Seok & DeCosta, 2012). While differences between east and west in gaming style and popularity have been established, none-the-less lessons learned in the east, collectivist cultures, regarding any problems associated with gaming should not be ignored in the west, individualistic cultures. While it was not listed as a disorder, it was listed as a possible disorder that requires more research to determine the effects of video gaming.

Dream study offers an unobtrusive devise to examine the effects of a waking behavior. This is in part because nighttime dreams both reflect our waking life, "Continuity Hypothesis" (Hall and Norby, 1997), and are the phenomenal representation of some memory processes (Wamsley, 2014). Gackenbach, Ellerman and Hall (2011) identified one benefit of gaming on dreams called the "Nightmare Protection Effect". They found that males who played combat centric action video games had protection from threats in their dreams because of the transfer of a learned response,

fighting back in the face of threat, from a video game. This appears to contradict the argument made earlier of a weak association between violence and some video game play. The distinction here is between real world behavior, as in the literature cited earlier, and imaginal behavior, as illustrated in thinking about a game move while awake or in sleep (Ortiz de Gortari & Griffiths, 2014). This of course opens up an entire discussion about the relationship between waking behaviors and imaginal behaviors which have been shown to be related, including in dreams, but also to show distinctions. In this case the distinctions are when is it appropriate to respond aggressively and when is it not appropriate in waking and in dreaming. This issue is informed in waking by individual differences (i.e. aggressive personality; Markey & Markey, 2010) as well as various other social and culture aspects (violent culture or family; Ferguson, 2010). In sleep, however, these `behaviors` are most informed by individual memory and metaphor.

Another variable that plays an important role in shaping our waking life, personal experiences, values, the way we think about the world and ourselves is culture. By culture we are looking at ethnic backgrounds both subjective (self-identifying background where the participants will state what ethnic background they feel they are a part of) and objective (different cultural measurement and scales). Ethnic background can shape one's perception, understanding and interpretations of their surrounding (Lu, & Gilmour, 2007), so by considering culture as a variable we are inquiring how these differences effect different dreams aspects. Thus the current inquiry focuses on the impact of gaming on nighttime dreams as a function of culture.

In an earlier similar study, Gackenbach and Gahr (2015) reported that Canadian students of varying cultural backgrounds, relative individualism versus collectivism, took an online survey for course credit examining their dream experiences (Dream Intensity Scale, DIS; Yu, 2010) and history of media use, i.e., social media and video game play. Regression analyses onto the dream data found that the role of sex and culture, relative to history of media use, were the strongest predictors of various dream experiences. When media use was a dream predictor, it most often included age the subject began using social media or gaming as well as their use of MySpace, one of the first social media sites and thus presumably longest used. These findings support Lambrecht, Schredl, Henley-Einion, and Blagrove (2013) in terms of the continuity hypothesis of dreaming and high frequency of an activity resulting in more dream incorporation. The current inquiry is an extension of the previous study with refined attention to culture and gender.

In the present inquiry, the Multigroup Ethnic Identity Measure (MEIM) determined culture and ethnicity. The MEIM allowed determination of how strongly an individual identifies with their culture with degree of westernization accounted. Many of the participants were residents of Canada and grew up in the western world removed from their collectivist heritage. One item on the MEIM asked the participants to self-identify what ethnicity they belong. This scale offered additional culturally relevant information beyond what was collected in the earlier study.

So too with gender, a supplementary measure was used, the Bem Sex Role Inventory along with the anatomical sex of the participant. This was to allow for variation within each gender. For example, do males who are more feminine show similar dream experiences as females? Likewise,

do females who are masculine demonstrate the Nightmare Protection Effect that was mentioned earlier? Being just as masculine as you are feminine is called androgyny and the amount of androgyny that exists in society could highly be influenced by culture. We are interested to see if that will be the case in our study or if participants will fall into traditional stereotypes (males scoring high on masculine and female on feminine).

The intention of this study is to go further than the last research by Gackenbach and Gahr and consider more refined measurement of culture and of gender in their contribution to dream variables relative to the use of media.

2. Method

2.1. Participants

Participants were 320 Introductory Psychology students who attended a Western Canadian University. They received post-secondary course credit for anonymous participation, having the right to withdraw from the study at any time without any plenty or loss of credit. Of those that were not deleted due to incomplete data, there were 120 males and 167 females of whom 94% were single. Ages ranged from 18 to 21 on average. Of the 199 who provided information about their highest education all were in post-secondary with 42% reporting some sort of post-secondary diploma or degree.

2.2. Instruments

Demographics. Seven demographic aspects were solicited including: sex, education, marital status, city and country of residence, race/ethnicity, occupation, and first language. Questions on sex and marital status were closed ended questions and the remaining were opened ended.

Media Use Questionnaire. Video game play and social media use history was gathered. Such information included age of first media use, time length of each session on media, frequency of media use, and number of media used. Additional video game information gathered was preferred genre and were they playing a video game in the hours before they took the survey and if so what game(s) were they playing. They were also asked if they use gaming social media, think about gaming while not playing, talk to friends about games, and gaming character class they are most likely to choose. Social media frequency of use was asked about for these outlets: Facebook, Linkedin, Twitter, Tumblr, Instagram, Myspace, YouTube, Google+, Pinterest, and Other. Their first social media was inquired about as well. Finally,, one question queried about number of cell phone texts typically sent. The video game play questions had been used in previous research (Gackenbach & Rosie, 2009). The social media questions were adapted from a longer scale (Boyes & Gackenbach, 2016).

Dream Intensity Scale (DIS; Yu, 2011). The DIS has 23-items with an underlying principle that dream intensity is composed of multiple dimensions and is a useful tool for examining general awareness of dreams. The DIS is divided into four primary scales; Dream Quality, Dream Vividness, Diffusion and Altered Dream Episodes. The Dream Quality scales includes variables that measure aspects of regular dream such as frequencies of dream awareness, recall of main content, nightmares and experiencing multiple dreams in one night. The Dream Vividness scales breaks down into two subscales; Major and Minor Modalities which mea-

sure sensory experiences while dreaming such as smelling, tasting, seeing colours and feeling emotions. The Diffusion Scales encompasses the Dream Work and Paramnesia subscales, which will measure cognitive distortions such as condensation and dream-reality confusion. These two subscales necessitate the transference of psychical values and suggest the breakdown in boundaries and the invasion of material between the two conscious systems. Altered Dream Episodes scale consists of the Lucid Dreaming and Autosuggestion subscales. Lucidity is based on the occurrence of a dreamer experiencing an altered form of the dream experiences such as the dreamer have awareness that they are in a dream and revisiting a dream that they once experienced and wish to experience again (ability to reconnect with a past dream). The DIS was shown to have good reliability, inter-item correlations and item-scale correlations as well as good convergent and discriminant concurrent validity (Yu, 2010). Yu (2012) conducted study to examine the factorial structure of the DIS and concluded that four higher order and eight lower order factors are highly stable (Yu, 2012, pp. 301). Dream information was gathered using responses to the DIS. This scale breaks down into eight subscales for which scores were computed. Dream Intensity Scale requires participants to indicate their frequencies on a standardized 10-point absolute scale (1 is never to 10 is almost every day) for the 10 point items. The five point items range from 1, never happened, to 5, it happened in almost every one of my dreams

 Recent Dream Record. Respondents were asked to provide a recent dream. Specifically they were asked:

Please describe your most recent dream. Do this 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

Be sure to report ONLY ONE DREAM. Dialogue box will be provided for up to 1000 words.

Following the dream collection, these students were asked to rate their dream in terms of 15 possible emotions they experienced during the dream and then to classify their dream in terms of nine dream types. These are pointed out in the results section below.

 Independent versus Interdependent Self Scales (IISS; Lu & Gilmour, 2007). This 40 item scale assesses the degree to which an individual considers themselves as independent or interdependent. Lu and Gilmour conducted a study to investigate the validity and reliability of the Independent and Interdependent Self Scale (IISS) among a Chinese and British sample. The two factor solution with a varimax rotation was imposed in an exploratory factor analysis. A paired t-test showed that Chinese participants scored significantly higher on interdependent self than independent and British participants were significantly higher for independent self than interdependent. This t-test indicated that the IISS has

good construct validity. Overall Lu and Gilmour concluded that the IISS is a reliable and valid measure of self: independent and interdependent.

 Multigroup Ethnic Identity Measure (MEIM, Phinney, 1992). Magnitude of ethnic identity strength was measured with the Multigroup Ethnic Identity Measure which broke down into four subscales: Ethnic Identity affirmation and belong, ethnic identity achievement, ethnic identity behaviours and ethnic identity other group orientation. Lower mean scores for these subscales indicate a higher ethnic identity because these subscales assess the strength of one's sense belonging and commitment to their ethnic group, frequency and importance of traditional practices, sense of pride for one's ethnic background and associations with others belonging to the same ethnic heritage. It can be used in a sample that is ethnically diverse or ethnicity is uncertain and permits a comparison of correlates of ethnicity identity across a diverse sample. Phinney (1992) concluded from a study that the MEIM is a reliable measure among high school and college student research pools.

 BEM Sex Role Inventory (BSRI, Bem, 1974). The Bem Sex Role Inventory is a 60 item survey consisting of 20 masculine items, 20 feminine and 20 neutral. These items are a list of terms that participants rate themselves as being on a 7-point Likert Scale (1 Never True, 5 Moderately True and 7 Almost Always True). However, in this study a shortened version which excluded all the neutral items was used in order to reduce the amount of time to complete the whole study. Bem concluded that all masculine and feminine items are independent from each other and that BSRI is a reliable measure of psychological androgyny. The internal consistency of the BSRI was shown to be high as well as test-retest reliability and concurrent reliability (Bem, 1974). In more recent studies there is a concern for the BSRI ability to accurately assessment sex role orientation outside of North American cultures (Lee & Kashubeck, 2015; Peng, 2006) and for transgender or transsexual individuals (Gomez-Gill, Gomez, Canizares, Guillamon, Rametti, Esteva, Vazquez, & Salamero-Baro, 2012)

2.3. Procedure

Surveys were posted on Qualtrics and could be accessed via research participant managment system where participants received course credit. This dual access approach allowed for participant's surveys to remain anonymous. Participation only began once informed consent was given. Basic demographic information was gathered first, then Video Game Use Questionnaire; Yu's Dream Intensity Scale followed the recall of a recent dream. Participants were provided with an empty space to record a recent dream that they had preferably in the past two weeks and asked for as much detail about the dream as possible. Fifteen emotions were then rated on a Likert Scale for intensity within their recent dream. This is a scale developed by Zadra and Donderi (2000). They then rated their dream in terms of nine dream types. Finally, Multigroup Ethnic Identity Measure and Bem Sex Role Inventory were administered. In order to eliminate any ordering effect these last two questionnaires were randomized. Response time for all surveys took about one hour. At the end of the survey there is a question regarding permission to quote their dream. If participants opted out of the study, or if they finished the surveys, they were given a debriefing statement.

Table 1. Descriptive Statistics for Dream Variables.

Scale	N	Minimum	Maximum	Mean	SD
Dream Intensity Subscales (sum scores; missing values are means for the subscale)					
Regular Dreams (3 items)	287	0	27	17.1	6.6
Bad Dreams (2 items)	287	0	18	5.4	3.8
Major Modalities (3 items)	287	0	27	8.9	2.6
Minor Modalities (2 items)	287	0	18	2.0	1.9
Dreamworks (4 items)	287	0	36	4.7	2.9
Paramnesia (2 items)	287	0	18	6.3	4.1
Lucid (2 items)	287	0	18	5.4	4.5
Autosuggestion (2 items)	287	0	18	6.0	4.4
Recent Dream Emotions (factor scores)					
Anger/hate	232	-1.74	3.56	0.0	1.0
Fear	232	-2.34	2.53	0.0	1.0
Happiness	232	-1.68	2.76	0.0	1.0
Type of Recent Dream (confidence rated on a Likert scale)					
Lucid	232	1	7	6.80	1.0
Control	232	1	7	2.0	1.5
Bad	232	1	7	2.8	1.8
Mythological/spiritual	232	1	7	2.7	1.9
Bizarre	232	1	7	3.8	2.1
Observer	232	1	7	2.6	2.0
Electronic Media	232	1	7	2.1	1.8
Normal	232	1	7	3.5	2.2

3. Results

Of the original 320 participants, 25 did not fill out any of the gaming questions on the survey and an additional subject was dropped for not filling social media questions leaving only 294. Finally seven more were dropped for not filling out any information on ethnic identity or dream intensity scales. This left 287 respondents data for analysis. Occasional items left blank were filled in with usable sample means.

3.1. Scale Coding

Individual Difference Variables. Gender, culture and media use kinds of information were gathered which were of interest in predicting various dream assessments.

Beginning with culture, the Multigroup Ethnic Identity Measure (MEIM) had four subscales: affirmation and belonging, achievement, behaviors, and other group. In terms of self labeling of ethnic identity respondents were asked to self label their ethnicity using one of six categories or fill in a seventh one as other. They also were asked the same thing about their mother and their father. These verbal descriptors were then categorized into collectivists (i.e., Asian) or individualistic (i.e., European) cultures. If an individual indicated that their parents ethnic background were different (mixed individualistic/collectivist) they were put into a third category. Of the 287 respondents 39% self identified as collectivist and 55% as individualistic. Only 5% were classified as mixed due to parents mixed backgrounds. The third type of cultural information gathered was Self Construal (Independent versus Interdependent Self Scales; IISS). Two subscale scores were computed. Thus there were a total of seven scale scores relative to culture.

Gender was assessed in terms of biological sex and in terms of relative masculinity and femininity using the Bem Sex Role Inventory (BSRI). Thus there were three gender related scores.

Media use questions were of two types gaming and social media. There were nine gaming questions and 12 social media questions (these included cell phone texting). These were treated as individual items.

Dream Variables. Information about dreaming came from three sources; Dream Intensity Scale (DIS), dreamer evaluations of their own recent dream, and judges evaluations. The DIS offers a look at the dream experiences history of a respondent. It is coded into eight subscales; Regular Dreams, Bad Dreams, Major Modalities, Minor Modalities, Dream Work, Paramnesia, Lucid Dreaming, and Autosuggestion. Each subscale has two to four items. In addition to these subscale scores several individual items were also examined which based on previous research were thought to be related to gaming; lucidity (#6), control (#7), nightmares (#3), nightmares that awaken (#4), animals talking (#20), objects talking (#21), fabrication of dream characters (#19) and dream reality confusion (#23).

Table 2. Hall and Van de Castle Dream Content Analysis Subscale as Sum of Act Frequencies.

Scale	N	Minimum	Maximum	Mean	SD
Characters	167	.00	8.00	2.3593	1.65093
Aggression	167	.00	2.00	.2156	.52778
Friendliness	167	.00	5.00	.2395	.64200
Sexuality	167	.00	4.00	.1198	.57876
Activity	167	1.00	34.00	7.3234	6.01331
Success	167	.00	1.00	.0120	.10911
Failure	167	.00	1.00	.0240	.15336
Misfortune	167	.00	2.00	.1617	.41533
Emotions	167	.00	8.00	1.0180	1.25858
Settings	167	1.00	9.00	1.9641	1.42648
Objects	167	.00	23.00	5.4371	4.19200
Modifiers	167	.00	16.00	1.3174	2.03905

A recent dream was collected and respondents were asked to evaluate their own dream in terms of 15 dream emotions and nine dream types. The dream emotions were each rated along a 5-point Likert scale measuring intensity. The dream types were: lucid, control, nightmare, bad dream, mythic/spiritual, bizarre, observer, electronic media and normal. Each dream type was evaluated along a 7-point Likert type scale in terms of the dreamer's confidence that the dream they reported had that quality. Due to findings in previous research with using the 15 emotions as always reducing to a few with factor analysis (Gackenbach, 2012), these self reported emotions were also factor analyzed to reduce them to factor scores. The factor scores were identified as fear/sadness; anger/hate and happiness.

Finally, individuals' dreams were coded using the Hall and Van de Castle Coding Analysis (HVDC). Although 232 participants entered text into the dream dialogue box, only 167 entered a code-able dream using the HVDC. Hall and Van de Castle define a code-able dream as when the participant records a dream that is at least fifty words (excluding their explanations of the dream and experiences prior or upon awakening from the dream). The dream must also have at least a physical or mental activity present such as moving, thinking, sitting or speaking and/or a setting or object present within the dream. Other characters are not necessary because there can be many settings, objects or activities being done by the dreamer. As this is an act frequency scale the number of acts per subscale were used in the regressions. All but one subscale (good fortune) showed some range and were able to be entered into the regressions. The HVDC subscales are detailed in Table 2.

3.2. Descriptive Statistics

The descriptive statistics for each of the individual difference and dream variables are listed below. Tables 1 and 2 list the dream related variables upon which the regressions were computed. Tables 3 and 4 list the descriptive statistics for the three types of individual difference variables; culture, gender and media use, which were used to predict the dream information.

Table 3. Descriptive Statistics for Culture and Gender Type Variables.

Individual Difference Scales	N	Minimum	Maximum	Mean	SD
Self-identified ethnic identity (collectivist=1, mixed =1.5, individualistic=2)	287	1.0	2.0	1.6	0.5
Independent self-construal	287	42.3	147.0	109.1	13.9
Interdependent self-construal	287	41.7	139.0	98.4	14.2
Ethnic identity behaviours scores	287	2.0	8.0	5.0	1.5
Ethnic identity affirmations and belonging scores	287	5.0	19.0	9.8	2.9
Ethnic identity achievement scores	287	7.0	25.0	16.7	3.1
Ethnic identity with other group scores	287	6.0	19.0	12.0	2.4
Sex of respondent (1=male; 2=female)	287	1.0	2.0	1.6	0.5
BEM Masculinity Sum	287	29.0	140.0	16.4	16.4
BEM Femininity Sum	287	26.0	140.0	15.9	15.9

Table 4. Descriptive Statistics for Gaming and Social Media Variables.

Scale	N	Minimum	Maximum	Mean	SD
Gaming*					
Frequency of gaming	287	1.00	5.00	2.26	1.366
Length of gaming session	286	1.00	6.00	2.52	1.181
Number of games played	287	0	18	5.4	3.8
Age of first gaming	287	0	27	8.9	2.6
Read about gaming	287	0	18	2.0	1.9
Visit gaming websites	283	0	36	4.7	2.9
Social Media**					
Age of first social media use	287	3.00	9.00	6.81	0.940
LinkedIn use	1.00	0	18	6.0	4.4
Tumblr use					
Instagram use	232	-1.74	3.56	0.0	1.0
Myspace use	5.00	-2.34	2.53	0.0	1.0
Youtube use	232	-1.68	2.76	0.0	1.0
Google + use					
Other social media use	2.30	1	7	6.80	1.0
Average text messages sent per day	260	1	7	2.0	1.5

*Gaming: Frequency - Rarely or never (1), Several times a year (2), Several times a month (3), Several times a week (4), Daily (5); Length - a. I no longer play video games (1), b. Less than an hour (2), 1 to 2 hours (3), 3 to 4 hours (4), 5 to 6 hours (5), 7 to 8 hours (6), 9 to 10 hours (7), 11 to 12 hours (8), 13 hours or more (9); Number - One to five (1), Six to twenty (2), Twenty-one to fifty (3), Fifty-one to one hundred (4), Over one hundred (5); Age - During my 50s or older (1), During my 40s (2), During my 30s (3), During my 20s (4), 2 years after high school (5), grade 10 to grade 12 (6), grade 7 to grade 9 (7), grade 4 to grade 6 (8), kindergarten to grade 3 (9), before kindergarten (10); Read - 1-Never (1), 2-Rarely (2), 3-Sometimes (3), 4-Often (4), 5-Always (5); Visit - Never (1), Once a year (2), Every six months (3), Every month (4), Every few weeks (5), 1-2 days a week (6), 3-5 days a week (7), About once a day (8), Several times a day (9), About every hour (10), Several times in an hour (11), Pretty much constantly checking (12).

**Social Media: Age - During my 50s or older (1), During my 40s (2), During my 30s (3), During my 20s (4), 2 years after high school (5), grade 10 to grade 12 (6), grade 7 to grade 9 (7), grade 4 to grade 6 (8), kindergarten to grade 3 (9), before kindergarten (10); Frequency for checking each category of social media were rated, Less often or never (1), Every few weeks (2), 1-2 days a week (3), 3-5 days a week (4), About once a day (5), Several times a day (6), About every hour (7), Several times in an hour (8), Pretty much constantly checking (9); text messages - No text messages (1), 1 to 10 text messages (2), 11 to 20 text messages (3), 21 to 50 text messages (4), 51 to 100 text messages (5), 101 to 200 text messages (6), More than 200 text messages (7).

3.3. Regression Analysis

A step-wise regression analysis was conducted for individual difference variables predicting different dream variables. In each table, individual differences related to culture, gender and media use were regressed onto ways of examining dreams; self report history, self report recent dream and judges reports of a recent dream. Each regression table is presented with a brief discussion of the results. Following the presentation of each type of dream variable a summary of the results is offered.

Tables 5, 6 and 7 show the results of step-wise regression analyses for the three main categories of predictor variables (culture, gender, media use) on the various dream assessments. All variables in the table were significant predictors as indicated by the F-values. The percentage of the prediction is given in the R2 values. While the R2 values are relatively small, this is typical of psychological regressions and because they are significant there is a contribution to the dream prediction of these variables. The Beta's for all included variables were significant. All but one of the Beta coefficients are positive thus indicating for everyone one unit increase in the predictor variable the dependent variable will increase by that Beta value.

Table 5 shows that self-identified ethnic identity was the main predictor for the occurrence of Regular dreams and Major Modalities and can also predict instances of Bad

Dreams and Paramnesia from the Dream Intensity Scale. Various types of media use are present in all subscales except for Bad Dreams with Minor Modalities and Dream Work subscales only being predicted by media use. Starting to use social media at a young age predicted the occurrence for Paramnesia and the main predictor for autosuggestion. Lucid dreaming and Major Modalities could also be predicted by an individual starting to play video games at a young age.

Gender and Sex Role Orientation were also present in all Dream Intensity Subscales except for Dream Work and Minor modalities where being anatomically female best predicting the occurrence of Bad Dreams and Paramnesia. However, having a masculine BEM score and being anatomically male were the best predictors of lucid dreams subscale of the DIS.

Next, cultural, gender and media variables were regressed on Self-reported dream emotions and type of dream (Table 6). Culture was the best predictor for hate/anger to be present within individuals' dreams and being anatomically female was the only predictor for fear. However when it comes to the emotion of happiness gaming alone (higher frequency and length of playing session) were the only predictors.

Culture variables were only able to predict normal, lucid and bizarre dreams with ethnic identity affirmations and belonging being the main predictor for the occurrence of normal dreams . However, media use was a predictor for

Table 5. Step-wise Regression Analyses with Predictors, R2 and F-values.

Scale	Predictors	R2/adj.R2/Beta	F-values
Dream Intensity Subscale			
Regular Dreams	Self-Identified Ethnic Identity (Individualist)	.065/.062/.255	$F_{(1, 285)} = 19.786$
	Sex of subject (male)	.109/.103/.211	$F_{(2, 284)} = 17.387$
	MySpace Use	.133/.124/-.157	$F_{(3, 283)} = 14.436$
	YouTube Use	.149/.137/.138	$F_{(4, 282)} = 12.329$
Bad Dreams	Sex of subject (female)	.076/.073/.276	$F_{(1, 285)} = 23.540$
	Self-Identified Ethnic Identity (Individualist)	.101/.095/.158	$F_{(2, 284)} = 15.961$
	BEM High Femininity Scores	.116/.107/.130	$F_{(3, 283)} = 12.381$
Major Modalities	Self-Identified Ethnic Identity (Individualist)	.079/.076/.281	$F_{(1, 285)} = 24.517$
	BEM Femininity Scores	.127/.120/.219	$F_{(2, 284)} = 20.581$
	tumblr use	.149/.140/.151	$F_{(3, 283)}= 16.475$
	YouTube	.165/.153/.136	$F_{(4, 282)}= 13.947$
	Age of 1st Gaming (young)	.177/.162/.111	$F_{(5, 281)}= 12.086$
Minor Modalities	High frequency of text messages sent	.015/.011/.121	$F_{(1, 285)} = 4.23$
Dream Work	Reading about gaming	.032/.029/.179	$F_{(1, 285)} = 9.417$
	Instagram Use	.055/.048/.151	$F_{(2, 284)} = 8.212$
	LinkedIn Use	.070/.060/.125	$F_{(3, 283)} = 7.133$
Paramnesia	Sex of subject (female)	.078/.075/.280	$F_{(1, 285)} = 24.223$
	Age of 1st Social Networking (Young)	.104/.098/.161	$F_{(2, 284)} = 16.530$
	BEM Masculinity Scores	.125/.115/.148	$F_{(3, 283)}= 13.432$
	tumblr Use	.142/.130/.136	$F_{(4, 282)}= 11.666$
	Self-Identified Ethnic Identity (Individualist)	.164/.149/.151	$F_{(5, 281)}= 11.009$
	SMEANS (other)	.175/.158/.108	$F_{(6, 280)}= 9.927$
Lucid Dreaming	Bem Masculinity Scores	.040/.037/.200	$F_{(1, 285)} = 11.866$
	Sex of the subject (male)	.076/.069/.196	$F_{(2, 284)}= 11.603$
	High Interdependent Score	.105/.095/-.173	$F_{(3,283)}= 11.011$
	Age of First Gaming (young)	.125/.113/.146	$F_{(4, 282)}= 10.092$
Autosuggestion	Age of 1st Social Networking (young)	.046/.043/.215	$F_{(1, 285)}= 13.798$
	Sex of the subject (male or female)	.075/.068/.169	$F_{(2, 284)}= 11.477$
	BEM Masculinity Scores	.107/.097/.186	$F_{(3, 283)}= 11.286$

all dream types except for bizarre dreams and was the only predictor for observer dreams (YouTube Use). YouTube use in fact was a predictor in lucid and control dream types as well.

Gender, particularly BEM scores were the main predictors for dream types with masculine BEM scores predicting lucid, control and mythological/spiritual dreams. Femininity best predicted bizarre and bad dreams but did not appear in any other type of dream.

Judges coded recent dream using the HVDC scale. Act frequencies for each subscale was the predicted variable. Media use was the main predictor for the occurrence of characters and friends being present in dreams, activities being done within a dream (talking, walking, running etc.) and misfortune. Failure and success in a dream were also only predicted by media use. Emotions and modifiers being present within an individuals' dreams were the only aspects that had gender and culture variables with BEM masculinity scores predicting emotions in the dream. However, masculine scores were not the main predictor. Ethnic identity behaviours scores were the main predictor for modifiers being present within the dream.

4. Discussion

The continuity hypothesis has been a major theory suggesting what the content of our dreams might contain (Hall & Norby, 1997). What a person does the day or week before a dream, in part determines its content. Another major influence has been suggested to be gender, men and women

Table 6. Regression Analysis for Self-Reported Recent Dream Emotions and Dream Type.

Scale	Predictors	R2/adj.R2/Beta	F-values
Self-Reported Recent Dream Emotions			
Anger/Hate	Ethnic Identity Achievement Scores	.018/.014/-.134	$F(1, 230) = 4.220$
	Ethnic Identity Behaviour Scores	.038/.030/.160	$F(2, 229) = 4.584$
Fear	Sex of subject (female)	.032/.028/.179	$F(1, 230) = 7.631$
Happiness	High Gaming Frequency	.021/.017/.146	$F(1, 230) = 5.010$
	Length of Gaming	.046/.038/-.225	$F(2, 229) = 5.549$
Dream Type			
Lucid	BEM Masculinity Scores	.029/.025/.170	$F(1, 230) = 6.808$
	YouTube Use	.051/.043/.151	$F(2, 229) = 6.188$
	High Number of Games Played	.069/.057/-.136	$F(3, 228) = 5.638$
	Ethnic Identity Achievement Scores	.089/.073/.149	$F(4, 227) = 5.578$
Control	BEM Masculinity Scores	.045/.041/.213	$F(1, 230) =10.947$
	YouTube Use	.062/.054/.130	$F(2, 229) = 7.598$
Bad	BEM Femininity Scores	.020/.016/.141	$F(1, 230)= 4.666$
	High Frequency Use of Gaming Websites	.040/.032/.146	$F(2, 229) = 4.821$
Mytholog./Spiritual	BEM Masculinity Scores	.046/.042/.215	$F(1, 230)= 11.135$
	Google+ Use	.065/.057/.150	$F(2, 229)= 8.006$
Bizarre	BEM Femininity Scores	.039/.035/.198	$F(1, 230) = 9.382$
	Ethnic Affirmation and Belonging Scores	.062/.054/.154	$F(2, 229) = 7.629$
Observer	YouTube Use	.029/.024/.169	$F(1, 230) = 6.774$
Electronic Media	Gaming Videos- videos about gaming/topics	.029/.025/.171	$F(1, 230)= 6.945$
	Number of Games Played	.053/.045/-.174	$F(2, 229)= 6.400$
	BEM Masculinity Scores	.076/.064/.154	$F(3, 228)= 6.272$
Normal	Ethnic Identity Affirmation and Belonging	.036/.032/-.190	$F(1, 230) = 8.573$
	Sex of the subject (male)	.056/.047/-.140	$F(2, 229) = 6.740$
	LinkedIn Use	.073/.061/ .132	$F(3, 228)= 5.992$

seem to have differences in their dream content (Hall & VandeCastle, 1966). More recently culture has become a variable of interest in considering dream content (Yu, 2008; Neilsen, et al, 2003) as has media use (Gackenbach, 2012; Gackenbach & Gahr, 2015).

Recall of a recent dream (preferably from the past two weeks) is one way to collect dream data and is helpful because the dreamer is providing a narrative of the dream. Additionally, dreamer's ratings about the dream following it's report offers another type of self report on the dream experience. However, this method does not give a broad picture of peoples' overall dream experience (Schredl, Mathess, & Goritz, 2014), which is why it was decided to use a third data collection method about dreams, the Dream Intensity Scale (DIS). The DIS is a 23-item scale that was designed to measure subjective magnitude of the dreamer's beliefs about and experiences with their dreams (Yu, 2012).

Gackenbach, Lee, Zhou, and Yu (2015) conducted a study that compared dream variable differences between students attending a western university and those attend-

ing three universities in China. They examined the DIS as well as content and emotional self evaluation of a recent dream. It was found that culture and gaming had mediating effects for Dream Awareness Subscales as well as for self perceived bizarreness and the emotion of fear in a recent dream (Gackenbach et al., 2015). In the current inquiry these measures were utilized to get a better picture of the participant's average dream experience.

The major finding of this inquiry regards the relative contributions of each type of individual difference variable in predicting dream content from three different dream data collection methods. As noted what we dream about can be assessed in a variety of ways as pointed out by Schredl (2010). Thus, to allow for these differences in content in the current study three methods were used: self-report history, dreamer evaluations of self-reported recent dream, and judges evaluations of a recent dream. A variety of regressions were computed predicting various dream related variables using the same set of 31 predictors. These predictors were gender (3 variables); Media use (21 variables) and cul-

Table 7. Regression Analyses for Hall and Van de Castle Coding Analysis of Recent Dreams.

Scale	Predictors	R2/adj.R2/Beta	F-values
Hall and Van de Castle Coding			
Characters	Google+ Use	.033/.027/.180	$F_{(1, 165)} = 5.550$
Friends Present	Instagram Use	.024/.018/.153	$F_{(1, 165)} = 3.980$
Activities	Other Social Media Use	.017/.013/-.130	$F_{(1, 285)} = 4.865$
Success In Dreams	Age of 1st Gaming (Young)	.033/.027/.171	$F_{(1, 165)} = 5.664$
Failure In Dreams	tumblr Use	.029/.023/.213	$F_{(1, 165)} = 4.957$
Misfortune In Dreams	Age of 1st Social Networking (young)	.039/.033/-.197	$F_{(1, 165)} = 6.696$
Having Emotions	Other Social Media Use	.026/.020/-.162	$F_{(1, 165)} = 4.430$
Present in Dream	Age of 1st Gaming (young)	.058/.046/ .180	$F_{(2, 164)} = 5.043$
	BEM Masculinity Scores	.081/.064/-.154	$F_{(3, 163)} = 4.807$
	Google+ Use	.111/.089/ .178	$F_{(4, 162)} = 5.068$
Modifiers Present	Ethnic Identity Behaviour Scores	.032/.026/.179	$F_{(1, 165)} = 5.485$
in Dreams	YouTube Use	.062/.051/.173	$F_{(2, 164)} = 5.428$

ture (7 variables). Because there were different number of predictors the best way to consider the relative importance of each type of predictor in predicting dreams is to look at the relative percentage of actual predictors as a function of possible predictors. This is portrayed in Table 8 below.

It can be seen in Table 8 that gender type variables were the strongest predictors in two of the three types of dream information. Both types were self-reports. However, when a judge coded a recent dream of the respondents and those subscales were predicted by the same set of individual difference variables, then a different picture of relative contribution emerged. First there were relatively fewer predictions of judges evaluations relative to dreamer self reports. Secondly, gender type variables were no more powerful predictors of dream content assessed by judges then media use or culture. This may be an artifact of this data collection effort thus it requires duplication. However, while most often gender differences are found in some form of self-report, sometimes judge's assessments come into play. Thus, Shredl and Piel (2005) had interviewers talk to respondents about their dreams. They made every effort to neutralize any bias that might emerge due to knowing the gender of the dreamer and still found the classic sex differences in dream experiences. In the current study, the judges were blind to gender of the dreamer. However, there are often indicates in a dream of the dreamer's gender. Most often terminology like "my boyfriend" would imply a female dreamer. But in recent years, with the increasing visibility of gender types, such language can no longer be assumed to be from one or the other of the sexes.

4.1. Limitations

The biggest limitation of this study is that while it proports to examine culture, all students were attending a Canadian University. Because of Canadian immigration policies, it was possible to get a relatively large sample of participants from widely different cultural backgrounds but they are living, studying, and speaking in an English speaking province. Secondly, the age range is limited. The measures of

Table 8. Relative Contribution of Three Individual Difference Type Variables to Predict Three Types of Dream Information.

Type & Number of Dependent Dream Variable	Media Predictors Total Possible Distinct Predictors = 21 (68%)	Gender Predictors Total Possible Distinct Predictors = 3 (10%)	Culture Predictors Total Possible Distinct Predictors = 7 (22%)
8 Dreamers evaluations of history of dreams (DIS subscales)	168 possible; 15/168 or 9% did predict	24 possible; 9/24 or 38% did predict	56 possible; 5/56 or 9% did predict
12 Dreamer evaluations of a Recent Dream (type and emotions)	252 possible; 11/252 or 4% did predict	36 possible; 8/36 or 22% did predict	84 possible; 5/84 or 6% did predict
13 HVDC Judges evaluations of a recent dream	273 possible; 12/273 or 4% did predict	39 possible; 1/39 or 3% did predict	91 possible; 2/91 or 2% did predict

media use were actually not as many as those of culture and gender, but the lack of the development of a media use survey resulted in the reliance on individual items. This may have skewed the results. However, the final summary table (Table 8) took this into account.

References

Adachi, P., & Willoughby, T. (2013). More than just fun and games: the longitudinal relationship between strategic video games, self-reported problem solving skills and academic grades. Journal of Youth and Adolescence, 42, 1041-1052.

American Psychiatric Association. (2013). Internet Gaming Disorder. Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

Arriaga, P., Adriao, J., Madeira, F., Cavaleiro, I., Maia e Silva, A., Barahona, I., & Esteves, F. (2015). A "dry eye" for victims of violence: effects of playing violent video games on papillary dilation to victims and on aggressive behaviour. Psychology of Violence, 5(2), 199-208. Advance online publication.

Bem, S. L. (1974). The measurement of psychological androgyny. Journal of Consulting and Clinical Psychology, 42, 155–162.

Boyes, A. & Gackenbach, J.I. (2016). Nightmare protection, gender and video game play. Dreaming, 26(1), 29-41.

Ferguson, C.J. (2010). Blazing angels or resident evil? Can violent video games be a force for good? Review of General Psychology, 14(2), 68-81.

Gackenbach, J.I. (2012). Video game play and dreams. In Barrett, D. & McNamara, P. (eds.) Encyclopedia of Sleep and Dreams. Santa Barbara, CA: ABC-CLIO (p. 795-800).

Gackenbach, J., Darlington, M., Ferguson, M.L., & Boyes, A. (2013). Video game play as nightmare protection: a replication and extension. Dreaming, 23, 97-111.

Gackenbach, J.I., Ellerman, E. & Hall, C. (2011). Video game play as nightmare protection: a preliminary inquiry in military gamers. Dreaming. 21(4), 221-24.

Gackenbach, J.I. & Gahr, S. (2015). Media use and dreams associations between Canadians of differing cultural backgrounds. International Journal of Dream Research, 8(1).

Gackenbach, J. I., & Rosie, M. (2009). Cognitive evaluation of video games: Players' perceptions (pp. 23–24). Proceedings of the 2009 Conference on Future Play on @ GDC Canada, Vancouver, British Columbia, Canada.

Gomez-Gill, E., Gomez, A., Canizares, S., Guillamon, A., Rametti, G., Esteva, I., Vazquez, A., & Salamero-Baro, M. (2012). Clinical utility of the Bem Sex Role Inventory in the Spanish transsexual and non-transsexual population. Journal of Personality Assessment, 94, 304-309.

Hall, C. S., & Nordby, V. J. (1972). The individual and his dreams. New York: Signet.

Hall, C. S., & Van de Castle, R. L. (1966). The content analysis of dreams. New York: Appleton-Century-Crofts.

Hollingdale, J., & Greitemeyer, T. (2014). The effects of online violent video games on levels of aggression. PLoS ONE, 9, 1-5.

Jones, C.M., Scholes, L., Johnson, D., Katsikitis, M., & Carras, M.C. (2014) Gaming well: links between videogames and flourishing mental health. Frontiers in Psychology, 5(260).

Kastenmuller, A., Fischer, P., & Fischer J. (2014). Video racing games increase actual health-related risk-taking behavior. Psychology of Popular Media Culture, 3, 190-194.

Lambrecht, S., Schredl, M., Henley-Einion, J., & Blagrove, M. (2013). Self-rated effects of reading, TV viewing and daily activities on dreaming in adolescents and adults: The UK library study. International Journal of Dream Research, 6(1), 41-44.

Lee, D. & Kashubeck-West, S. (2015). Factor structure of the Bem Sex Role Inventory in samples of ethnically diverse adults in the U.S. Journal of Asia Pacific Counseling, 5. 1-22.

Lu, L. & Gilmour, R. (2007). Developing a new measure of independent and interdependent views of the self. Journal of Research in Personality, 41, 249-257.

Markey, P. & Markey, C. (2010). Vulnerability to violent video games: A review and integration of personality research. Review of General Psychology, 14(2), 82-91.

Melchior, M.,Chollet, A., Fombone, E., Surkan P.J. & Dray-Spira, R. (2014). Internet and video game use in relation to overweight in young adults. American Journal of Health Promotion, 28, 321-324.

Nielsen, T., Zadra, A., Simard, V., Saucier, S., Stenstrom, P., Smith, C., & Kuiken, D. (2003). The Typical Dreams of Canadian University Students. Dreaming, 13 (4), 211-235.

Ortiz de Gortari, A. B., & Griffiths, M. D. (2014). Automatic mental processes, automatic actions and behaviours in game transfer phenomena: An empirical self-report study using online forum data. International Journal of Mental Health and Addiction, 12(4), 432-452.

Peng, T.K. (2006). Construct validation of the Bem Sex Role Inventory in Taiwan. (2006). Sex Roles, 55, 843-851.

Phinney, J.S. (1992). The multi-group ethnic identity measure: a new scale for use with diverse groups. Journal of Adolescent Research, 7, 156-176.

Seok, S. & DeCosta, B. (2012). The world's most intense online gaming culture: Addiction and high-engagement prevalence rates among South Korean adolescent and young adults. Computers in Human Behavior, 28, 2143-2151.

Shredl, M. & Piel, E. (2005). Gender differences in dreaming: Are they stable over time? Personality and Individual Differences. 39(2), 309-316.

Subramanian, R., Wise, K., Davis, D., Bhandari, M., & Morris, E. (2014).The relative contribution of implicit and explicit self-esteem to narcissistic use of Facebook. Computers in Human Behaviour, 39, 306-311.

Wamsley, E. (2014). Dreaming and offline memory consolidation. Current Neurology and Neuroscience Reports, 14, 433-435.

Yu, C. (2008). Typical dreams experienced by Chinese people. Dreaming, 18 (1), 1-10.

Yu, C. (2010). Dream intensity scale: factor in phenonmenological analysis of dreams. Dreaming, 20, 107-129.

Yu, C. (2011). The mechanisms of defense and dreaming. Dreaming, 21, 151-169.

Yu, C. (2012). Testing the factorial structure of the dream intensity scale. Dreaming, 22, 284-309.

Zadra, A., & Donderi, D.C. (2000). Nightmares and bad dreams: Their prevalence and relationship to well-being. Journal of Abnormal Psychology, 109(2), 273-81.