

**Ontogenetic and gender dimensions in a normative study of the dreams of Canadians**

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## **Abstract**

The current dissertation examined gender, cultural, and ontogenetic dimensions in the dreams of Canadians. Normative studies in the United States, Europe, and other countries have documented normative data including gender differences and compared their findings to American data to investigate cultural differences. The purpose of the present study was to extend research of this nature by establishing normative data for Canadians. Furthermore, age differences in dreams have been mostly investigated for females, with only a few studies with males, and have used a variety of methodologies and age ranges. Another objective of this study was to document, for the first time, the ontogenetic pattern of the main dream content categories from adolescence to old age for males and females. The rigorous and detailed dream diary method was used to collect dreams which were analyzed using the Hall and Van de Castle method of content analysis.

The first paper consisted of two dreams each from 150 male and female young adult Canadians, ages 18-24, totaling 600 dream reports. Findings provided support for the threat simulation theory as there were more negative than positive themes overall. Furthermore, dream gender differences were consistent with those in waking and the similarity of Canadian and American culture was reflected in dream imagery, supporting the continuity hypothesis of dream formation.

The final two papers examined the ontogenetic patterns of dream content for females and males respectively. The second paper consisted of 75 females across 5 age groups from adolescence to old age (12-17, 18-24, 25-39, 40-64, and 65-85) and the third paper consisted of 50 males across the same age groups with the exception of 31 males in the oldest group (65-85). The ontogenetic patterns of dream content from adolescence to old age reflected waking developmental patterns as proposed by social theories, neurobiological research, and recognized features of aging, supporting the continuity hypothesis.

In terms of the theoretical implications, this work provides support for the hypothesis of the threat simulation theory pertaining to the prevalence of negative content in dreams. It also provides support for the continuity between waking and dreaming hypothesis of dream formation. Implications of these findings regarding our understanding of the sources of dream formation are described. Finally, limitations and future directions, for research examining the evolution of gender differences across the lifespan, are discussed.

### **Résumé**

Cette thèse portait sur les dimensions générées, culturelles et ontogéniques dans les rêves des canadiens. Des études normatives aux États-Unis, en Europe et dans d'autres pays ont amassé des données normatives, incluant les différences reliées au genre, et ont comparé leurs résultats aux données d'américains pour investiguer les différences culturelles. L'objectif de la présente étude était de continuer les recherches normatives du passé en employant un échantillon de canadiens. Qui plus est, les différences liées à l'âge dans les rêves ont surtout été investiguées chez les femmes, avec seulement quelques études chez les hommes et en utilisant une variété de méthodologies et une grande étendue d'âges. Un autre objectif de cette thèse était de documenter, pour la première fois, les distributions ontogéniques des principales catégories de contenu dans les rêves, de l'adolescence à la vieillesse, pour les femmes et pour les hommes. La méthode rigoureuse et détaillée du journal de rêves a été utilisée pour la collecte des récits oniriques, qui ont été cotés conformément à la méthode d'analyse de contenu de Hall et Van de Castle.

Le premier article a utilisé deux rêves chacun de 150 jeunes hommes et femmes canadiens, âgés de 18 à 24 ans, pour un total de 600 rapports de rêves. Les résultats ont supporté la théorie de simulation des menaces, considérant la présence de contenu global plus négatif que positif. Qui

plus est, les différences reliées au genre dans les rêves coïncidaient avec celles observées dans la vie éveillée, et les similarités des cultures canadienne et américaine étaient reflétées dans l'imagerie onirique, appuyant l'hypothèse de la continuité transculturelle de la formation des rêves.

Les derniers deux articles examinaient les tendances ontogéniques de contenu dans les rêves pour les femmes et les hommes respectivement. Le deuxième article utilisait des rêves de 75 femmes à travers cinq groupes d'âge, de l'adolescence à la vieillesse (de 12 à 17, 18 à 24, 25 à 39, 40 à 64, et 65 à 85), et le troisième article utilisait les rêves de 50 hommes à travers les mêmes groupes d'âge, avec l'exception de 31 hommes dans le groupe plus âgé (de 65 à 85). Les tendances ontogéniques de contenu dans les rêves, de l'adolescence à la vieillesse, reflétaient les tendances développementales observées dans la vie éveillée telles que proposées par les théories sociales, la recherche neurobiologique et des caractéristiques reconnues de la vieillesse, supportant ainsi l'hypothèse de la continuité.

En termes des implications théoriques, cet ensemble d'études supporte la théorie de simulation des menaces en ce qui a trait à la prévalence de contenu négatif dans les rêves. Il supporte également l'hypothèse de la continuité entre l'éveil et les rêves dans la formation des rêves. Les implications de ces résultats concernant notre compréhension des sources de la formation des rêves ont été décrites. Finalement, la discussion a porté sur les limites et directions futures pour la recherche examinant l'évolution des différences reliées au genre.

## Table of Contents

|                                                                                                               |      |
|---------------------------------------------------------------------------------------------------------------|------|
| Abstract.....                                                                                                 | ii   |
| Resume.....                                                                                                   | iii  |
| List of Tables.....                                                                                           | vi   |
| List of Figures.....                                                                                          | vi   |
| Preface.....                                                                                                  | vii  |
| Acknowledgements.....                                                                                         | viii |
| Introduction.....                                                                                             | 1    |
| <i>Dream History and Ancient Cultures</i> .....                                                               | 2    |
| <i>Current Dream Theories</i> .....                                                                           | 6    |
| <i>Hall and Van de Castle Study</i> .....                                                                     | 10   |
| <i>The Content Categories</i> .....                                                                           | 11   |
| <i>Findings of Hall and Van de Castle's Normative Study</i> .....                                             | 15   |
| <i>Normative Study Replications and Follow Ups</i> .....                                                      | 18   |
| <i>Normative Studies with American College Students</i> .....                                                 | 19   |
| <i>Normative Studies in other Cultures</i> .....                                                              | 23   |
| <i>Ontogenetic Normative Studies</i> .....                                                                    | 30   |
| <i>Dream Methodologies</i> .....                                                                              | 31   |
| <i>The University of Ottawa Normative Database</i> .....                                                      | 33   |
| <i>Thesis Studies</i> .....                                                                                   | 35   |
| <i>Original Contributions</i> .....                                                                           | 36   |
| Article 1: Dreams of Canadian students: Norms, gender differences, and comparison<br>with Americans.....      | 38   |
| Article 2: Ontogenetic patterns in the dreams of women across the lifespan.....                               | 68   |
| Article 3: Dream content of males from adolescence to old age: An exploration of<br>Ontogenetic patterns..... | 95   |
| General Discussion and Conclusions.....                                                                       | 128  |
| <i>Dreams of Canadian Students: Norms, Gender Differences, and Comparison<br/>with Americans</i> .....        | 128  |
| <i>Ontogenetic Patterns in the Dreams of Women across the Lifespan</i> .....                                  | 130  |
| <i>Dream Content of Males from Adolescence to Old Age: An exploration of<br/>Ontogenetic Patterns</i> .....   | 131  |
| <i>Original Contributions to Scientific Knowledge and Dream Literature</i> .....                              | 132  |
| <i>Limitations and Future Directions</i> .....                                                                | 137  |
| <i>Conclusions</i> .....                                                                                      | 140  |
| Bibliography.....                                                                                             | 143  |

## List of Tables

### Introduction

|                                                                     |    |
|---------------------------------------------------------------------|----|
| Table 1. Normative Data on the Dreams of Young American Adults..... | 18 |
| Table 2. Normative Sample of Canadian Dreams .....                  | 35 |

### Article 1

|                                                                                                                                     |    |
|-------------------------------------------------------------------------------------------------------------------------------------|----|
| Table 1. Normative Data for the Dreams of Young Adult Canadians .....                                                               | 52 |
| Table 2. Gender Differences for Canadians and Americans and National<br>Differences (+ higher for males, - higher for females)..... | 54 |
| Table 3. Comparison of Canadian and American Males and of Canadian and<br>American Females .....                                    | 57 |

### Article 3

|                                                                                                                                   |     |
|-----------------------------------------------------------------------------------------------------------------------------------|-----|
| Table 1. Frequency of main Hall and Van de Castle (1966) content categories<br>for dream reports and daily logs by age group..... | 115 |
|-----------------------------------------------------------------------------------------------------------------------------------|-----|

## List of Figures

### Article 2

|                                                                                                                |    |
|----------------------------------------------------------------------------------------------------------------|----|
| Figure 1. Pattern of characters in the dreams of women across the lifespan .....                               | 80 |
| Figure 2. The pattern of activities in the dreams of women without<br>controlling for dream report length..... | 81 |
| Figure 3. Pattern of aggressive interactions in the dreams of women across<br>the lifespan .....               | 82 |
| Figure 4. Pattern of friendliness in the dreams of women across the lifespan.....                              | 83 |
| Figure 5. Pattern of emotions in the dreams of women across the lifespan.....                                  | 84 |

### Article 3

|                                                                                 |     |
|---------------------------------------------------------------------------------|-----|
| Figure 1. Pattern of characters in the dreams of men across the lifespan.....   | 111 |
| Figure 2. Pattern of activities in the dreams of men across the lifespan.....   | 112 |
| Figure 3. Pattern of aggression in the dreams of men across the lifespan.....   | 113 |
| Figure 4. Pattern of friendliness in the dreams of men across the lifespan..... | 114 |

### General Discussion and Conclusions

|                                                     |     |
|-----------------------------------------------------|-----|
| Figure 1. Layers in the construction of dreams..... | 135 |
|-----------------------------------------------------|-----|

## Preface

### **Authorial contributions:**

**Allyson Dale:** assisted with refining the study design including hypotheses and predictions, recruited and collected extra participants, helped with the content analysis of dream reports and entering data into the dreamSAT program, performed and interpreted the statistical analyses, and drafted and revised all three manuscripts.

**Monique Lortie-Lussier:** contributed to the initial study idea and design, performed preliminary analyses investigating ontogenesis in female dreams, assisted with the editing and revision process for publication of the first and second papers.

**Christina Wong:** involved in collecting participants and the content analysis of the dream reports.

**Alexandre Lafrenière:** involved in the content analysis of the dream reports and the daily logs and assisted with the revisions for the final paper on the ontogenesis of male dreams.

**Joseph De Koninck:** contributed the original idea and study design, secured funding for the project through a grant from the Social Sciences and Humanities Research Council of Canada, supervised the research project, assisted with interpreting the statistical analysis, and assisted with editing and revising the manuscripts.

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## **Introduction**

This dissertation examined ontogenetic and gender dimensions in the dreams of Canadians. Three studies were conducted with participants from a database obtained from a Social Sciences and Humanities Research Council of Canada (SSHRC) grant to Dr. De Koninck at the University of Ottawa. A background on the history of dream work, beliefs, and attempts to classify the content from various ancient cultures will be presented first. This will be followed by a description of the prominent dream theories in the scientific literature. Next Hall and Van de Castle's method of content analyses, which was used to code the dreams, will be introduced as well as the findings from the original study conducted in 1966 referred to as the "normative study". Subsequently, the literature will be reviewed from normative studies in the United States as well as in other countries. Although this dissertation did not include child participants, the main findings for studies conducted using children's dreams will also be briefly reviewed, with ontogenetic studies conducted with older age groups reviewed thoroughly in the final two papers.

The next section will describe the methodology used for the three studies in the dissertation including the participants, the dream package and the various measures collected, the content analysis method used to code the dreams, and the programs used for statistical analyses. Finally, the normative data base of Canadian dreams at the University of Ottawa will be introduced as well as a description of the three studies, their rationale, hypotheses, and original contributions.

The three articles will then be presented starting with "Dreams of Canadian students: Norms, gender differences, and comparison with Americans". The main purpose of this investigation was to establish normative data for a large sample of young adult Canadian dreams and to examine gender differences. Additional objectives were to compare our findings with

those of the original Hall and Van de Castle (1966) study for gender differences and also male and female norms. The second article is entitled “Ontogenetic patterns in the dreams of women across the lifespan”. The purpose of this article was to extend previous research on the developmental differences in women’s dreams across the lifespan and to determine whether dream content patterns reflect developmental patterns as proposed by social theories and recognized features of aging for women. Similarly, the third article is entitled “Dream content of males from adolescence to old age: An exploration of Ontogenetic patterns”. The purpose of this article was to fill a much needed gap in the literature on age differences in the dreams of males and to compare the ontogenetic patterns of dream content with developmental patterns in sociological, aging, and neurobiological research.

The last section of this dissertation will focus on reviewing the major findings of the three articles including the significant contributions, theoretical implications, and limitations. Directions for future research as well as a model of the layers of dream formation, and its relationship with the major findings of the three papers, will conclude the general discussion.

### **Dream History and Ancient Cultures**

Dreams have both fascinated and helped shape the history of humanity and still remain currently relevant with the growing scientific field of dream research. Beliefs and opinions about both the function and meaning of dreams have evolved in various ancient cultures. In a detailed and thorough review, Van de Castle (1994) points out that dreams were considered very important in ancient cultures. Beliefs of ties of dreaming with the spiritual world have led to the development of dream incubation, dream interpretations, and attempts to classify and categorize dreams and their meanings (Van de Castle, 1994).

Scholars studying the dream records of various ancient cultures, for example Dr. Leo Oppenheim at the University of Chicago, attempted to classify dreams from Mesopotamian, Egyptian, and Old Testament records into three categories including message dreams, mantic dreams, and symbolic dreams. Message dreams were largely experienced by kings and an important message was delivered by a deity. Mantic dreams referred to those dreams that indicated future events and symbolic dreams were those that expressed the personality of the dreamer and involved unusual interactions with gods, stars, people, or objects (Oppenheim, 1956; Van de Castle, 1994). In ancient Egyptian culture, two collections of *omina* or signs survived in relation to dreams. The first is the Chester Beatty Papyrus III and consists of a table listing 143 good dreams and 91 bad dreams, along with interpretations for the various dream imagery (Van de Castle, 1994). The classification of the dreams and their interpretation involved the corresponding of ideas and words, symbolic aspects of the dreams, and paragraphs providing help in protecting against evil in bad dreams (Gardiner, 1935; Van de Castle, 1994). The second collection are from the Carlsburg Papyrus and included originally 250 *omina* categorized into section headings. Six of these headings remain as many were damaged. The texts described the different outcomes that would arise in a person's life after certain dream activities. In addition, the texts included a section on exclusively women's dreams (Van de Castle, 1994).

The Chinese culture provided classifications of dream content with interpretations in the T'ung Shu, an ancient Chinese almanac describing seven categories of dreams and their interpretations including heaven and the weather, houses, gardens, forests, the human body, animals and birds, and clothing and jewellery (Palmer, 1986; Van de Castle, 1994). In addition, several classes of dreams were described in a Taoist work known as the Lie-tsu including ordinary, terror, thought, waking, and joy dreams. This work also described possible causes for

certain dream imagery as opposed to offering interpretations for each category of the dream content. Causes for the dream imagery included what is now known as the compensation theory of dreams, which states that we compensate in dreams for what we do not experience in waking life (Jung, 1933). Other causes and explanations for dreams provided in the Lie-tsu include the importance of yin and yang energy as well as the role of physical factors (Palmer, 1986).

Another attempt to categorize dreams was conducted in ancient Indian culture in the book of wisdom known as the Vedas, written between 1500 and 100 BC (Somprasong, 2012). This work distinguished the imagery in dreams as being either favourable or unfavourable. For example, to ride an elephant was described as a lucky dream and riding a donkey was described as an unlucky dream. In addition to listing both favourable and unfavourable dreams, this work described the outcomes of certain actions in dreams such as violence and aggression which led to success and happiness (Somprasong, 2012; Van de Castle, 1994). A different attempt to categorize dream imagery was conducted in ancient Greece by Hippocrates, who believed in prophetic dreams, diagnostic dreams, and psychologically revealing dreams and who placed an important emphasis on one's body and health in relation to dream imagery (Hill, 1996). In his work "On Dreams" Aristotle describes how certain dream imagery describes the current functioning of the body and health. For example, atypical astrological configurations were a sign of tension or bodily disturbance where dreams of heavenly bodies shining brightly were a sign of optimal bodily functioning (Van de Castle, 1994).

The attempt of ancient cultures to classify and categorize both dreams and their interpretations in Ancient Eastern, Indian, Chinese, and Greek cultures led to the first large scale classification of dreams, both thorough and detailed, which was conducted by Artemidorus of Daldis. Artemidorus was a contemporary of Galen and a Roman soothsayer or fortune teller and

he inscribed the book “Oneirocritica” or “The Interpretation of Dreams” in the 2<sup>nd</sup> century AD (De Koninck, 2012; MacKenzie, 1965; Van de Castle, 1994). The Oneirocritica was the most complete work on the interpretation of dream imagery and greatly influenced dream interpreters until the work of Freud. The Oneirocritica was first translated from Greek to English in a doctoral dissertation by Robert White in 1975 at Yale University (De Koninck, 2012). The Oneirocritica consisted of five books compiling an encyclopedia of dreams and containing interpretations for certain detailed elements and dream imagery. The first three books of the series present a detailed and thorough taxonomy of dream content and their interpretation for the knowledge of the general public. The last two books of the series were meant for his son, a novice at dream interpretation, to develop his skills (MacKenzie, 1965; Harris-McCoy, 2012; Van de Castle, 1994).

The first book in the series contained 82 numbered units on the human body and its activities. This thorough and detailed analysis classified every aspect of the human body in an orderly fashion starting with the head, hair, and facial features and ending with the shin bones, ankles, and toes (Harris-McCoy, 2012; Van de Castle, 1994). Various other activities of the human body were also described in great detail in the first book including physical or craft activities, the act of consumption of food and beverages, and sexual activity (Harris-McCoy, 2012).

The second book in the series contained 70 units on dreams concerning objects and events occurring in the natural world (Harris-McCoy, 2012; Van de Castle, 1994). The categories in the second book included clothing, weather, fire, animals, bodies of water, the gods, the deceased, flying, and numbers appearing in dreams. The detailed and thorough listing of all

categories and classifications of animals, from domestic mammals to birds, portrays the magnitude of the encyclopedia offered by Artemidorus (Harris-McCoy, 2012).

The third book, as with the first two, also contained a structured classification of dream imagery and contained 66 units on dreams described as being somewhat loose and disconnected (Harris-McCoy, 2012). The fourth book in the *Oneirocritica* was a manual to his son and concerned techniques for dream interpretation (Harris-McCoy, 2012; Van de Castle, 1994). The final book of the series, book 5, was a collection of 95 dreams collected by Artemidorus in which the outcomes were personally witnessed for his son to use as practice materials (Harris-McCoy, 2012).

It seems that past classification systems for dream imagery focussed on predetermined interpretations. Interestingly, modern dream content analysis methods do not include this component and interpretations are only self or therapist guided (DeCicco, 2009; Heaton, Hill, Peterson, Rochlen, & Zack, 1998). However, the encyclopedic collection of dream imagery and interpretations by Artemidorus had a major influence on ancient and historical dream exploration and paved the way for both the categorization and classification of dream imagery into a coding system for statistical analyses and for modern day theories of the relation of dreams to waking life.

### **Current Dream Theories**

David Foulkes, a pioneer in the study of the dreams of children (1982; 1999), suggested that dream content reflects waking cognitive and emotional development. Cavallero and Foulkes (1993) further described dreaming as an intellectual process as opposed to perceptual, requiring certain cognitive skills as a precondition. Therefore, the cognitive capacity to produce the dream is the most fundamental requirement. This has also recently been put as one of the first layers in

De Koninck's (2012) model of dream formation. This notion, and findings from his studies related to the development of children's dreams (Foulkes, 1982), support the major theory of dream formation, first coined by Hall and Nordby (1972), the continuity hypothesis. There is ongoing debate over the definition of continuity and the proper methodology to test the theory as this can range from concerns and emotions to events and all waking activities (Domhoff, 2011; Malinowski & Horton, 2011; Schredl, 2012).

In the most general terms, the continuity hypothesis (Domhoff, 2011; Hall & Nordby, 1972; Hobson & Schredl, 2011; Schredl, 2012; Schredl & Hofmann, 2003) posits that dreams reflect waking life experiences. This continuity can be seen in the form of waking day events, desires, and concerns, differences between populations, fears, or relationships. Dreams have also been demonstrated to be a realistic simulation of waking life in a wide variety of ways (Barrett & McNamara, 2007; Clarke, DeCicco, & Navara, 2010; Dale & DeCicco, 2011; DeCicco, 2007b; 2008; 2009; Hobson & Schredl, 2011; Schredl, 2012; Schredl & Hoffman, 2003). Studies demonstrate that both male and female student dreams relate to their waking life (Dale & DeCicco, 2011; DeCicco, 2007a; Delorme Lortie-Lussier, & De Koninck, 2002). For example, student physical mood and self-construal were reflected in their dream imagery (King & DeCicco, 2007). Furthermore, results from a questionnaire distributed to university students found strong support for the belief that dreams were meaningful and relate to waking day circumstances (King & DeCicco, 2009). Interestingly, students who did not believe that dreams were important or relevant to waking life still held the belief that dreams were reflective of waking day (King & DeCicco, 2009).

Dream research exploring interpersonal relationships and sexuality further demonstrate support for the continuity hypothesis (King, DeCicco, & Humphreys, 2009; Zadra, 2007; Zanas, 2007).

DeCicco, Dale, Mussolino, & Wright, 2012). For example, relationship dissatisfaction in waking life is related to dream jealousy in people reporting unhealthy relationships (Clarke et al., 2010), dream content reflects sexual daytime practices, and married people dream more of their partners than those who are not married people (Funkhouser, Hirsbrunner, Cornu, & Bahro, 1999). In addition to relationships and sexuality, continuity between waking life and dream content has been examined with respect to aging (Cote, Lortie-Lussier, Roy, & De Koninck, 1996; Lortie-Lussier, Cote, & Vachon, 2000), emotions (Howe & Blick, 1984), and emotions in relation to age differences (St-Onge, Lortie-Lussier, Mercier, Grenier, & De Koninck, 2005), and pregnancy (Blake & Reimann, 1993; Malinowski & Horton, 2011; Sabourin, 2010).

The continuity hypothesis is further supported in studies examining differences in dream content between various populations, for example in clinical samples comparing people with mental disorders or who experienced trauma to control groups (Barrett & Loeffler, 1992; Mellman, David, Bustamante, Torres, & Fins, 2001; Schreuder, Kleijn, & Rooijmans, 2000), comparing soldiers and civilians (Dale & DeCicco, 2013; Dale, DeCicco, & Miller, 2013), and working mothers and homemakers compared to female students (Lortie-Lussier, Schwab, & De Koninck, 1985; Rinfret, Lortie-Lussier, & De Koninck, 1991). In addition, research on dream content reported by males and females show that they reflect gender differences in waking life (Hall & Van de Castle, 1966; Krippner, & Weinhold, 2002; Dale, Wong, & De Koninck, 2013). The continuity theory has recently been a subject of ongoing debate regarding its nature, empirical support, and proper methodology for testing the theory (Domhoff, 2011; Malinowski & Horton, 2011; Schredl, 2012).

A competing hypothesis of dream formation is the compensatory theory, which states that dreams serve as an outlet for emotions and thoughts that cannot be expressed during the day or

that are repressed and become preoccupations at night (Bell & Cook, 1998; Dallett, 1973). Jung stated that dreams include parts of the personality that compensate for unconscious concerns, conflicts, and frustrations, an idea supported by research (Cohen & Cox, 1975; Wright & Koulack, 1987). Dreams can relieve tensions during the day by allowing the expression of thoughts and feelings, compensating for something missing in life (Bell & Cook, 1998; Dallett, 1973; Punamaki, 1998), and allowing the exaggeration of intense core emotions and desires (King & DeCicco, 2007; Punamaki, 1998). The compensatory theory has been explored in the literature investigating Canadian students and motivation (De Koninck & Sirlois-Berlis, 1978), women victims of sexual abuse (Gates, 1997), children exposed to violence and dangerous environments (Punamaki, 1998), and repressors and non-repressors (Bell & Cook, 1998). It is important to note that the compensatory and continuity theories can be thought of as complimentary rather than contradictory. For example, dream imagery that compensates for things not experienced in the day may be a preoccupation of the dreamer's desire for such an experience and therefore the dream imagery reflects the current concerns and desires of the dreamer, as per the continuity hypothesis.

A major theory relating to evolutionary function is the threat simulation theory (Revonsuo, 2000) which proposes that dreaming simulates threatening situations in order to improve threat-avoidance skills which are necessary and adaptively crucial for human survival. This theory does not make any claims that the threat simulation theory has any contemporary dream function. According to this evolutionary theory, threat simulations are constructed from the episodic memory traces containing the highest emotional charge and dream content selectively represents negative situations (Valli & Revonsuo, 2009). Support for this theory

comes from evidence of negatively toned universal dream themes such as being chased, late, inappropriately dressed, lost, or injured (Valli & Revonsuo, 2009).

### **Hall and Van de Castle Study**

The detailed and thorough taxonomy of dream imagery by Artemidorus finds its modern expression through studies by Hall and Van de Castle (1966) which are the most widely recognized dream research studies and provide the foundation for a dream coding system that would become referenced and utilized internationally and remains the standard coding system to this day. The system both codes and analyzes dream reports and objectively quantifies the data found in dream reports, known as the method of content analysis. In more recent research using content analysis, the categories are very specific to the type of dream collection and to the content being analyzed. For example, for soldiers' dreams categories would include war related themes (Dale & DeCicco, 2012). In addition to providing a coding system for analyzing dream reports, Hall and Van de Castle conducted a large scale normative study with dreams from both male and female college students which serves today as a benchmark for current dream research providing normative data for American males and females to which the dreams of various populations and cultures are compared. The findings from the Hall and Van de Castle (1966) normative study still remain as relevant in current dream literature as it has been in the past.

The participants in the normative study were from Western Reserve University and Baldwin Wallace College with data collected from 1945 to 1950. They ranged between 18 and 25 years of age and had recorded their dreams for class participation. This study consisted of 1000 dream reports from 100 male and female students who each recorded five dreams, selected at random, from a dream series containing ten to twenty dreams. The dream reports were coded and analyzed using the method of content analysis which has been demonstrated to be very

reliable. Inter-rater reliability was also established where two judges independently code ten categories and the percentages for agreement ranged from 84 to 94 percent.

### **The Content Categories**

The Hall and Van de Castle method of content analysis consists of thirteen empirical scales and ten theoretical scales. These scales will be briefly discussed as all the normative studies have used the same scoring system. The scales include Characters, Aggression, Friendliness, Sexuality, Activities, Success and Failure, Misfortune and Good fortune, Emotions, Settings, Objects, Descriptive Modifiers, Negatives, Temporal references, and Food, and Eating.

For characters, the scoring system consists of people, mythical figures, and animals. These different types of characters can then appear in dreams as individuals or in groups and are coded as such. In addition to the number of characters, gender, identity, and age are also coded. The identity of the characters includes information on the relation of the characters to the dreamer. For example, the characters could be known to the dreamer, a stranger, a prominent figure, or a friend or relative.

Aggression, Friendliness, and Sexuality are the three types of interactions in the Hall and Van de Castle scales. For aggression, there are eight subtypes that range from covert feelings of hostility or anger, excluding overt expressions of aggression, to an aggressive act that results in the death of another character. The coding for aggression includes information on who was the aggressor and who was the victim in the dream. The category for friendliness is also coded for seven different subtypes, ranging from feelings of friendliness towards a character, excluding overt expressions, to friendliness expressed through the desire for a close, long term relationship such as getting married, engaged, or falling in love. The coding for friendliness also includes information on who was the befriender and who was the befriended for the friendly action in the

dream. For sexuality there are fewer subclasses of interactions than for both aggression and friendliness. There are five ranging from sexual thoughts or fantasies to having or attempting to have sexual intercourse. Similar to both aggression and friendliness, the coding for sexuality also includes information on who initiated and who received the sexual interaction.

When scoring activities, information is coded about what both the dreamer and the characters are doing in the dream. Activities in dreams may include individuals or groups of characters and coding includes information about which character in the dream was involved in the activity. Activities can also take place as an interaction and is coded as such. For example if a character has a conversation or gets physical with another character this is coded in the same procedure as an interaction. There are many different subtypes for the category for activities including physical, movement, location change, verbal, expressive communication, visual, auditory, and thinking.

The categories for Success and Failure include situations in dreams where the dreamer or characters are striving. These categories are coded when a character has a definite task or goal and carries out actions to achieve a goal or complete the task. If the character does not successfully complete the goal it is a failure and if they do successfully complete the goal it is a success. Information is also provided in coding about which character or characters were involved in the success or failure.

In addition to coding for success or failure, there are also situations where there are consequences to a success or failure in a dream and these situations are coded as either a misfortune or good fortune. There are three situations in dreams that are coded as a consequence to success. These include when the success is nullified by a misfortune, a character achieves success but then failure occurs, or another character intentionally nullifies the success through an

aggressive interaction. There are also three situations in dreams that are coded as a consequence to failure. These include when the failure is reversed by a good fortune, when a failure then turns into a success through additional effort, or when failure is overcome by a friendly interaction of another character.

The categories misfortune and good fortune involve situations where bad or good things happen to the dreamer or characters and which are completely independent of their actions or decisions. There are six subtypes of misfortunes to a character that include harm, danger, threat, or adversity to a character or the dreamer, which does not occur as a fault of their own. The subtypes of misfortune range from environmental barriers or obstacles to the death of a character due to an accident, illness, or unknown cause. In contrast to misfortunes, when characters experience luck or something good that happens to them, and which is out of their control, this is coded as a good fortune. This scale does not include any subtypes. The coding for these categories also include information about which character the misfortune or good fortune is occurring to.

Emotions are scored only when there is an explicit mention of one or more emotions. Thus, emotions are never inferred from emotional situations or dream narrative, unless explicitly mentioned in the dream report. Often a dream report may contain emotional or terrifying situations, however, there is an absence of description of the emotional impact to the dreamer. There are five subclasses of emotions: anger, apprehension, sadness, happiness, and confusion and the coding for emotions includes information on who in the dream experienced the emotion.

One of the physical surroundings mentioned in a dream report include the category for settings which provides information about where the dream activities and interactions take place. The location of the settings in a dream can take place either indoors or outdoors or this is

unclear. There are also situations where there is no setting in a dream and dreamer just describes the events that take place without mentioning the surroundings. In addition to the location, the coding for setting includes information on whether the setting is familiar, unfamiliar, distorted, geographical or questionable if this second part of information is not clear. Often a dream involves more than one setting and all settings in a dream where something takes place are (settings = plural) coded.

In addition to settings, the other category for physical surroundings that can be coded in a dream report are the objects. The category for objects identifies all of the objects that are present in a dream and include many different subclasses. The subclasses for objects in a dream include architecture (with seven subtypes), household, food, implements (with the subtypes tools, weapons, recreation), travel, streets, regions, nature, body parts (with five subtypes), clothing, communication, money, and miscellaneous.

The final category for descriptive elements includes information about both attributes and qualities of objects, people, actions, and emotional states of both the dreamer and characters. Modifiers include information about colour, size, age, thermal, velocity, linearity, intensity, and evaluation. The temporal scale includes information about time references or different points in time such as length of time, years, dates, and time of day. The negative scale describes situations where the dreamer describes something that is not happening or something is not like something and reflects a different style of reporting. For examples, a dreamer may say that a character does not physically resemble someone they know, does not have a similar personality to their friend, or cannot remember an element of the dream.

### **Findings of Hall and Van de Castle's Normative Study**

The Hall and Van de Castle normative study found significant gender differences between the American college men and women which are summarized in their 1966 book "The Content Analysis of Dreams." Specifically, for characters, there was a significant difference between males and females for total male and total female characters. This is referred to as the 'ubiquitous gender difference' in dreams and is also called the male/female percent. The male/female percent for male dreams is 67/33 and the male/female percent for female dreams is 48/52. These findings demonstrate that males dream twice as often about other men as they do about other women and females dream equally about men and women. Normative findings also demonstrate a gender difference in familiar and unfamiliar character percentages where females have more familiar characters in their dreams. When further examining the gender of familiar and unfamiliar characters, findings demonstrate that men dream more of unfamiliar males in dreams and females dream more of unfamiliar females. Findings on the different subclasses of characters revealed that both males and females have more known characters in dreams, women have more known and family characters in dreams, and men have more strange characters.

Findings for aggression revealed that both males and females have more aggressive than friendly interactions, the dreamer is involved in approximately 80% of aggressive interactions, and dreamers are more often the victims than the aggressors. Males also have both more total and physical aggressive interactions in dreams than females. Male dreamers are more aggressive when controlling for characters as demonstrated by the gender difference in the A/C index which is determined by dividing the number of aggressive interactions by the total number of characters. Finally, females have more aggressive interactions in the subclass involving rejection. These findings were calculated using percentages.

For friendliness, normative findings demonstrate that women have more total friendliness when just looking at raw frequencies. There are no differences in friendliness between the genders when controlling for characters as demonstrated by the F/C index which is determined by dividing the number of friendly interactions divided by the total number of characters. When examining the subclasses, both males and females have the highest frequency for friendly interactions in the helping and protecting subclass, followed by verbal friendliness. Males and females are almost always involved in friendly interactions in dreams and also are the befrienders compared to being befriended approximately 50% of the time in dreams. Another measure of interactions is the aggression/friendliness index A/F Index which is determined by dividing the number of total aggressive interactions by the total number of both aggressive and friendly interactions. Males also have a higher A/F index than females. Similar to aggressive interactions, males also have more sexuality in dreams than women and female dreamers have more sexual interactions with familiar characters, where male dreamers have more sexual interactions with unfamiliar characters.

When examining normative findings for other categories including activities, success and failure, misfortune and good fortune, emotions, settings, and objects, gender differences were again noted. For the activities category, physical activities, movement, and talking account for approximately 70 to 75 percent of activities for both genders. For the categories success and failure, males had both more successes and failures in dreams which implies males had more striving in general compared to females. The only gender difference found for the categories misfortunes and good fortunes are that females had more bodily misfortunes than males. For emotions, negative emotions account for approximately 80% of all emotions and females express more emotions than males. Findings on gender differences in settings, reveal that females have

both more indoor and familiar settings and males have both more outdoor and unfamiliar settings. When collapsing genders, both males and females have more familiar than unfamiliar settings. Similar to settings, gender differences have also been found with objects. Specifically, males have more implement objects in their dreams such as weapons and tools and females have more clothing in their dreams. Body parts also demonstrate a gender difference and the torso/anatomy percent is determined by dividing the sum of torso, anatomy, and sexual organ references by the total number of body parts and males have a higher torso/anatomy percent. See Table 1 for an outline of the Hall and Van de Castle (1966) findings for normative dream content for young Americans.

Table 1  
*Normative Data on the Dreams of Young American Adults*

|                                    | <b>Men<br/>1966</b> | <b>Women<br/>1966</b> |
|------------------------------------|---------------------|-----------------------|
| Environments<br>(per dream)        | 1.3                 | 1.3                   |
| Interior (%)                       | 44                  | 55                    |
| Exterior (%)                       | 47                  | 35                    |
| Familiar (%)                       | 31                  | 37                    |
| Unfamiliar (%)                     | 19                  | 10                    |
| Characters<br>(per dream)          | 2.4                 | 2.8                   |
| Male (%)                           | 53                  | 37                    |
| Female (%)                         | 26                  | 40                    |
| Animal (%)                         | 6                   | 4                     |
| Social interactions<br>(per dream) | 1.5                 | 1.3                   |
| Aggressive (%)                     | 47                  | 44                    |
| Friendly (%)                       | 38                  | 42                    |
| Sexual (%)                         | 12                  | 3                     |
| Emotions<br>(per dream)            | 0.6                 | 0.8                   |
| Positive (%)                       | 20                  | 20                    |
| Negative (%)                       | 80                  | 80                    |
| Outcome<br>(per dream)             | 0.3                 | 0.2                   |
| Success (%)                        | 15                  | 8                     |
| Failure (%)                        | 15                  | 10                    |
| Fortune<br>(per dream)             | 0.5                 | 0.5                   |
| Good fortune (%)                   | 6                   | 6                     |
| Misfortune (%)                     | 36                  | 33                    |

\*Data obtained in the early 1950s, based on 5 dreams of 100 men and 100 women aged 18 to 25.  
 Extracted from De Koninck (2012)

### Normative Study Replications and Follow Ups

Van de Castle (1994) describes the definition of normative studies as the availability of information that is based on data that is collected from a large number of participants. Since the Hall and Van de Castle (1966) normative study, many dream researchers have attempted to both replicate the findings and establish normative data for other cultures and compare the data with

the normative data for Americans. It is important to review other normative studies that both replicated their results as well as provided additional findings, advancing the field of dream research, before the current thesis is proposed. Van de Castle (1994) and Domhoff (1996) provide a thorough review of the normative studies in their respective books. First, normative studies with American college students utilizing the Hall and Van de Castle (1966) method of content analysis will be briefly reviewed followed by normative studies conducted in other countries and cultures.

### **Normative Studies with American College Students**

Hall, Domhoff, Blicke, and Weisner (1982) studied the dreams of 53 males and 69 females at the University of Richmond, which has been termed The Richmond Study. Each participant provided three to five dream reports resulting in a total normative sample of 263 dream reports from men and 340 dream reports from women, all undergraduate students in psychology. The Hall and Van de Castle scales chosen for the analyses included characters, aggression, friendliness, sexual interactions, misfortunes, settings, clothing, and weapons. These scales were chosen because they were used in previous studies, they had large frequencies, and some had demonstrated gender differences in previous studies, while others had not.

The results of the Richmond study supported the findings by Hall and Van de Castle (1966), with a few exceptions. The males and females in the Richmond study were compared to the norms for American college students and out of 40 comparisons, 9 were statistically different. The Richmond students had a higher percentage of familiar characters and a lower percentage of total friendliness and references to clothing. Richmond males had a lower percentage of friendliness with males, friendliness with unfamiliar characters, and dreams with at least one sexual encounter (Hall et al., 1982). In addition to differences between the two samples,

gender differences and similarities were compared to those found for the norms by Hall and Van de Castle (1966) and there were no differences. Gender differences and similarities found in the norms were replicated in the Richmond study by Hall et al. (1982). The interesting conclusion from this study was that the dreams of American college students had not changed in 30 years and the authors offered a couple interpretations although, as explained by Domhoff (1996), they did not know which of the interpretations were correct. The explanations offered were first, that human nature has not changed; second, that 30 years is too short a time span to observe social changes in dreams; and third, that changes in American society over the last 30 years were insignificant. The Richmond Study further validated the Hall and Van de Castle (1966) coding system and paved the way for additional normative studies.

Dudley and Fungaroli (1987) studied exclusively the dreams of women from an all-women's college in Winston-Salem, North Carolina known as the Salem College Study. One hundred and forty-one dream reports were collected from twelve women and results were compared with the female norms reported by Hall and van de Castle (1966). The results demonstrated some group differences. For example, the Salem women had less aggression with male characters (a more even ratio than the norms) and more friendliness with female characters in dreams, compared to the female norms. The authors suggest that the difference in social interactions between the Salem women and the female norms may be due to the differences in environment, which may result in less aggressive interactions with males and more friendly interactions with females in the all women college environment. Dudley and Swank (1990) later did a follow-up study and results further supported the findings of the first study by Dudley and Fungaroli (1987). The higher percentage of friendliness with female characters remained stable but the decline in aggression with males was not as great in the follow up study. The authors

suggest this difference may become larger when the students are in the all women college environment for a longer period of time. The results of the Salem college study supported the continuity hypothesis and demonstrated that differences from the norms may be attributed to a difference in environment and waking day settings.

Later, another larger normative study with the dreams of exclusively women was conducted by Tonay (1990) at the University of California in Berkeley. This study included additional elements that other normative studies did not, such as an ethnicity component. The study consisted of 500 dream reports from 100 females who were either European American or Asian American. The participants' dream reports were scored by two researchers and then randomized. The Berkeley study compared the findings to the female norms for the categories of characters, settings, friendliness, and sexuality and findings demonstrated there were no significant differences across 24 comparisons. However, the female students in the Berkeley study differed slightly from the Hall and Van de Castle (1966) female norms for emotions and aggression. Specifically, women had more emotions in their dreams, they were more likely to be victims of female characters, and they were more often the aggressors, compared to the female norms.

The ethnicity component added in the study by Tonay (1990) was a comparison of Asian American women and non-Asian American women and results found that the Asian American women had more unfamiliar settings, were less often the aggressors, and were more often the victims of male characters, than the non-Asian American women. Similar to the Salem college study, the Tonay study provided additional support for the continuity hypothesis and Tonay suggested that the differences in the dreams of the two groups of women may be attributed to the sub-cultural differences and specifically to the way the two groups of women are socialized.

These differences aside, the Berkeley study also did not differ greatly from the female norms and Tonay (1990) suggested that the normative dream imagery for females seem to remain stable over time.

Subcultural differences in dreams were also researched in a large scale study preceding the Berkeley study. Gornik and Hall in 1967 collected 101 dreams from 12 males and 233 dreams from 25 African-American females ranging from 18 to 29 years old from Crane Community College in Chicago (Domhoff, 1996). The dream reports were analyzed by Hall for all but three content categories including settings, activities, and descriptive elements. The dream reports from both the male and female African-American students were compared with each other to examine gender differences and were also compared to the norms (Domhoff, 1996).

The results of the Crane community college study were similar to the norms, with some notable group differences. African American students, compared to the normative males and females, had both more family characters and more physical aggression. In addition, African American males, compared to the normative males, had more female characters, familiar characters, and relatives and less aggressive interactions with female characters (Domhoff, 1996). The African American females, compared to the normative females, were also more aggressive. Specifically, they had more total friendliness; more friendliness with both male and female characters; more total aggression; and more aggression with both male and female characters. The gender differences and similarities in the African American sample were compared to the gender differences in the Hall and Van de Castle (1966) norms. The ubiquitous sex difference coined by Hall (1984) was not observed in this sample of African-American college students. Interestingly, two gender differences from the Hall and Van de Castle (1966) study were reversed in the African-American students. For examples, African-American males

had a higher familiarity percent for characters and African-American females had a higher A/C index. The Crane community college study may provide support for the continuity hypothesis as the majority of the students still lived at home and had a higher familiarity percent for characters. The authors also suggest that there may be subcultural differences between the African-American and European-American samples and these two groups may experience differences in gender relations, which may provide an explanation for the subcultural differences observed in dream interactions. In addition to subcultural differences, major cultural differences have been found in dreams in international large scale normative studies in other countries and these findings further support the continuity hypothesis for the cultural differences observed between the different populations.

### **Normative Studies in other Cultures**

Domhoff (1996) conducted an excellent review of international normative dream studies in other cultures. The larger scale studies in other cultures will be briefly reviewed here and consist of normative studies using the Hall and Van de Castle (1966) categories that were conducted in large scale nations. In the Netherlands, Waterman, De Jong, and Magdelijns (1988) collected dream reports and developed normative data for the Netherlands using the Hall and Van de Castle (1966) dream content categories. Thirty-four men and 32 women living in Amsterdam each contributed 5 dreams, totaling a sample of 330 dreams. The participants ranged between 19 and 30 years old and were living in Amsterdam. The dreams of both the Dutch and American college students were compared and the Dutch students were similar to the American norms for the interactions aggression and friendliness. Specifically, aggression was more frequent than friendliness and the A/C percent was higher for males. However, in contrast to the norms, the Dutch students had much less aggression for both males and females than the

American students (Waterman et al., 1988). These results provide further support for the continuity hypothesis, for cultural differences observed in dream imagery, as Domhoff (1996) describes the Netherlands as being one of the least violent nations in the world and the United States being the most violent, which may explain the cross cultural differences observed in dream aggression.

Additional European normative studies were conducted in Zurich by Strauch and Meier (1995) which consisted of REM dream reports from 26 females and 18 males each contributing between 2 and 19 dream reports and ranging in age from 19 to 35 years old. The final sample consisted of 331 female and 169 male dreams. Findings revealed that for the categories settings, objects, and characters, there were very few differences between the American norms and the Swiss laboratory dream reports. Specifically, Swiss females had a higher percentage of male and strange characters than the American females and Swiss males had a higher percentage of indoor settings than American males. For the dream interaction scales of aggression and friendliness, the differences between the two cultures were similar to the observed differences in the Netherlands. Specifically, when comparing Swiss students to American students, collapsing genders, the Swiss students had less dreams with at least one aggression and also a lower percentage of physical aggression than the Americans (Strauch & Meier, 1995). These differences were also much larger for the males than for the females. In addition, a cultural difference was noted in the expression of friendliness. Both male and female Swiss dreams contained more verbal friendliness and American dreams contained more gestures of friendliness such as gift giving, helping, and physical friendliness, when exploring the different subclasses. These findings, together with the findings from the Netherlands, demonstrate that there may be a

subcultural difference in aggression (especially physical aggression) between the United States and these European cultures that is evident in the social interactions observed in dreams.

In Germany, content analysis of German students dreams were compared to American findings and results demonstrate that dreams were more similar than different after cross cultural examination of dream content categories using content analysis (Schredl, Ciric, Bishop, Golitz, & Buschtons, 2003). Similarities across cultures seem to be stable over time as well. One difference observed in this study between the American and German samples however, was the disappearance of the ubiquitous sex difference in the male/female ratio. Specifically, German women had more male characters than American women and German men had less male characters than American men (Schredl et al. 2003) This is consistent with preliminary findings found with our sample of dreams of Canadians (Ouellet, Duchesne-Pérusse, Paquet-Biron, Sabourin, & De Koninck, 2009). The cultural difference of less aggression in dreams when compared to American norms observed in both the Netherland and Swiss populations was not observed in the population of German students (Schredl et al. 2003). Later, Domhoff, Meyer-Gomes, & Schredl (2006), replicated and further supported these findings with the same sample that was truncated by removing participants for a more concise age range as well as removing participants whose dreams seemed to be a fabrication or too theatrical or fairy-tale like in nature to compare to American normative data. Domhoff et al., (2006) suggest that dreams across cultures are more similar than different because dreams involve people's conceptions and concerns in relation to personal issues which do not show significant cross-cultural differences (Domhoff et al, 2006).

In the 1960's a large scale normative study involved the Latin American countries Argentina, Mexico, and Peru where dream reports were collected in urban schools. This study

was the first to use the most recent dream methodology and each participant wrote down one recent dream and provided the date. Findings from the three countries were compared first to one another and then to the norms for American teenagers as discussed in Domhoff (1996). The sample for Argentina consisted of 239 males, ages 12 to 17, and 149 females, ages 18 to 21. The Peruvian sample consisted of 276 males, ages 12 to 19, and 192 females, ages 13 to 20 and lastly, the Mexican sample consisted of 178 males, ages 16 to 24, and 54 females, ages 18 to 21. Domhoff (1996) describes the caution that one should have when comparing these findings due to the differences in age groups for the different samples. Results demonstrated that there were similarities in the dream content categories for all four countries. Specifically, there were more familiar than unfamiliar characters, more aggression than friendly interactions, and more aggression with male rather than female characters, females had more familiar characters than males, and males had more aggression in dreams than females (Domhoff, 1996). A difference in these four countries was found in the male/female percent. Peruvian and Mexican males dreamed equally about male and female characters and Peruvian and Mexican females dreamed more of male as opposed to female characters, in contrast to the norms. The implication of these findings are that there may be a cultural difference between Peru and Mexico, which is present in the cultural differences in the male/female percent observed in dreams. Domhoff (1996) explains that Argentina differs from the other Latin American countries due to large numbers of Italian and German immigrants and less indigenous people and this may support the cultural difference observed for dream characters.

In addition to large scale normative dream data in Europe and Latin American countries, India and Japan have developed normative dream data providing further support for the continuity hypothesis with respect to cultural differences. The first study in India consisted of

941 dream reports from 45 female and 51 male college students and a traditionalism scale was also used to examine ties with Hindu culture (Grey & Kalsched, 1971). The findings were used to explore the ubiquitous sex difference in dream reports and the results of the gender difference in the male/female ratio in dreams was supported. Therefore, males dreamed twice as often of other males and females dreamed equally of both genders. The authors further reported that Indian males dream even more of males and Indian females even less compared to the norms (Grey & Kalsched, 1971).

The second study conducted in India consisted of ten reports from 50 males and 50 females ranging from 18 to 25, totaling 1000 dream reports, and was conducted to replicate the Hall and Van de Castle (1966) normative study for the Indian population (Prasad, 1982). The data were compared to the American male and female norms but lacked quantitative analyses for demonstrating the significance of the observed differences. The general findings discussed in the study were that when compared to Americans, collapsing genders, Indian dreams are more likely to be in familiar settings, have more family and relatives, witness more aggression, and have more food and nature in dreams. These findings demonstrate great similarities between the two cultures as these were the only minor differences observed. Bose and Pramilia (1993) later compared 175 home dream reports from a home dreams versus laboratory dreams study a decade earlier (Bose & Pramilia, 1983) and the results supported what was found by Prasad (1982). The authors concluded that there are few differences between the two cultures in social interactions, activities and striving. However, there are some differences in settings, characters, and objects which reflect the differences in Indian and American cultures (Bose & Pramilia, 1993).

Lastly, in Japan, Yamanaka, Morita, and Matsumoto (1982) collected both laboratory and home dreams. After determining the sample had very few differences, the dream reports were

coded for all Hall and Van de Castle (1966) categories and then compared to the findings for American college students. Seventeen males provided 104 dreams and 22 females provided 193 dreams and the two samples had very few differences in activities and objects. Specifically, the Japanese students had more food and drink in dreams and American students had more physical movement. For characters, Japanese students had more characters, fewer animals, and more familiar characters. In contrast to the gender differences in normative findings, Japanese males had less aggression than Japanese females, less sexuality than American males, and Japanese females had a lower male/female ratio than American females (Yamanaka et al., 1982). These results may also support the continuity hypothesis for cultural differences observed in dreams as the Japanese students live in a very densely populated country, with fewer animals, as was reported in the dream reports. This finding is further discussed by Domhoff (1996) in his cultural analysis of dreams. Domhoff and Nishikawa, & Brubaker (2004) later found the opposite findings for the male/ female ratio in Japanese women's dreams. Three separate dream reports from college age Japanese women were coded and the male / female ratio was significantly higher than the norm for American females and as well as significantly higher than the male /female ratio found in the 1980's, contradicting the findings by Yamanaka et al. (1982).

More recently, Mazandarani, Aguilar-Vafaie, & Domhoff (2013) analyzed gender differences in the dream content of Iranian college students and compared these findings to normative American findings as well as Japanese and Indian samples. The Iranian students' dreams were similar to the American norms with some differences. The Iranian students' dreams had more known and family characters compared to the American norms and this difference has also been observed in India (Bose & Pramila, 1993; Grey & Kalsched, 1971; Prasad, 1982) as well as Japan (Yakamana et al. 1982). These cross cultural differences reflect the values and

social differences between eastern and western cultures. Western culture encourages independence and self-autonomy where eastern cultures encourage and emphasize group coherence and community involvement.

Cross-cultural differences reflected in dream imagery demonstrated in the normative studies further support the continuity hypothesis of dreams. Certain dream features appear to be universally similar, such as including settings, characters, interactions, emotions, distortions of waking experiences, and the absence higher executive functions such as logic and reasoning. However, it is evident that there are differences related to both culture and also individual characteristics such as personality and waking experiences.

The normative studies reviewed above are very important in furthering scientific dream literature and providing cross-cultural investigations of dream content. However, there are shortcomings and limitations to the majority of them that are important to address. The first deals with the use of the designation of a study as “normative”. Van de Castle (1994) stated that a normative study was the availability of information based on data from a large number of participants. The distinction to be made here is the majority of the studies had a large sample of dreams, however, they did not have a large number of participants. For example, the normative study of the dream content of people living in India was comprised of 45 males and 52 females (Grey & Kalshed, 1971). Therefore, although these studies were very influential in furthering cross-cultural research on dreams, it seems that caution should be used in the future when referring to a study as “normative”. Unfortunately, there are no rules or guidelines to determine how many participants are required in a study to warrant the title of “normative”. This is another challenge that faces future cross-cultural research of this nature.

Other issues with normative studies conducted in the United States and other countries are also important to address. First, they are usually conducted with students at a single university and do not represent the normative population but are referred to as such in the literature. Similarly, they usually do not include people of varying backgrounds such those with a differing social economic status. Finally, some of these studies use different methodologies for dream collection such as REM dream reports and still compare their findings to the American normative data for home dreams. Future research needs to take these issues into account in study design and methodology when comparing findings to the Hall and Van de Castle (1966) norms.

### **Ontogenetic Normative Studies**

The second major component of this dissertation deals with ontogenesis of dreams in women and men. The studies related to this are thoroughly reviewed in articles two and three and, therefore, will not be repeated here. Due to the limited means for collecting children's dreams for the normative database, the youngest age group for our studies was 12 to 17 years of age. Therefore, we briefly review here the literature on children's dreams.

Hall and Domhoff (1963; 1964) analyzed the dreams of boys and girls ages 2 -12 and noted that the reports were much shorter than those of teenagers and young adults. Compared to teenagers and young adults, the children's dreams had more animal characters and aggression involving animals. Children also had more aggression per characters (A/C index), a higher victimization percent, and more misfortunes, compared to teenagers and young adults. Later, one of the most influential longitudinal studies of children's dreams was conducted by Foulkes (1982). This comprehensive study provided information on REM sleep and home dream reports of children from ages 3 to 15. The dreams of the 3 to 5 year olds contained undeveloped plots and dream recall from REM awakenings was very low. At 5 to 7 years old the dream reports

became more dreamlike with characters, themes, and action. Only at ages 11 to 13 did the dream reports become comparable to those of adults for frequency, length of the reports, and the structure of the dream (Foulkes, 1982).

Domhoff (1996) compared these major studies on children's dreams and noted much less aggression, misfortune, and negativity in the studies by Foulkes (Foulkes, 1982; Foulkes, Hollifield, Sullivan, Bradley, and Terry, 1990) compared to those by Hall and Domhoff (1963; 1964) and offered several explanations for these findings. Foulkes used his own coding system which differed from the Hall and Van de Caste content analysis scales. In addition, there may have been selection bias in the studies by Hall and Domhoff (1963; 1964). Other large scale longitudinal studies on the dreams of children and adolescents in Switzerland (Strauch, 1995; Strauch & Lederbogen; 1999) are thoroughly described in articles two and three of this dissertation as well as the literature on age differences in dream content for older age groups. For a more recent and detailed review of the empirical studies on children's dreams and the ontogeny of dreaming see Sándor, Szakadát, and Bòdizs (2014).

### **Dream Methodologies**

The most precise and scientifically rigorous dream collection methodology is the laboratory during sleep awakening technique. However, it is not feasible for large samples and normative studies. There are many other dream collection methodologies, all with advantages and disadvantages. The questionnaire methodology, which can take the form of a questionnaire, survey, or self-report has been widely used in dream research to explore elements of dreams such as anxiety (Schredl, Palmer, & Montasser, 1996), gender differences (Schredl, 2002a; Schredl, Ciric, Götz, & Wittmann, 2004), dream symbolism (Howarth, 1962), typical dreams (Griffith, Miyagi, & Tago, 1958; Nielsen et al. 2003), student's dreams (Nielsen et al., 2003), dream

content and boundaries (Schredl, Schafer, Hofmann, & Jacob, 1999), and continuity between dreams and waking day (Schredl & Hofmann, 2003). Although the questionnaire methodology is an efficient way to collect a vast amount of information from large samples, it does not allow for the extensive review of an actual dream report.

Another dream collection methodology known as the most recent dreams method (MRD) is stronger than questionnaires and surveys as it includes a dream report for detailed coding and analyses. This MDR methodology has been used in the literature more recently to study the frequency of typical dream themes (Mathes, Schredl, & Goritz, 2014), social media and gaming (Gackenbach & Boyes, in press), dreams and the connection to waking narratives (Magglioni, Cagnin, Crippa, Persico, & Rizzi, 2010), Greek children and adolescents (Karagianni, Papadopoulou, Kallini, Dadatsi, Abatzoglou, & Zilikis, 2013), and exploring dream recency, emotional intensity, and salience (Gupta & Hill, 2014). The MRD method has additionally been tested with various age groups including adults (Hartmann, Elkin, & Garg, 1991), preadolescents (Crugnola, Maggiolini, Caprin, De Martini, & Giudici, 2008; Saline, 1999) and children and adolescents (Avila-White, Schneider, & Domhoff, 1999; Crugnola et al., 2008; Oberst, Charles, & Chamarro, 2005). Participants are required to write down the last dream that they can remember having, regardless of whether the dream was the previous night, week, or month. They are also asked to recall the date when they originally recalled the dream (Domhoff, 1996). Reporting the date of the dream helps to both prime the participants to focus on the last dream they recall as well as to exclude dreams from months or years in the past, if the researchers choose to do so (Domhoff, 1996). Although the MRD methodology is efficient and very strong, it requires only one dream from the participant which has been selected among other, possibly important, dreams. Therefore, a more thorough and stronger methodology for dream collection

would be the use of the prospective dream diary method where dreams are reported as they are experienced, rather than retroactive recalled many days later, which presents some disadvantages due to issues with memory recall.

Although the dream diary method can be time consuming, it is the strongest of the three different methodologies discussed, as it provides a waking day connection with the dream imagery as well as more than one dream report which is recorded that night or the next day, as opposed to recalled many days later. The prospective nature of the dream diary method involves writing down everyday dreams remembered for various durations (days, weeks, months) in a diary. It has been found to be a reliable and strong method for large dream collections with different age groups and for longitudinal studies of individuals. Research with Canadian dreams using the dream diary methodology, have investigated emotions in the diaries and REM dreams of young and late adulthood women (St. Onge, Mercier, Lortie-Lussier, Grenier, & De Koninck, 2005), temporal references in dreams in relation to autobiographical memory (Grenier et al., 2005), the dreams of working mothers versus homemakers (Lortie-Lussier et al., 1985), the impact of family and occupational roles on both women's and men's dreams (Lortie-Lussier, Simond, Rinfret, & De Koninck, 1992), the dreams of professional mothers and females students (Rinfret et al., 1991), and gender differences in the dreams of adolescent Canadians (Dale et al., 2013). The participants and dream reports used for these Canadian studies came from the database of dreams collected at the University of Ottawa including male and female, Anglophone and Francophone Canadians.

### **The University of Ottawa Normative Database**

Participants in this large normative sample of Canadians include both males and females (Anglophone and Francophone) in different age groups including 12-17 for adolescents, 18-24

for young adults, 25-39 for middle aged adults, 40-64 for older adults, and 65-85 for old age or the elderly. For this prospective study, participants complete a general questionnaire involving socio-demographics, linguistic status, information on dreams and dream recall, and sleep habits. After completing the general questionnaire, participants complete a dream diary over ten days. This involves mood checklists that are completed twice a day in both the morning and evening, and on reported dreams. The diary is kept until two dreams are provided. Information on the events of the day as well as thoughts and feelings before sleep are recorded in the diary. Dreams are subjected to content analysis using the Hall and Van de Castle (1966) system as refined by Domhoff (1996). In addition, DreamSAT (Schneider & Domhoff, 2009), an Excel spreadsheet specifically designed for dream coding with the Hall and Van de Castle (1966) system was used to enter the Hall and Van de Castle (1966) codes and all variables were controlled for word report length by dividing the total frequency for each category by the number of words in the dream report for each individual.

See table 2 for the current sample of participants for the normative database, collected at the University of Ottawa in Joseph De Koninck's sleep and dream research lab. It is important to note that the figures presented in bold are subgroups where further dream collection is necessary to complete the target sample. For example, additional participants will need to be recruited for Anglophone males in all age categories except for the young adulthood age group.

Table 2.

*Normative Sample of Canadian Dreams*

| Gender and Ethnicity \ Age |             | 12-17     | 18-24 | 25-39     | 40-64     | 65-85     |
|----------------------------|-------------|-----------|-------|-----------|-----------|-----------|
| Males                      | Anglophone  | <b>26</b> | 92    | <b>29</b> | <b>33</b> | <b>7</b>  |
|                            | Francophone | <b>27</b> | 81    | <b>34</b> | 66        | <b>24</b> |
| Females                    | Anglophone  | 50        | 141   | 52        | 59        | <b>12</b> |
|                            | Francophone | 81        | 114   | 58        | 91        | 63        |

**Thesis Studies**

This thesis is comprised of three different research papers arising from the normative study on the dreams of Canadians conducted at the University of Ottawa. The first paper is an attempt to replicate the original normative study of Hall and Van de Castle (1966) conducted with young adult Americans. The sample consists of 150 male and female young adults, ranging from 18 to 24 years old. Two dreams per participant, totaling 600 dreams, are analyzed using the Hall and Van de Castle content analysis categories, as described above. On the basis of the threat simulation theory, it is expected that overall dream content will be more negative than positive. Furthermore, on the basis of the continuity hypothesis, it is expected that gender differences will be consistent with waking gender differences and American norms. However, there may be some attenuation associated with waking social cultural evolution (Ouellete et al., 2009). Specific predictions will be presented in the first paper.

The other two studies examine the ontogenesis of dream characteristics of male and female participants. First, trend analyses is be applied to one dream of 75 women in each one of the five age groups: 12-17, 18-24, 25-39, 40-64, and 65-85, totaling 375 participants. The Hall and Van de Castle (1966) categories investigated include characters, some activities, social interactions, and emotions. It is hypothesized that the ontogenetic patterns (trend) in the dreams will support previous literature on the observed effects of age on content measures in women's dreams and will reflect women's waking developmental patterns noted in sociological and aging research. Specific predictions are again be presented in the second paper.

The final study is the first to examine the ontogenetic evolution of dream content in men. Due to the well documented low interest in dreams for men compared to women, the participants were more difficult to recruit and so the number of participants in the age groups of 12-17, 18-24, 25-39, and 40-64 were limited to 50 males and to 30 in the 65-85 group, for a total sample of 230 males. The categories of the analyses are the same as those used for the study on women's dreams. It is hypothesized that the ontogenetic pattern in male dreams will support the limited literature on the effects of age differences on the dream content of men. Furthermore, the mens' dreams will reflect the waking developmental pattern and the social aspects of aging in men's lives, as per the continuity hypothesis.

### **Original Contributions**

The first contribution of this thesis is to provide a new replication of normative and gender dimensions of the dreams of young adults documented since the original studies of Hall and Van de Castle (1966) with young Americans. The importance of this study is paramount as it is the first to scrutinize normative data of young adult Canadians, allowing for cross cultural investigations of dream content and assimilating Canadians into a more global investigation of

cultural dream differences. Conducting this normative study with Canadians allows for the exploration of subcultural differences in dream content for North Americans. More importantly, this thesis presents the first comprehensive examination of ontogenetic patterns in the dreams of men and women from the age of 12 to 85 years old. No other studies have covered as wide a range of ages with such significant samples. Studying the such as wide spectrum of dream dimensions and using state of the art dream collection and content analyses methodologies, will provide insight into the evolution of gender differences in the ontogenesis of dreams. Overall, this large sample serves as a foundation for the future investigation of cross-cultural differences in the ontogenetic pattern of dream content.

**Dreams of Canadian Students: Norms, Gender Differences, and Comparison with  
Americans**

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### **Abstract**

A total of 600 dream reports were collected from 300 Canadian university students, 150 female and 150 male, and their content analysed with the Hall and Van de Castle (1966) system of categories. The main dream content categories were characters, aggressive and friendly interactions, positive and negative emotions, and dream outcomes. The main purpose of the analysis was to provide normative data for a large sample of young Canadians in order to determine a) whether negative elements prevail over positive ones, as assumed by the threat simulation theory and b) whether dream gender differences are consistent with differences in waking life, in accordance with the continuity hypothesis. Overall, findings support both theories. The final objective was to compare the Canadian data, relative to gender differences, with normative data established in 1966 with the original American sample. Findings for males and females and gender differences remain consistent with the American normative data for most categories despite a fifty years interval. Similarities in Canadian and American dream content reflect similarities between the respective cultures. They also attest to fundamental structural dimensions of dream content that transcend cultures. Other types of content analysis relative to themes, for instance, might be appropriate to highlight cultural differences.

**Keywords:** dream, gender differences, culture, Canadian, normative data, continuity

## Dreams of Canadian Students: Norms, Gender Differences, and Comparison with American Norms

The predominant theory in dream research rests on the continuity hypothesis (Hall & Nordby, 1972). This theory states that dreams are meaningful and reflect waking life, which can be in the form of waking thoughts and preoccupations or activities and behavior. Their hypothesis was based on many dream series and a large scale study by Hall and Van de Castle (1966) on gender differences in the dreams of American students. Other studies include observations made by psychologists who wrote down their own dreams (Calkins, 1893; Weed & Hallam, 1896), as others explored objective personality measures and dreams (Foulkes, Larson, Swanson, & Rardin, 1969; Foulkes & Rechtschaffen, 1964). Laboratory studies using clinical assessments (Fiss, 1983; 1986), and the analysis of dream diaries and journals (Bell & Hall, 1971; Hall, 1953; Hall & Lind, 1970) supply further evidence that dreams reflect waking life.

More recently, continuity between waking and dreaming was found in many studies conducted in Canada. For example, emotions in REM and dream diaries reflected waking emotions (St. Onge, Mercier, Lortie-Lussier, Grenier, & De Koninck, 2005), temporal references in dreams were associated with waking events (Grenier et al., 2005), differences in dreams reflected differences in family and occupational roles (Lortie-Lussier, Schwab, & De Koninck, 1985; Lortie-Lussier, Simond, Rinfret, & De Koninck, 1992; Rinfret, Lortie-Lussier, & De Koninck, 1991), gender differences in adolescent dreams were consistent with adolescent gender differences (Dale & DeCicco, 2013), and typical dreams reflected waking anxiety and concerns of the dreamer (Nielsen et al., 2003). The continuity notion was also supported when examining dream content and discovery about the meaning of the dream in relation to waking life events (DeCicco, 2009). University students learned about academic concerns (Dale, 2011), combat

soldiers about war (Dale & DeCicco, 2013; Dale, DeCicco, & Miller, 2013; Dale, DeCicco, Miller, & Tavakoli, 2015), and recovering addicts about substance abuse (Miller, DeCicco, Fox, & McCourti, 2015). The theory has acquired, over the years, a strong foundation. However, there is still a debate with respect to the scope of continuity in the spectrum from concerns and emotions to events and all waking activities (Domhoff, 2011; Malinowski & Horton, 2011; Schredl, 2012).

### **Normative Studies Conducted in the United States**

As mentioned briefly, the first systematic observations in support of the continuity hypothesis have arisen from the Hall and Van de Castle (1966) normative studies carried out in the 1950's with American college students. The final sample consisted of five dreams each from 100 males and 100 females, between the ages of 18-25, from Western Reserve University and Baldwin College. These widely recognized studies also provided the foundation for a dream coding system (Hall and Van de Castle, 1966) and serve as norms of the dreams of American college students. These norms have in turn served as references for comparisons with many different populations and cultures. The categories used to analyse the dreams included characters, settings, activities, interactions, emotions, striving, and objects.

For their data analysis they calculated percentages, proportions, and ratios for the various dream variables that are described in "The Content Analysis of Dreams" (Hall & Van de Castle, 1966). The findings that attracted the most attention were mostly related to differences between the genders and were judged to be consistent with waking gender differences. For example, they observed that males dreamed proportionately twice as often of male characters while females dream more evenly of male and female characters. This gender difference has become known as "the ubiquitous gender difference" in dreams. Other findings include males having more total

males, unfamiliar males, and strange characters. Females, in contrast, had more total familiar, unfamiliar female, and family characters. For interactions, the A/C index was devised: the number of aggressions divided by the total number of characters. Similar measures included the friendliness per character (F/C index) and the sexual interactions per character (S/C index). Males had more total and physical aggression, a higher A/C index and aggression/friendliness index (aggression divided by aggression plus friendliness, A/F index), more total sexual interactions, and more sexual interactions with unfamiliar characters. Females had more aggressive interactions involving rejection, more friendliness (for raw frequencies only), and more sexual interactions with familiar characters. For gender differences in other categories, males had more success, failure, outdoor settings, unfamiliar settings, and implement objects (such as weapons and tools), and a higher torso/anatomy percent. Females had more bodily misfortunes, emotions, indoor settings, familiar settings, and clothing (Hall & Van de Castle, 1966).

Since then a large body of research has further examined gender differences in dreams (Domhoff, 1996; Domhoff & Schneider, 2008; Hall, Domhoff, Blicke, & Weesner, 1982; Hall & Van de Castle, 1966; Howard, 1978; Krippner & Rubenstein, 1990; Krippner & Weinhold, 2002; Krippner, Winkler, Rochlen, & Yashar, 1998; Schredl, Ciric, Bishop, Golitz, & Buschtons, 2003; Schredl & Piel, 2003). The Richmond Study, conducted 30 years after the normative study, demonstrated that the gender differences and similarities found in the normative study had remained stable over 30 years, despite sociological and social role changes (Hall et al., 1982).

### **Continuity Hypothesis for Gender Differences**

Sociological and psychological investigations have confirmed parallels between dream gender differences and waking gender differences for interactions, emotions, and environment

(Domhoff, 2005; Schredl et al., 1998), supporting the continuity hypothesis. For aggressive interactions, males tend to have higher physical aggression and crime rates (Brannon, 1996) and females have more verbal and inward aggression (Eagly, 1987; Underwood, 2003). On the other hand, when examining friendliness, male networks tend to consist more of males who are coworkers while women tend to surround themselves with family and friends which are assumed to be of a more equal gender distribution (Schredl et al., 1998). These findings reflect “the ubiquitous gender difference” found in dreams. Studies on sexual behaviour report that males have more sexual intercourse and activity than women (Hyde, 1993). With regards to mental health and emotions, females have more depressive symptoms and a higher prevalence of major depressive disorder (APA, 1994; Nolen-Hoeksema, 1990). This is also reflected in dreams as females tend to have more self-negativity (Schredl et al., 1998). Furthermore, reports of vivid memories parallel the gender distinctions arising in dream content as women’s memories are longer and contain more people, emotion words, and descriptive elements (Niedzwieńska, 2003). Finally, Domhoff (2005) noted that the prevalence of household objects and indoor settings in their dreams reflects waking life as women tend to spend more time in the home with family responsibilities.

### **Threat Simulation Theory**

A major observation in dream research is the predominance of negative as opposed to positive elements in dreams for both sexes. This has been documented for dreams collected in the laboratory (Roussy et al., 2000), typical dreams (Nielsen et al., 2003), and home dreams (De Koninck, 2012; Hall et al., 1982; Hall & Van de Castle, 1966; Mazandarani et al., 2013; Rainville & Rush, 2009). For example, with respect to interactions, there is more aggression than friendliness, more misfortunes than good fortunes, and more failure than successes. However, for

emotions, the findings are more controversial. While studies using Hall and Van de Castle (1966) scales and external raters have consistently found more negative than positive emotions (Domhoff, 1996; Hall et al., 1982; Hall Van de Castle, 1966; Schredl & Doll, 1998), it has been suggested this may be due to bias in judge ratings or an underestimation of positive emotions in the Hall and Van de Castle (1966) scales (Schredl & Doll, 1998). When dreamers are asked to rate their dreams, some findings have indicated a predominance of positive emotions (Fosse, Stickgold, & Hobson, 2001; Sikka, Valli, Virta, & Revonsuo, 2014), more balanced positive and negative emotions (Schredl & Doll, 1998), while others found a predominance of negative emotions (Roussy, Gonthier, Raymond, and De Koninck, 2000). With these mixed findings, the picture still remains unclear.

Overall, the observation of more negative than positive elements does not support the continuity hypothesis, as we do not necessarily experience more negative than positive elements in our day to day activities. An explanation for this phenomenon has been more recently proposed by Revonsuo's (2000) threat simulation theory. According to the model, dreaming serves an adaptive function by simulating threatening events in order to prepare the dreamer to face danger in waking life. Therefore, dreams containing more aggression, negative emotions, failures, and misfortunes could serve as an adaptive function preparing the dreamer to cope with both physical and social threats.

### **Cultural Differences in Dream Content**

The American normative dream gender differences were found to be present in a number of cultures. However, nuances reflecting different values and style of living are observed when various other cultures are compared to the American norms (Domhoff, 2005; Hall & Nordby, 1972; Schredl et al., 1998). For example, less aggression in European samples from Switzerland

reflect a least violent nation globally (Waterman, De Jong, and Magdelijns, 1988; Strauch and Meier, 1995). In India, more familiar settings, family characters, food, and nature in dreams were suggested to reflect differences in Indian and American cultures (Bose & Pramilla, 1993; Grey & Kalsched, 1971). More total and familiar characters and fewer animals in Japanese dreams reflects cultural and environmental differences as Japan is densely populated, with few animals (Yamanaka, Morita, & Matsumoto, 1982). Finally, more known people and family members in Iranian, Indian, and Japanese dreams, reflect western and eastern cultural differences in values, beliefs, and practices. (Mazandarani, Aguilar-Vafaie, & Domhoff, 2013). However, subcultural differences within North American, western culture have been of little focus in the literature to date.

Grabb & Curtis (2010) explored cultural differences between Americans and Canadians and further classified North-American cultures coinciding with four distinct regions including a) the politically and culturally, left-liberal Quebec b) the conservative U.S. South c) English Canada and d) the U.S. North (Grabb, 2011; Grabb & Curtis, 2010; Waugh, 2011). The English Canadian and U.S. northern regions were found to be very comparable in terms of social structures, political sociology, and individualism. Furthermore, these North American regions share similar attitudes, behaviours, and values including views on religion, government, and individuality (Grabb, 2011; Grabb & Curtis, 2010; Waugh, 2011). According to Grabb's (2010) classification, the original studies by Hall and Van de Castle (1966) were conducted in Ohio and the later Richmond study were collected in Virginia (Hall et al., 1982) and therefore belong to the U.S. northern region in Grabb & Curtis's (2010) sub regions.

## **Purpose**

The main purpose of the present study was to establish normative data for a large sample of young adult Canadians. A second purpose was to determine whether the dream content of young adult Canadians, overall, support the threat simulation theory. The third purpose was to examine gender differences, specifically in the Canadian sample, to determine whether they are consistent with the continuity hypothesis. The final objective was to compare the Canadian sample to the Hall and Van de Castle (1966) American sample to compare both gender differences and the male and female norms. This comparison would provide information on the similarities and differences between the two groups, bearing in mind the fifty year differences in the timing of the studies.

## **Hypotheses**

It was first hypothesized, based on the threat simulation theory (Revonsuo, 2000), that the normative data for the dreams of Canadians, overall, would reveal more negative than positive elements, as documented in previous studies (Hall et al., 1982; Hall & Van de Castle, 1966; Nielsen et al., 2003; Roussy et al, 2000). Specifically, it was predicted that there would be more aggression, negative emotions, failure, and misfortune than friendliness, positive emotions, success, and good fortune. Secondly, it was hypothesized, based on the continuity hypothesis, that gender differences in Canadian dreams would be consistent with waking gender differences and previous investigations (Hall et al., 1982; Hall & Van de Castle, 1966). Specifically, it was predicted that there would be a predominance of aggression, a higher male/female ratio, and more sexuality in male dreams and more familiar and family characters, indoor settings, and negative emotions in female dreams. Finally, as northern American and Canadian cultures were found to be very similar (Grabb, 2011; Grabb & Curtis, 2010), it was hypothesized that

Canadians and Americans would have both similar patterns of gender differences as well as similar normative dream content for males and females.

## **Method**

### **Participants**

The participants in the current study included 150 Canadian males (mean age = 20.74, SD = 1.70) and 150 Canadian females (mean age = 20.33, SD = 1.82), ranging in age from 18-24. There were equal numbers of English speaking and French speaking participants, referring to their primary language. Each participant provided two dreams each for a total of 600 dream reports. This provided a sample of 300 male and 300 female dreams in order to get a sample size close in approximation to the norms as reported by Schneider (Domhoff, 1996). Since a previous study comparing English and French speaking Canadians found differences in achievement motivation in dreams (De Koninck & Sirois-Berlis, 1978), it was felt important to determine whether there were indeed differences between Anglophones and Francophones on the various scales that were used in this study. Independent T-tests confirmed that there were no significant differences on any of the scales for characters, interactions, activities, success, failure, and emotions. Therefore, the Anglophone and Francophone participants were combined to constitute the Canadian sample. These young adult students came from all disciplines, not just psychology, and the sample is thus likely representative of a general university student population. It also seems comparable to that of most normative dream studies. The participants were recruited through advertisements at the University of Ottawa and using the Integrated System for Participation in Research (ISPR). This research project was approved by the Research Ethics Board at the University of Ottawa.

## Measures and Procedure

Each participant completed a dream package which included information on basic demographics, sleep quality, and a daily diary for recording the day's events for ten days or until two dreams were reported, as has been used in previous research (Grenier et al., 2005; St. Onge et al., 2005). Two dreams for each participant containing a minimum of 50 words and a maximum of 300 words were retained for coding. The first two dreams reported in the dream diary, were scored by two independent judges and there was over 80 percent agreement on each of the Hall and Van de Castle (1966) scales of content analysis. For the statistical analyses, the scores from one of the judges was used.

The Hall and Van de Castle method of content analysis consists of 13 empirical scales and 10 theoretical scales that we briefly outline here. Empirical scales are derived from trial and error from reading numerous dream reports, without a theory in mind. In contrast, theoretical scales are derived from theory. For characters, different types of characters can appear in dreams as individuals or in groups and are coded as such. In addition to the number of characters, gender, identity, and age are also coded. The identity of the characters includes information on the relation of the characters to the dreamer.

There are three types of interactions in the Hall and Van de Castle scales that include Aggression, Friendliness, and Sexuality. For aggression, there are eight different subtypes that range from covert feelings of hostility or anger to an aggressive act resulting in the death of another character. Friendliness is scored with seven different subclasses ranging from feelings of friendliness towards a character, to friendliness expressed through the desire for a close, long term relationship such as getting married, engaged, or falling in love. For sexuality, there are five subclasses ranging from sexual thoughts or fantasies to having or attempting to have sexual

intercourse. The coding for interactions in dreams includes information on who initiated and who received the interaction. For activities, there are many different subtypes including physical, movement, location change, verbal, expressive communication, visual, auditory, and thinking. Information is also coded on what character was involved in the activity.

The categories for Success and Failure include situations where the dreamer or characters are striving. These categories are coded when a character has a definite task or goal and carries out actions to achieve a goal or complete the task. If the character does not successfully complete the goal it is a failure and if he/she does it is a success and coding provides information on which character or characters were involved. There are also situations where there are consequences to a success or failure in a dream and these situations are coded as either a misfortune or good fortune. The categories misfortune and good fortune involve situations where bad or good things happen to the dreamer or characters which are completely independent of their actions or decisions. There are six subtypes of misfortunes ranging from environmental barriers or obstacles to the death of a character due to an accident, illness, or unknown cause. In contrast to misfortunes, when characters have good experiences or luck, which is out of their control, this is coded as a good fortune and does not include any subtypes.

For emotions, coding occurs when there is an explicit mention of emotions and are never inferred unless explicitly mentioned in the dream report. There are five subclasses of emotions including anger, apprehension, sadness, happiness, and confusion and the coding for emotions includes information on who in the dream experienced the emotion.

The category for settings includes information about where the dream activities and interactions take place. This can be either indoor, outdoors or ambiguous, or no setting and the

setting can be familiar, unfamiliar, distorted, geographical or questionable. Often a dream involves more than one setting and all settings in a dream where something takes place is coded.

The category for objects identifies all of the objects that are present in a dream and include many different subclasses. The subclasses for objects in a dream include architecture (with seven subtypes), household, food, implements (with the subtypes tools, weapons, recreation), travel, streets, regions, nature, body parts (with five subtypes), clothing, communication, money, and miscellaneous.

The last category for descriptive elements includes information about attributes and qualities of objects, people, actions, and emotional states of the dreamer and characters. The three subcategories of descriptive elements include modifiers (adjectives, adverbs, and phrases used for descriptive elaboration), temporal scales (for references to time), and negative scales (when the dreamer mentions not having done something). These are secondary measures and were not used in the present study. Schneider and Domhoff (2016) provide a detailed and thorough explanation of the categories, with coding rules, and sample dream content on their dream research website (See <http://www.dreamresearch.net/>).

An excel program for coding and analyses of dream reports, dreamSAT (Schneider & Domhoff, 2016), was used to enter the codes and calculate total frequencies for each category and effect sizes using the  $h$  statistic, which is an effect size measure for arcsine transformed proportion differences (Cohen, 1977). The categories used to establish the normative data for Canadians (See Table 1) were taken from the table in De Koninck (2012) and include environment, characters, social interactions, emotions, outcomes, and fortunes. The effect size categories used to examine Canadian gender differences and compare them to the American sample (See Table 2) resemble those published in Hall and Van de Castle (1966) and are

generated by dreamSAT. An add-on of the dreamSAT program, which allows for the comparison of two data sets, was used for the comparison of Canadian and American males and of Canadian and American females, separately, for these same categories (See Table 3). The categories included characters, social interaction percentages, social interaction ratios, settings, and self-concept percentages (See Hall and Van de Castle (1966) for the categories included in the analyses and how the specific percentages are calculated).

## **Results**

### **Normative Data for Canadians**

Table 1 presents the normative data for Canadians. The frequency column includes the total frequency for each category and the percentage column includes the percentage of dreams containing each category out of the total number of dreams in the sample. The most frequent dream element was Characters, followed by Environments and Interactions, and finally Outcomes were the least frequent. Overall, there were also more negative than positive elements. Specifically, the most frequent interaction was Aggression, Friendliness came second, and Sexual interactions came third. There was also a higher percentage of Negative as opposed to Positive emotions. For striving, there were more Failures than Successes and Misfortunes also outnumbered Good Fortunes.

Table 1  
*Normative Data for the Dreams of Young Adult Canadians*

|                                        | Canadians   |    | Males       |    | Females     |    |
|----------------------------------------|-------------|----|-------------|----|-------------|----|
|                                        | (n = 600)   |    | (n = 300)   |    | (n = 300)   |    |
|                                        | <i>f</i>    | %  | <i>f</i>    | %  | <i>f</i>    | %  |
| <b>Environments (per dream)</b>        | <b>1.57</b> |    | <b>1.49</b> |    | <b>1.64</b> |    |
| Interior                               | 449         | 58 | 181         | 50 | 268         | 67 |
| Exterior                               | 329         | 43 | 157         | 43 | 172         | 44 |
| Familiar                               | 276         | 36 | 108         | 29 | 168         | 43 |
| Unfamiliar                             | 71          | 10 | 31          | 10 | 40          | 11 |
| <b>Characters (per dream)</b>          | <b>3.55</b> |    | <b>3.13</b> |    | <b>3.97</b> |    |
| Male                                   | 667         | 64 | 305         | 59 | 362         | 69 |
| Female                                 | 605         | 59 | 210         | 48 | 395         | 69 |
| Animal                                 | 124         | 13 | 52          | 13 | 72          | 12 |
| <b>Social Interactions (per dream)</b> | <b>1.56</b> |    | <b>1.36</b> |    | <b>1.76</b> |    |
| Aggressive                             | 525         | 48 | 255         | 46 | 270         | 50 |
| Friendly                               | 364         | 40 | 137         | 33 | 227         | 46 |
| Sexual                                 | 47          | 5  | 16          | 4  | 31          | 6  |
| <b>Emotions (per dream)</b>            | <b>.98</b>  |    | <b>.85</b>  |    | <b>1.11</b> |    |
| Positive                               | 127         | 18 | 70          | 18 | 57          | 17 |
| Negative                               | 461         | 48 | 184         | 40 | 227         | 57 |
| <b>Outcomes (per dream)</b>            | <b>.34</b>  |    | <b>.33</b>  |    | <b>.34</b>  |    |
| Success                                | 81          | 12 | 41          | 11 | 36          | 12 |
| Failure                                | 121         | 17 | 58          | 16 | 54          | 18 |
| <b>Fortunes (per dream)</b>            | <b>.69</b>  |    | <b>.72</b>  |    | <b>.66</b>  |    |
| Good fortune                           | 57          | 9  | 36          | 10 | 20          | 7  |
| Misfortune                             | 357         | 40 | 179         | 40 | 120         | 40 |

\*Bold numbers indicate the total frequency for the category divided by the total number of dreams in the sample.

### Gender Differences for Young Adult Canadians

Gender differences for young adult Canadians are displayed in the second column of Table 2 which provides  $h$  and  $p$  values and the direction of the relationship (+ higher for males, - higher for females), using the dreamSAT categories. Canadian males had a higher percentage of Male characters ( $h = +.23, p < .001$ ), Aggression/Friendliness index ( $h = +.22, p = .004$ ), Befriender ( $h = +.29, p = .019$ ), Physical Aggression ( $h = +.35, p = <.001$ ), and Aggression/Character index ( $h = +.11, p = .017$ ). Canadian females had a higher percentage of Family characters ( $h = -.12, p = .009$ ), Friendliness/Character index ( $h = -.11, p = .007$ ), Indoor settings ( $h = -.15, p = .04$ ), Negative emotions ( $h = -.25, p = .002$ ), and dreams with at least one Friendly interaction ( $h = -.29, p = .001$ ).

Table 2

*Gender Differences for Canadians and Americans and National Differences (+ higher for males, - higher for females)*

| Categories                             | Gender Differences for Canadians<br>(2000s) |          |          | Gender Differences for<br>Americans (HVDC 1950s<br>Norms) |          |          | National<br>Difference <sup>a</sup> |
|----------------------------------------|---------------------------------------------|----------|----------|-----------------------------------------------------------|----------|----------|-------------------------------------|
|                                        | m/f                                         | <i>h</i> | <i>p</i> | m/f                                                       | <i>h</i> | <i>p</i> |                                     |
| <b>Characters</b>                      |                                             |          |          |                                                           |          |          |                                     |
| Male/Female                            | 59/48                                       | +.23     | .000**   | 67/48                                                     | +.39     | .000**   | small                               |
| Familiarity                            | 56/59                                       | -.06     | .174     | 45/58                                                     | -.26     | .000**   | small                               |
| Friends                                | 33/35                                       | -.04     | .446     | 31/37                                                     | -.12     | .004**   | none                                |
| Family                                 | 17/22                                       | -.12     | .009**   | 12/19                                                     | -.21     | .000**   | none                                |
| Animal                                 | 6/6                                         | -.02     | .619     | 6/4                                                       | +.08     | .037*    | none                                |
| <b>Social Interaction<br/>Percents</b> |                                             |          |          |                                                           |          |          |                                     |
| Aggression/Friendliness                | 63/52                                       | +.22     | .004**   | 59/51                                                     | +.15     | .014*    | none                                |
| Befriender                             | 55/41                                       | +.29     | .019*    | 50/47                                                     | +.06     | .517     | medium                              |
| Aggressor                              | 44/36                                       | +.16     | .131     | 40/33                                                     | +.14     | .129     | none                                |
| Physical Aggression                    | 54/37                                       | +.35     | .000**   | 50/34                                                     | +.33     | .000**   | none                                |
| <b>Social Interaction Ratios</b>       |                                             |          |          |                                                           |          |          |                                     |
| A/C Index                              | 0.27/.23                                    | +.11     | .017*    | 0.34/.24                                                  | +.24     | .000**   | small                               |
| F/C Index                              | 0.15/.19                                    | -.11     | .007**   | 0.21/.22                                                  | -.01     | .852     | none                                |
| S/C Index                              | 0.02/.03                                    | -.02     | .162     | 0.06/.01                                                  | +.11     | .000**   | small                               |
| <b>Settings Percent</b>                |                                             |          |          |                                                           |          |          |                                     |
| Indoor Setting                         | 54/61                                       | -.15     | .040*    | 48/61                                                     | -.26     | .000**   | small                               |
| Familiar Setting                       | 78/81                                       | -.08     | .489     | 62/79                                                     | -.38     | .000**   | medium                              |
| <b>Self-Concept Percents</b>           |                                             |          |          |                                                           |          |          |                                     |
| Self-Negativity                        | 72/66                                       | +.12     | .087     | 65/66                                                     | -.02     | .617     | small                               |
| Bodily Misfortunes                     | 12/16                                       | -.11     | .279     | 29/35                                                     | -.12     | .217     | small                               |
| Negative Emotions                      | 72/83                                       | -.25     | .002**   | 80/80                                                     | +.00     | .995     | medium                              |
| Dreamer-Involved<br>Success            | 40/37                                       | +.06     | .722     | 51/42                                                     | +.18     | .213     | small                               |
| Torso/Anatomy                          | 33/25                                       | +.17     | .148     | 31/20                                                     | +.26     | .002**   | none                                |
| <b>Dreams with at Least<br/>One:</b>   |                                             |          |          |                                                           |          |          |                                     |
| Aggression                             | 46/50                                       | -.08     | .327     | 47/44                                                     | +.05     | .409     | small                               |
| Friendliness                           | 33/46                                       | -.28     | .001**   | 38/42                                                     | -.08     | .197     | small                               |
| Sexuality                              | 4/6                                         | -.09     | .274     | 12/4                                                      | +.31     | .000**   | large                               |
| Misfortune                             | 40/40                                       | +.00     | 1.       | 36/33                                                     | +.06     | .353     | small                               |
| Good Fortune                           | 10/7                                        | +.13     | .105     | 6/6                                                       | +.02     | .787     | small                               |
| Success                                | 11/12                                       | -.03     | .701     | 15/8                                                      | +.24.    | .000**   | medium                              |
| Failure                                | 16/18                                       | -.04     | .588     | 15/10                                                     | +.17     | .007**   | medium                              |
| Striving                               | 25/25                                       | +.02     | .85      | 27/15                                                     | +.31     | .000**   | medium                              |

\* $p < .05$ ; \*\* $p < .01$ .

<sup>a</sup>  $h$  differences of .00–.10 = none; .11–.20 = small; .21–.30 = medium; .31+ = large.

### Comparison of Gender Differences for Canadians and Americans

A comparison of the second and third columns of Table 2 reveals similarities and differences in the presence and absence of gender differences for both national groups. For both Canadians and Americans, males had a higher percentage of Male characters, Aggression/Friendliness index, Physical aggression, and Aggression/Character index and females had a higher percentage of Family characters and Indoor settings.

The last column of Table 2 also provides the magnitude (small, medium, or large) of the national difference for both groups as was previously used for comparing national gender differences for Germans and Americans (Domhoff, Meyer-Gomez, & Schredl, 2006). Although there were differences between the two samples for the presence/absence of the following gender differences, the magnitude of the national differences was small or non-existent (See the last column of Table 2). Specifically, gender differences observed in the American sample, but that were not in the Canadian sample, include a higher percentage of Animal Characters ( $h = +.08, p = .037$ ), Sexuality/Characters index ( $h = +.11, p < .001$ ), Torso/Anatomy ( $h = +.26, p = .002$ ), and dreams with at least one instance of Striving ( $h = +.31, p < .001$ ) for males. Females had a higher percentage of Familiar ( $h = -.26, p < .001$ ) and Friendly characters ( $h = -.12, p = .004$ ). On the other hand, in the Canadian sample, gender differences emerged that were not observed in the American sample. These include for females, a higher Friendliness/Characters index and a higher percentage of dreams with at least one instance of Friendliness.

For the other dream variables, there were some national differences that revealed a medium effect size. Specifically, American males had a higher percentage of dreams with at least one instance of Success ( $h = +.24, p < .001$ ) and Striving ( $h = +.31, p < .001$ ) and American females had a higher percentage of Familiar settings ( $h = -.38, p < .001$ ), differences not found in

the Canadian sample. Inversely, gender differences found in the Canadian sample had not been observed in the American sample (medium effect sizes). Specifically, males had a higher Befriender percentage and females had a higher percentage of Negative emotions. Finally, the highly significant predominance of sexuality for American males ( $h = +.31, p < .001$ ) was not present in the Canadian sample (large effect size).

### **Comparison of Canadian and American Males and of Canadian and American Females**

Table 3 presents differences between Canadian and American males and Canadian and American females with  $h$  and  $p$  values and the direction of the relationship (+ is higher for Canadians and – is lower for Canadians). Of significance, Canadian males compared to American males, had a lower percentage for Males ( $h = -.17, p = .003$ ), A/C index ( $h = -.16, p = .007$ ), F/C index ( $h = -.16, p = .001$ ), S/C index ( $h = -.11, p < .001$ ), Bodily misfortunes ( $h = -.29, p < .001$ ), Negative emotions ( $h = -.19, p = .028$ ), and dreams with at least one instance of Sexuality ( $h = -.28, p < .001$ ). Canadian males also had a higher percentage for Familiar characters ( $h = +.21, p < .001$ ), Family characters ( $h = +.16, p = .001$ ), Dead and Imaginary characters ( $h = +.13, p = .003$ ), Familiar settings ( $h = +.35, p < .001$ ), Self-Negativity ( $h = +.15, p = .017$ ), and dreams with at least one instance of Good fortune ( $h = +.16, p = .029$ ). Canadian females had a lower percentage of Bodily misfortunes ( $h = -.43, p < .001$ ) and a higher percentage of both Animal characters ( $h = +.08, p = .034$ ) and dreams with at least one instance of Success ( $h = +.15, p = .041$ ), Failure ( $h = +.24, p = .001$ ), and Striving ( $h = +.25, p = .001$ ).

Table 3

*Comparison of Canadian and American Males and of Canadian and American Females*

|                                  | Comparison of Canadian<br>(2000s) Males to American<br>(1950s) Males |          | Comparison of Canadian<br>(2000s) Females to American<br>(1950s) Females |          |
|----------------------------------|----------------------------------------------------------------------|----------|--------------------------------------------------------------------------|----------|
|                                  | Effect size                                                          | <i>p</i> | Effect size                                                              | <i>p</i> |
| <b>Characters</b>                |                                                                      |          |                                                                          |          |
| Male/Female Percent              | -.17                                                                 | .003**   | -.01                                                                     | .906     |
| Familiarity Percent              | +.21                                                                 | .000**   | +.01                                                                     | .795     |
| Friends Percent                  | +.05                                                                 | .324     | -.04                                                                     | .382     |
| Family Percent                   | +.16                                                                 | .001**   | +.07                                                                     | .08      |
| Dead & Imaginary                 | +.13                                                                 | .003**   | +.06                                                                     | .115     |
| Animal Percent                   | -.02                                                                 | .643     | +.08                                                                     | .034*    |
| <b>Social Interaction</b>        |                                                                      |          |                                                                          |          |
| <b>Percents</b>                  |                                                                      |          |                                                                          |          |
| Aggression/Friendliness          | +.08                                                                 | .283     | +.01                                                                     | .935     |
| Befriender                       | +.10                                                                 | .392     | -.12                                                                     | .215     |
| Aggressor                        | +.09                                                                 | .376     | +.07                                                                     | .479     |
| Physical Aggression              | +.08                                                                 | .303     | +.06                                                                     | .467     |
| <b>Social Interaction Ratios</b> |                                                                      |          |                                                                          |          |
| A/C Index                        | -.16                                                                 | .007**   | -.02                                                                     | .549     |
| F/C Index                        | -.16                                                                 | .001**   | -.06                                                                     | .105     |
| S/C Index                        | -.11                                                                 | .000**   | +.03                                                                     | .018*    |
| <b>Settings</b>                  |                                                                      |          |                                                                          |          |
| Indoor Setting Percent           | +.10                                                                 | .136     | -.01                                                                     | .911     |
| Familiar Setting Percent         | +.35                                                                 | .000**   | +.05                                                                     | .577     |
| <b>Self-Concept Percents</b>     |                                                                      |          |                                                                          |          |
| Self-Negativity                  | +.15                                                                 | .017*    | +.01                                                                     | .913     |
| Bodily Misfortunes               | -.43                                                                 | .000**   | -.43                                                                     | .000**   |
| Negative Emotions                | -.19                                                                 | .028*    | +.06                                                                     | .386     |
| Dreamer-Involved Success         | -.22                                                                 | .128     | -.10                                                                     | .505     |
| Torso/Anatomy                    | +.04                                                                 | .698     | +.13                                                                     | .182     |
| <b>Dreams with at Least One:</b> |                                                                      |          |                                                                          |          |
| Aggression                       | -.03                                                                 | .714     | +.11                                                                     | .148     |
| Friendliness                     | -.12                                                                 | .113     | +.08                                                                     | .254     |
| Sexuality                        | -.28                                                                 | .000**   | +.13                                                                     | .082     |
| Misfortune                       | +.08                                                                 | .284     | +.14                                                                     | .061     |
| Good Fortune                     | +.16                                                                 | .029*    | +.04                                                                     | .542     |
| Success                          | -.12                                                                 | .102     | +.15                                                                     | .041*    |
| Failure                          | +.03                                                                 | .726     | +.24                                                                     | .001**   |
| Striving                         | -.04                                                                 | .604     | +.25                                                                     | .001**   |

\**p* < .05; \*\**p* < .01.

## **Discussion**

### **The Threat Simulation Theory**

**Normative Data for Young Adult Canadians.** The first hypothesis that, overall, the dreams would support the threat simulation theory (Revonsuo (2000) and therefore contain more negative than positive dimensions, was supported. Specifically, there was more aggression than friendliness; negative emotions were more prevalent than positive; and failures and misfortune outnumbered successes and good fortune. Thus, dreams overall contain more negative than positive elements. This is also consistent with studies of dreams collected during sleep in the laboratory (Roussy et al., 2000), typical dreams (Nielsen et al., 2003), and home dreams (De Koninck, 2012; Hall et al., 1982; Hall & Van de Castle, 1966; Mazandarani et al., 2013; Rainville & Rush, 2009). Our findings support previous investigations which observed a predominance of negative emotions when dreams are rated by external judges, instead of the dreamer (Schredl & Doll, 1998; Sikka et al., 2014).

### **The Continuity Hypothesis**

**Gender Differences in Young Adult Canadians.** The second hypothesis, that gender differences for young adult Canadians would be consistent with previous investigations (Hall et al., 1982; Hall & Van de Castle, 1966), was supported. For example, there was a predominance of aggression and a higher male/female ratio in male dreams and more family characters, indoor settings, and negative emotions in female dreams. These findings are consistent with the continuity hypothesis as psychological and sociological research has found males tend to have higher physical aggression (Eagly, 1987; Underwood, 2003) and crime rates (Brannon, 1996) , and females tend to have more depression (APA, 1994; Nolen-Hoeksema, 1990), are more often

with family and friends (Schredl et al., 1998), and express more emotions (Brannon, 1996). In summary, it seems that gender differences observed in Canadian culture parallel those noted in psychological and sociological research.

**Comparison of Gender Differences for Canadians and Americans.** The third hypothesis was also supported, with minor exceptions, as national gender differences were comparable for Canadians and Americans. For both groups, males had a higher percentage of male characters, aggression/friendliness index, physical aggression, and aggression/character index and females had a higher percentage of family characters and indoor settings. These findings support the literature on the similarities between the English Canadian and the U.S northern regions, and are consistent with the continuity hypothesis (Grabb, 2011; Grabb & Curtis, 2010; Waugh, 2011). Furthermore, these findings are consistent with those observed by Hall et al. (1982).

Interestingly, Hall and Van de Castle (1966) and later Hall et al. (1982) reported more sexual content in male dreams. There was no gender difference for sexual dream interactions for the Canadian sample. This finding is consistent with observations by Zadra (2007) that sex dreams account for 8% of dream content for both Canadian men and women. However, this is at variance with the continuity hypothesis, as social research reports more frequent sexual intercourse and activities in males than in females. The absence of this gender difference in the Canadian sample, compared to the American sample (large effect size), could be due to the sexual revolution and changes in female sexuality experienced in the western world (Allyn, 2000; Escoffier, 2003). However, this interpretation could not be empirically tested because of the design of the study.

Additionally, Canadian males befriended more often in dreams, in contrast to the findings of Hall & Van de Castle (1966) and Hall et al. (1982). This observation may be due to either a cultural difference in dream friendliness or changes in social evolution, occurring over the last 30 years. Again, we were not able to empirically test for changes in social evolution. Interestingly, Canadian women did not have more familiar settings, also contrasting previous findings (Hall & Van de Castle, 1966). Since this variable was not investigated in the Richmond study (Hall et al. 1982), further investigations with setting and environment are warranted. Furthermore, the previously noted difference of males having more success and failure (Hall & Van de Castle, 1966), was not present in the Canadian sample. These findings may be further explained by the sociological changes of men and women having a more egalitarian role in the work force over the last 50 years (Giele & Stebbins, 2003; Lortie-Lussier et al., 1985), although this would have to be explicitly tested. Overall, it seems that the gender differences in dream content of North-Americans seem to be fundamentally similar and where differences do exist, they seem to reflect social and cultural evolution and support the continuity hypothesis (Hall & Nordby, 1972).

**Comparison of Canadian and American Males and of Canadian and American Females.** As predicted by the third hypothesis, there were few differences between Canadians and Americans, overall, in dream content for male and female norms. Interestingly, there were more differences between males than between females. However, the majority of the male differences had a small effect size with exceptions where the effect size was medium. For example, Canadian males had more familiar settings and less bodily misfortunes and sexuality. Hall et al. (1982) also found less sexuality in a sample of males in the Richmond study, conducted 30 years after the normative study, in line with the present findings. The differences in these variables may be due to changes in social and cultural evolution or may represent

subcultural differences in North-America for males and, therefore, needs further investigation. Interestingly, males differed on all the social interaction ratios as Canadians had a lower ratio for the aggression, friendliness, and sexuality/character indexes. Although the effect sizes were small, these findings imply that Canadian males socialize less in their dreams and the lower A/C index may reflect the less violent climate observed in Canadian compared to American culture (Gannon, 2001; Tremblay, 1999).

For females, there were also very few differences observed and the magnitude of the effect sizes were mostly small with some exceptions. Medium effect sizes were observed for Canadian females having less bodily misfortunes and more dreams with striving, specifically more failures. The observations may reflect social evolution, as women have moved from being predominantly homemakers to having a more equal role in the workforce (Giele & Stebbins, 2003) and may be dreaming of tasks associated with these new responsibilities. Indeed, dreams were found to reflect these changing social roles of women (Lortie-Lussier, Schwab, & De Koninck, 1985), supporting the continuity hypothesis (Hall & Nordby, 1972). But still overall, very few differences exist between American and Canadian young adults reflecting waking similarities in economy, behaviours, values, media, and daily life (Grab, 2010; Waugh, 2011).

### **Limitations and Future Directions**

A first limitation of this study was the lack of exploration of other Hall and Van de Castle (1966) categories such as descriptive elements, which are a secondary category and are not generally used in normative studies. The current study also did not explore thematic content in dreams, which were first examined by Nielsen et al. (2003) for major themes in young Canadians. The Hall and Van de Castle (1966) rating system is very effective for coding the major categories of dream content which can and has been used as a universal rating system to

develop normative dream content in the literature. Where this content analysis method is lacking is that it does not provide information on thematic content of dreams. For example, you cannot code for threat in dreams or different types of threat, if this is a variable of interest. In addition, in response to previous criticism regarding possible scale artifact or judge bias in the case of external ratings of emotions, future studies should include participant's self-rating of emotions in addition to external judge ratings. This should be carried out across a variety of methodologies including REM awakenings, dream diaries, and questionnaires, in order to fully assess the relative representation of positive and negative emotions in dreams. Having these more specific thematic categories and a variety of dream collection and rating scale methodologies to investigate dream emotions, would provide a more comprehensive look at gender differences in dreams for normative purposes. Another limitation of the present study was that the changes in social-cultural evolution could not be empirically tested. Therefore, our interpretations can only serve as suggestions for further exploration.

As for future normative studies research, it would be interesting to include measures of waking behavior in comparison with dream content that would more directly test the continuity hypothesis. A within subjects design should be used in future work to allow for the comparison of various dreams from one individual. This would shed light on the stability of dream content within participants. Finally, it would be interesting to expand normative studies to include all age groups and that should apply to different cultures as well and allow for developmental exploration of gender differences in dreams. Although it seems that certain dream features are universal, such as a predominance of negative dream dimensions, it does seem that environmental and cultural factors do influence dream content. This is evident in the current

observation of similarities and minor differences in dream imagery for Canadians and Americans.

### References

- Allyn, D. (2001). *Make love, not war: The sexual revolution, an unfettered history*. New York, NY: Taylor & Francis.
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders*, 4th Ed. Washington, DC: American Psychiatric Association.
- Bell, A. P. & Hall, C. S. (1971). *The personality of a child molester. An analysis of dreams*. New Brunswick, New Jersey: Transaction Publishers.
- Bose, V. S., & Pramila, V. (1993). Do Indian and American college students dream differently? Unpublished manuscript, Department of Psychology, Andhra University, India.
- Brannon, L. (1996). *Gender : Psychological perspectives*. Boston: Allyn and Bacon.
- Calkins, M. W. (1893). Statistics of dreams. *American Journal of Psychology*, 5, 311-343.
- Cohen, J. (1977). *Statistical Power for the Behavioral Sciences*. New York: Academic Press.
- Dale, A.L., & DeCicco, T L. (2011). Content and discovery in the dreams of Canadian male university students: A pilot study. *Dreaming*, 21(4), 257-276.
- Dale, A.L. & DeCicco, T.L. (2013). Examining The Storytelling Method with Canadian soldiers. *Imagination, Cognition, and Personality*, 33, 369-383.
- Dale, A.L., DeCicco, T.L., & Miller, N. (2013). Exploring the dreams of Canadian soldiers with content analysis. *International Journal of Dream Research*, 6(1), 22-30.
- DeCicco, T. L. (2009). *The giant compass: navigating your life with your dreams*. NC: Malito Press.
- De Koninck, J. (2012). Sleep, dreams, and dreaming. In C. A. Espie & C. M. Morin (Ed.) *The oxford handbook of sleep and sleep disorders* (pp. 150-171). New York, NY: Oxford University Press.
- De Koninck, J., & Sirois-Berliss, M. (1978). La motivation au rendement dans les rêves et durant l'éveil chez des étudiants canadiens-français et canadiens-anglais. *Canadian Journal of Behavioural Science*, 10, 329-338.
- Domhoff, G. W. (1996). *Finding meaning in dreams: A quantitative approach*: Springer.

- Domhoff, G. W. (2005). *The Dreams of Men and Women: Patterns of Gender Similarity and Difference*. Retrieved July 31, 2015 from the World Wide Web: [http://dreamresearch.net/Library/domhoff\\_2005c.htm](http://dreamresearch.net/Library/domhoff_2005c.htm)
- Domhoff, G. W. (2011). Dreams are embodied simulations that dramatize conception and concerns: The continuity hypothesis in empirical, theoretical, and historical context. *International Journal of Dream Research*, 4(2), 50-62.
- Domhoff, G. W., Meyer-Gomes, K., & Schredl, M. (2006). Dreams as the expression of conceptions and concerns: A comparison of German and American college students. *Imagination, Cognition and Personality*, 25(3), 269-282.
- Domhoff, G., & Schneider, A. (2008). Similarities and differences in dream content at the cross-cultural, gender, and individual levels. *Consciousness and cognition*, 17(4), 1257-1265.
- Eagly, A. H. (1987). Sex differences in social behaviour: A social role interpretation. Hillsdale: Lawrence Erlbaum.
- Escoffier, J. (2003). *Sexual revolution*. New York, NY: Running Press.
- Fiss, H. (1983). Toward a clinically relevant experimental psychology of dreaming. *Hillside Journal of Clinical Psychiatry*, 5(2), 147-159.
- Fiss, H. (1986). An empirical foundation for a self-psychology of dreaming. *Journal of Mind and Behavior*, 7(2-3), 161-191.
- Fosse, M. J., Stickgold, R. J., & Hobson, J. A. (2001). The mind in REM sleep: Reports of emotional experience. *Sleep*, 24, 947-955.
- Foulkes, D., Larson, J. D., Swanson, E. M., & Rardin, M. (1969). Two studies of childhood dreaming. *American Journal of Orthopsychiatry*, 39(4), 627-643.
- Foulkes, D., & Rechtschaffen, A. (1964). Presleep determinants of dream content: Effects of two films. *Perceptual and Motor Skills*, 19(3), 983-1005.
- Gannon, M. (2001). Crime comparisons between Canada and the United States. Juristat 21, 11. Catalogue 85-002. Ottawa: Statistics Canada.
- Giele, J. Z., & Stebbins, L. F. (2003). *Women and equality in the workplace: a reference handbook*. Santa Barbara, CA: ABC-CLIO.
- Grabb, E. G. (2011). Comparing Canadians and Americans. *Think Sociology*, 1(8):4-5.
- Grabb, E. G. & Curtis, J. E. (2010). *Regions apart: The four societies of Canada and the United States*. Toronto, ON: Oxford University Press.

- Grenier, J., Cappeliez, P., St-Onge, M., Vachon, J., Vinette, S., Roussy, F... & De Koninck, J. (2005). Temporal references in dreams and autobiographical memory. *Memory & cognition*, 33(2), 280-288
- Grey, A., & Kalsched, D. (1971). Oedipus east and west: An exploration via manifest dream content. *Journal of Cross-Cultural Psychology*, 2, 337-352.
- Hall, C. S. (1953). *The meaning of dreams*. New York, NY: Harper & Brothers.
- Hall, C. S., Domhoff, G. W., Blick, K. A., & Weesner, K. E. (1982). The dreams of college men and women in 1950 and 1980: A comparison of dream contents and sex differences. *Sleep*, 5, 188-194.
- Hall, C. S., & Lind, R. E. (1970). *Dreams, life, and literature: A study of Franz Kafka*. Chapel Hill, NC: University of North Carolina Press.
- 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.
- Howard, M. (1978). *Manifest Dream Content of Adolescents*. Ph.D. Dissertation. Iowa State University.
- Krippner, S., & Rubenstein, K. (1990). Gender differences in dream content. *ASD Newsletter*, 7(4).
- Krippner, S., & Weinhold, J. (2002). Gender differences in a content analysis study of 608 dream reports from research participants in the United States. *Social Behaviour and Personality: an international journal*, 30(4), 399-409.
- Krippner, S., Winkler, M., Rochlen, A., & Yashar, B. (1998). Gender, national and regional differences in a content analysis of 799 dreams reports from research participants in Argentina, Brazil and the United States. *Interamerican Journal of Psychology*, 32, 71-98.
- Lortie-Lussier, M., Schwab, C., & De Koninck, J. (1985). Working mothers versus homemakers: Do dreams reflect the changing roles of women? *Sex roles*, 12(9), 1009-1021.
- Lortie-Lussier, M., Simond, S., Rinfret, N., & De Koninck, J. (1992). Beyond sex differences: Family and occupational roles' impact on women's and men's dreams. *Sex Roles*, 26(3-4), 79-96.
- Malinowski, J., & Horton, C. L. (2011). Themes of continuity. *International Journal of Dream Research*, 4(2), 86-92.
- Mazandarani, A. A., Aguilar-Vafaie, M. E., & Domhoff, G. W. (2013). Content analysis of

- Iranian college students' dreams: Comparison with American data. *Dreaming*, 23(3), 163-174.
- Niedźwieńska, A. (2003). Gender differences in vivid memories. *Sex Roles*, 49(7-8), 321-331.
- Nielsen, T. A., Zadra, A. L., Simard, V., Saucier, S., Stenstrom, P., Smith, C., & Kuiken, D. (2003). The Typical Dreams of Canadian University Students. *Dreaming*, 13(4), 211.
- Nolen-Hoeksema, S. (1990). *Sex differences in depression*. Stanford: Stanford University Press.
- Oliver, M. B., & Hyde, J. S. (1993). Gender differences in sexuality: a meta-analysis. *Psychological Bulletin*, 114(1), 29-51.
- Rainville, R. E., & Rush, L. L. (2009). A contemporary view of college-aged students' dreams. *Dreaming*, 19(3), 152-171.
- Revonsuo, A. (2000). The reinterpretation of dreams: An evolutionary hypothesis of the function of dreaming. *Behavioural and Brain Sciences*, 23(6), 877-901.
- Rinfret, N., Lortie-Lussier, M., & De Koninck, J. (1991). The dreams of professional mothers and female students: An exploration of social roles and age impact. *Dreaming*, 1(3), 179-191.
- Roussy, F., Raymond, I. & De Koninck, J. (2000). Affect in REM dreams: Exploration of a time-of-night effect. *Sleep*, 23, A174–A175.
- Schneider, A. & Domhoff, G.W. (2016). The quantitative study of dreams (online). Available from: <http://www.dreamresearch.net/> (Accessed Feb 10, 2016).
- Schredl, M. (2012). Continuity in studying the continuity hypothesis of dreaming is needed. *International Journal of Dream Research*, 5(1), 1-8.
- Schredl, M., Ciric, P., Bishop, A., Gölit, E., & Buschtöns, D. (2003). Content analysis of German students' dreams: Comparison to American findings. *Dreaming*, 13(4), 237-243.
- Schredl, M., & Doll, E. (1998). Emotions in diary dreams. *Consciousness and Cognition*, 7(4), 634-646.
- Schredl, M., & Piel, E. (2003). Gender differences in dream recall: data from four representative German samples. *Personality and Individual Differences*, 35(5), 1185-1189.
- Schredl, M., Sahin, V., & Schäfer, G. (1998). Gender differences in dreams: do they reflect gender differences in waking life?. *Personality and Individual Differences*, 25(3), 433-442.

- Sikka, P., Valli, K., Virta, T., & Revonsuo, A. (2014). I know how you felt last night, or do I? Self-and external ratings of emotions in REM sleep dreams. *Consciousness and cognition*, 25, 51-66.
- St-Onge, M., Lortie-Lussier, M., Mercier, P., Grenier, J., & De Koninck, J. (2005). Emotions in the Diary and REM Dreams of Young and Late Adulthood Women. *Dreaming*, 15(2), 116-128.
- Strauch, I., & Meier, B. (1995). *In search of dreams: Results of experimental dream research*. Albany: State University of New York Press.
- Tremblay, S. (1999). Crime statistics in Canada, 1998. Juristat 19, 9. Catalogue 85-002. Ottawa: Statistics Canada.
- Underwood, M. K. (2003). *Social aggression among girls*. New York, Guilford Press.
- Waterman, D., M. De Jong, & Magdelijns, R. (1988). Gender, sex role orientation and dream content. *Sleep* '86, pp. 385-387. New York: Gustav Fischer Verlag.
- Waugh, B. (2011). Canadians and Americans are more similar than assumed. *University of British Columbia News*. Retrieved from <http://news.ubc.ca/2011/07/07/canadians-and-americans-are-more-similar-than-assumed/>.
- Weed, S. C. & Hallam, F. M. (1896). A study of the dream consciousness. *American Journal of Psychology*, 7, 405-411.
- Yamanaka, T., Morita, Y., & Matsumoto, J. (1982). Analysis of the Dream Contents in Japanese College Students by REMP-Awakening Technique. *Psychiatry and Clinical Neurosciences*, 36(1), 33-52.
- Zadra, A. (2007). 1093: Sex dreams: What do men and women dream about? *Sleep*, 30, A376.

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**Ontogenetic Patterns in the Dreams of Women across the Lifespan**

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### **Abstract**

The present study supports and extends previous research on the developmental differences in women's dreams across the lifespan. The participants included 75 Canadian women in each of 5 age groups from adolescence to old age including 12-17, 18-24, 25-39, 40-64, and 65-85, totaling 375 women. One dream per participant was scored by two independent judges using the method of content analysis. Trend analysis was used to determine the ontogenetic pattern of the dream content categories. Results demonstrated significant ontogenetic decreases (linear trends) for female and familiar characters, activities, aggression, and friendliness. These patterns of dream imagery reflect the waking developmental patterns as proposed by social theories and recognized features of aging as postulated by the continuity hypothesis. Limitations and suggestions for future research including the examining of developmental patterns in the dreams of males are discussed.

**Keywords:** dreams, women, development, aging, ontogenesis, continuity hypothesis

## **1. Introduction**

Psychological research on women has emerged in the 1960s with the exploration of many different aspects of their lives including features of development and social and gender roles (Giele & Stebbins, 2003; Greenwald, 1990; Parr, 1995; Smith, 2013). Research with women has also focused on interpersonal and mother child relationships (Baruch & Barnett, 1986; Birditt, Brown, Orbuch, & McIvane, 2010; Cassidy & Shaver, 2008; Himlein, 1995; Kretchmar & Jacobvitz, 2002; Nakonezny, Shull, & Rodgers, 1995). Interestingly, a number of studies have examined the dreams of women who are notoriously more interested in them (Szmigielska & Holda, 2007) and recall more dreams than men (Schredl & Reinhard, 2008). However, very few studies have examined the ontogenesis of the dreams experienced by women throughout the lifespan. The present study attempts to fill this gap. Of relevance therefore, is the research focusing on the development of women's waking life from adolescence to old age so that it can be related to the development of their dreaming experience.

### **1.1 Social Aspects of Aging and Theories**

Adolescence is described as a time of heightened emotions and curiosity coupled with physical and cognitive maturation. Studies investigating emotional changes in the transition from adolescence to adulthood found that adolescents tend to report more emotions such as loneliness, embarrassment, awkwardness, and self-consciousness, compared to adults (Csikszentmihalyi & Larson, 1984; Larson & Ham, 1993; Larson & Richards, 1994). Brain studies of responses to emotional stimuli reveal that adolescents respond to situations more emotionally and with the heart, compared to adults who demonstrate more rational thinking and control (Baird et al., 1999). Therefore, cognitive maturity seems to involve better emotional regulation. With respect

to activities, more time is spent in leisure activities with friends in young adulthood compared to middle adulthood (Osgood & Lee, 1993).

When considering older groups, according to the theory of disengagement, developed by Cumming, Henry, & Damianopoulos (1961), there is a severing of ties between an individual elderly person and society. Other studies have suggested that aging involves engaging in less social interactions (Carstensen, 1992), a decline in number of friendships (Roberts & Newton, 1987), and a smaller average social network size (Victor, Scambler, Bond, and Bowling, 2000). However, research has demonstrated that this involves a desire for higher quality over quantity relationships which are more fulfilling, satisfying, and supportive, rather than disengagement from society (Carstensen, 1992). With regard to waking activities and interactions, the generativity hypothesis states that in old age there is more of a focus on active involvement in life roles and in the community as opposed to stagnation (Erikson, 1963) as opposed to the disengagement theory.

With regards to emotions, Schultz (1985) suggested that from late adulthood onwards comes many experiences and emotional events in life and this may have a diminishing effect on the emotional intensity experienced in certain events in late adulthood and emotional regulation becomes stronger with age (Labouvie-Vief, Hakim-Larson, DeVoe, Schoeberlein, 1989; Schultz, 1985). In addition, older adults have been found to be relatively superior to younger adults in understanding emotional states (Labouvie-Vief, DeVoe, & Bulka, 1989). Furthermore, Blanchard-Fields and Irion (1988) found that older adults compared to younger adults use more mature emotion-focused coping strategies and as a result tend to blame people less, express less hostility, and have a greater capacity for altruism.

Finally, these changes in older women were found to be associated with more happiness, life satisfaction (Brody & Schoonover, 1986; Chappell & Haven, 1980; Gee & Kimball, 1987), and highly positive states and less negative ones (Carstensen, Mayr, Pasupathi, & Nesselroade, 2000), compared to younger women. This translates into less emotional symptoms of stress in older women (Griffith, 1983a; 1983b). Overall, these observations confirm the presence of waking developmental trends in women.

As to the research conducted on women's dreams, a wealth of studies has examined them through gender differences in dream experience (Domhoff, 1996; Domhoff & Schneider, 2008; Hall, Domhoff, Blicke, & Weesner, 1982; Hall & Van de Castle, 1966; Howard, 1978; Krippner & Rubenstein, 1990; Krippner & Weinhold, 2002; Krippner, Winkler, Rochlen, & Yashar, 1998; Schredl, Ciric, Bishop, Golitz, & Buschtons, 2003; Schredl & Piel, 2003). Other areas of investigations with women have explored dreams in relation to sex role orientation (Schredl, Paul, Lahl, & Goritz, 2010), pregnancy (Blake & Reimann, 1993; Kron & Brosh, 2003; Sered & Abramovitch, 1992; Sabourin, Touchette-Giroux, & De Koninck, 2008), different stages of the women's menstrual cycle (Sirois-Berliss & De Koninck, 1982; Wiebe, Lamarche, Sabourin, Lortie-Lussier, & De Koninck, 2007), and work roles (Lortie-Lussier, Schwab, & De Koninck, 1985). They have been studied mainly on the basis of the continuity theory of dreaming which states that dreams reflect waking life (Hall & Nordby, 1972; Schredl & Hofmann, 2003) and has been studied in the dreams of Canadians (Dale & DeCicco, 2011; Dale & DeCicco, 2013; Dale, DeCicco, & Miller, 2013; DeCicco, 2007; Nielsen et al., 2003). Indeed, it has been documented that the dreams of women can reflect their changing roles (Lortie-Lussier et al. 1985). However, age differences in dream content for women have not been as extensively studied and typically covered only portions of the lifespan (St. Onge, Lortie-Lussier, Mercier, Grenier, & De Koninck,

2005) and different age groups (Brenneis, 1975; Côté, Lortie-Lussier, Roy, & De Koninck, 1996; Lortie-Lussier, 2012; Lortie-Lussier, Côté, & Vachon, 2000; St. Onge et al., 2005). We briefly overview what has been done thus far on the main dream components of characters, activities, interactions, and emotions which will be the focus of the present study

## **1.2 Characters**

With respect to dream characters, studies have confirmed fewer total characters in older women compared to young women Brenneis (1975). The older women's dreams also presented the lowest ratios for males, females, familiar, and known characters. Lortie-Lussier, De Koninck, Renaud, and Rinfret (1990) also noted more familiar characters in adolescent girls' dreams compared to their mothers. Schredl, Lognitzer, & Vetter (1998) explored the waking life pattern of social contacts and found this to be related to the ratio of male and female characters in dreams. Furthermore, Lortie-Lussier et al. (2000) examined dream content in a sample of 21 women at two points in their lives, at the average ages of first, 29 and later, 44. At phase two of the longitudinal study (average age of 44) the percentage of adult characters in their dreams was significantly lower compared to the Hall and Van de Castle (1966) norms for college age females, but did not yield longitudinal differences in the total sample, a result which may be due to limitations in sample size (Lortie-Lussier et al., 2000). Moreover, Waterman (1991) also did not find any significant age differences for dream characters in his investigations of men and women from 45 to 85.

## **1.3 Activities**

Activities in the dreams of women have also shown marked changes with age (Van de Castle, 1994). Schredl, Schroder, and Lo (1996) reported that people over the age of 68 tend to have more daily activities in dreams compared to young adults. Brenneis (1975) noted

older women's dreams (40-85) contained more robust activity and movement compared to the dreams of two groups of younger women (16-17 and 18-26). Similar results were observed by Coté et al. (1996), where older women (45-56) had more activities and participated in their dreams more than younger women (26-35 and 36-45). In contradiction, Waterman (1991) did not find any age differences when examining dream activities in 45 to 75 year old participants consisting of middle-aged adults (45 to 60 years) and older adults (61 to 75 years).

#### **1.4 Interactions**

A number of studies have documented a decline in aggressive interactions with age for both men and women's dreams. Hall and Domhoff (1963) observed a decrease in aggressive interactions across three age groups including children (2-12), adolescents and young adults (12 to 24), and older adults (30 to 80). Later, Waterman (1991) documented reduced dream aggression after the age of 45. Moreover, Avila-White, Schneider, and Domhoff (1999) discovered a much higher aggression/friendliness ratio in adolescent girls' dreams in comparison to young women (Avila-White et al., 1999). Reports by Brenneis (1975) also indicated older women's dreams contained fewer aggressive interactions and injuries and the dreamer and characters were less often the source of an aggressive threat, when compared to the dreams of younger women.

A similar decrease with age has been documented with friendly dream interactions (Hall & Domhoff, 1964; Waterman, 1991). Additionally, adolescents tend to portray themselves as victims of aggression and recipients of friendliness in dreams (Hall & Domhoff, 1963; 1964). Hall and Domhoff (1964) conducted a large scale investigation of dream friendliness and reported that the dreams of young girls (2-12) and older women (30-80) contained less friendly interactions when compared to a group of young women (13-24). More

recently, Waterman (1991) also reported a large reduction in friendly interactions after the age of 45 in a sample of 80 men and women.

In contrast to aggression and friendliness, sexual dream interactions tend to remain stable over the lifespan as sexual interactions also persist in the dreams of the elderly (Van de Castle, 1994). Brenneis's (1975) investigations did not demonstrate significant differences in sexual dream interactions when comparing the dreams of older women (40-85) to the dreams of younger women (16-17 and 18-26). Von Sydow (1992) studied erotic dreams in older women (50 to 91) and documented that erotic dreams were experienced by 67% of participants in their 50's, 68% in their 60's, 74% in their 70's, and 33% in their 80's and older.

### **1.5 Emotions**

Hartmann (1996) describes a dream as explaining the emotional state of the dreamer and contextualizing emotional concerns. Lortie-Lussier and Delorme (1990) found a higher representation of the emotional self in the dreams of middle aged women (27-42) compared to adolescent (14-17) and older women (59-81). Further, the literature on dream emotions reports a decrease with age after young adulthood (Blicke & Howe, 1984; Funkhouser, 1999; Waterman, 1991). This notion is supported by investigations of dream diaries with more emotions in the dreams of college (17-19) compared to older (59-87) women's dreams. Waterman (1991) also reported a reduction in total dream emotions after the age of 45 and an even lower incidence of emotions in women older than 60. Negative dream emotions are also documented to decline with age (Brenneis, 1975; Côté et al., 1996; St-Onge et al., 2005). Côté, et al. (1996) observed this when exploring the impact of age and psychosocial changes on the dreams of women in three different age groups (26 - 35, 36 - 45, and 46 - 56). Comparable observations were observed in older women's home dreams (in their 60's) which contained fewer negative emotions with lower

intensity than younger women's (St. Onge et al., 2005). Similar age differences were reported by Brenneis (1975) when comparing older women (40-85) to two groups of younger women (16-17 and 18-26). Furthermore, results of the longitudinal research by Lortie-Lussier et al. (2000) indicated a decrease in negative emotions later in life, providing strong evidence of a decrease in emotions with age while controlling for other variables such as personality and character variances. To investigate the continuity theory, it is important to review the literature on waking day social aspects of aging and the change and development that occurs in different areas of the social lives of women, to explore associations with dream imagery.

### **1.6 Purpose**

Previous studies examining age differences in women's dreams have used differing methodologies. Furthermore, the findings from these studies have not always been consistent, which may be a result of the differing age ranges as well as collapsing genders. Therefore, it is important to include all age categories, with more narrow ranges, to investigate age related differences in dream content for women exclusively. The current study accomplishes this goal, and further extends previous research on age differences in dream content for women. Additionally, it provides an original first look at the evolution of dream imagery throughout the lifespan of women from adolescence to old age.

### **1.7 Hypotheses**

It was hypothesized that in accordance with the continuity hypothesis, the ontogenesis of dream imagery for women would reflect their waking developmental patterns as proposed by social theories, recognized features of aging and support age differences in women's dreams reported in the literature. Specifically, it was predicted:

1. For total characters, males, females, and familiar characters there will be a decrease from adolescence to old age (linear trend).
2. For Total activities and Dreamer only activities, there will be an increase with age starting with the 40-64 age group.
3. For total aggressive interactions, dreamer as aggressor, and dreamer as victim, there will be a decrease from adolescence to old age (linear trend).
4. For both Total friendly interactions and Friendliness per character in dreams there will be a decrease from adolescence to old age (linear trend).
5. Sexual interactions in dreams will not differ across age groups from adolescence to old age.
6. There will be a decrease (linear trend) from adolescence to old age for frequency of total emotions, and total negative emotions. Although the literature on the dreams of adolescents is limited to make predictions including adolescents.

## **2. Method**

### **2.1 Participant**

The participants in the current study were 375 Canadian females divided into 5 different age groups 12-17 ( $m = 16.52$ , range = 12-17), 18-24 ( $m = 20.48$ , range = 18-24), 25-39 ( $m = 30.04$ , range = 25-39), 40-64 ( $m = 51.13$ , range = 40-64), and 65 and years and older ( $m = 71.43$ , range = 65-90). Each age group contained 75 women (Anglophones and Francophones). The participants for the study were recruited by a host of ways. Specifically, through contacts with school boards, the University of Ottawa, invitations through media, public presentations and conferences, retiree associations, and word of mouth.

## 2.2 Measures and Procedure

Each participant completed a dream package including information on basic demographics, sleep quality and a daily diary for recording the day's events for ten days or until two dreams were reported as has been used in previous research (Grenier et al., 2005; Lortie-Lussier et al., 1985). Since a number of subjects only reported one dream while others reported up to four, we used only the first dream of each participant containing a minimum of 50 words and a maximum of 300 words was retained for coding as established by Hall and Van de Castle (1966) and followed since then by most authors in the dream literature (Domhoff, 2003). The dreams were scored by two independent judges and high inter-rater reliability of over 80 percent was achieved using the Hall and Van de Castle (1966) method of content analysis. Since many variables were correlated with the length of the dream report, all variables were controlled for dream report length by dividing by word count.

The main Hall and Van de Castle (1966) categories included in the analyses were characters; activities; aggressive, friendly, and sexual interactions; and emotions. Specifically for characters, total characters, male characters, female characters, and familiar characters were scored. For activities, total number of dream activities were scored. For interactions total aggressive interactions, dreamer as aggressor, dreamer as victim, total friendly interactions, friendliness per character (F/C), and total sexual interactions were scored. For emotions there were two categories, one for total emotions and one for total negative emotions. All variables were entered into a program called dreamSAT that was developed for computer coding of Hall and Van de Castle's (1966) content analysis method and is available on Domhoff's dream bank website (Schneider & Domhoff, 2009).

### 3. Results

Trend analysis was used to test for ontogenetic patterns in the dreams of women for the various Hall and Van de Castle dream content categories. The total number of recalled dreams and the mean number of words for the selected dreams per each age group were: 12-17 (183 dreams,  $m = 147.29$  words), 18-24 (258 dreams,  $m = 195.92$  words), 25-39 (215 dreams,  $m = 163.69$  words), 40-64 (218 dreams,  $m = 136.49$  words), and 65 and older (150 dreams,  $m = 107.97$  words).

#### 3.1 Characters

There was no significant effect of age or trends in the data for either Total number of characters ( $F(4, 370) = 1.03, p = .394$ ) or male characters ( $F(4, 370) = .438, p = .781$ ). For Female characters, there was a significant linear trend ( $F(1, 370) = 9.62, p = .002$ ). Female characters decreased slightly across age groups, from adolescence to old age. For familiar characters there was also a significant linear trend ( $F(1, 370) = 8.22, p = .004$ ). Familiar characters also decreased slightly across age groups, from adolescence to old age. See Figure 1 for the pattern of the frequency of characters in the dreams of women across the lifespan.

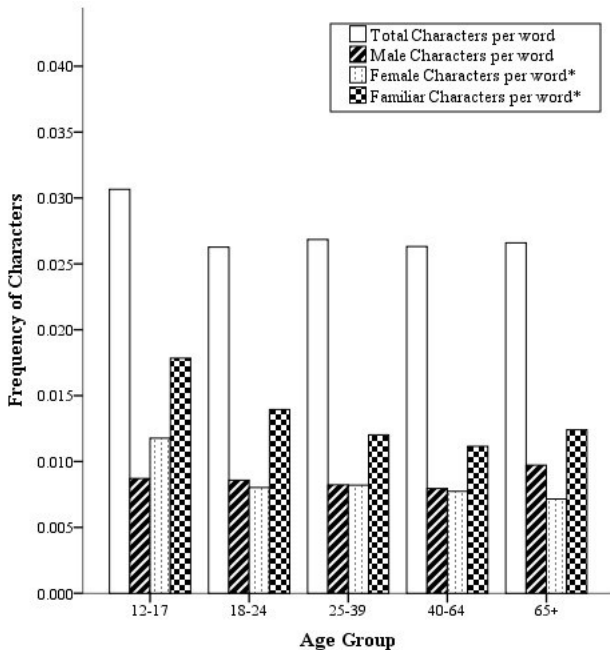


Figure 1. Pattern of characters in the dreams of women across the lifespan. Significant linear trend for Female characters ( $F(1, 370) = 9.62, p = .002$ ) and Familiar characters ( $F(1, 370) = 8.22, p = .004$ ).

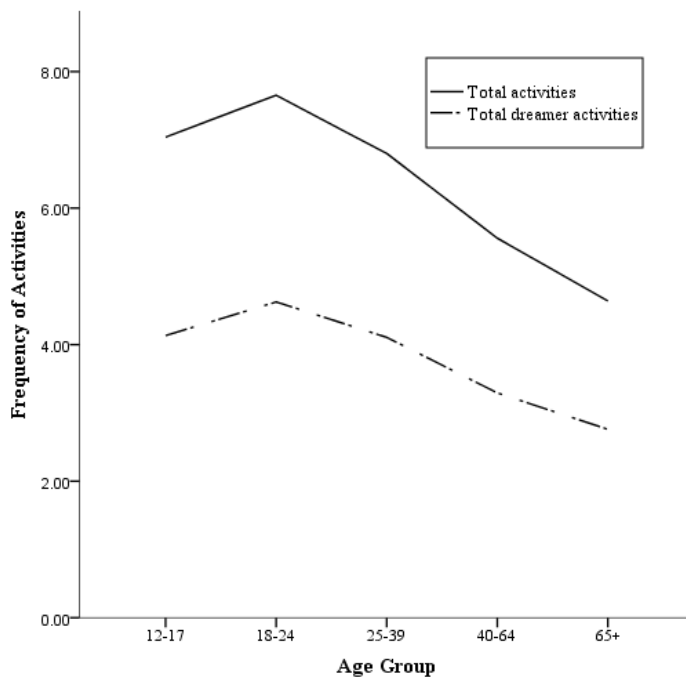
Further analyses revealed that there were no significant changes in the male to female ratio of dream characters (See Figure 2). This ratio was reported by Hall (1984) when examining gender differences in the representation of characters in the dreams of men and women. It is calculated by taking the total number of males divided by the total numbers of males and females. There was no significant trends in the data and the male to female ratio of characters in dreams is fairly even and remains stable across the lifespan.

### 3.2 Activities

There was no effect of age and no significant trends in the data for both Total number of activities ( $F(4, 370) = 1.38, p = .241$ ) and Total dreamer activities ( $F(4, 370) = .666, p = .616$ ). Further trend analyses were conducted without controlling for word count as activities in dreams would be highly influenced by the length of the dream report. There was a decrease from young

adulthood to old age (linear trend) for both Total activities ( $F(1, 370) = 18.43, p < .0001$ ) and Total dreamer activities ( $F(1, 370) = 13.66, p < .001$ ). See Figure 3 for the pattern of activities in the dreams of women without controlling for word count.

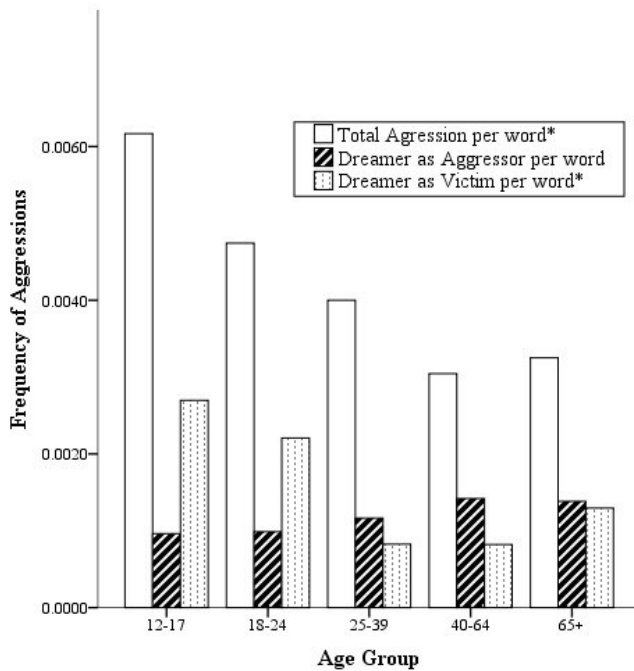
Since the literature has shown that activities in dreams tend to increase after the age of approximately 40 (Brenneis, 1975; Côté et al., 1996; Schredl et al., 1996), an independent samples t-test was performed on the last two age groups, 40-64 and 65 and older. The independent samples t-tests revealed that there are no differences in either Total activities ( $t = 1.50, p = .136$ ) or Total dreamer activities ( $t = 1.40, p = .165$ ) between the 40-64 and 65 and older age groups.



*Figure 2.* The pattern of activities in the dreams of women without controlling for dream report length. There was a significant linear trend for both Total activities ( $F(1, 370) = 18.43, p < .0001$ ) and total dreamer activities ( $F(1, 370) = 13.66, p < .001$ ).

### 3.3 Aggression

For total aggressive interactions there was a significant linear trend ( $F(1, 370) = 6.42, p = .012$ ). Total aggressive interactions decreased from adolescence to old age. For Dreamer as Aggressor, there was no effect of age and no significant trends in the data ( $F(4, 370) = .36, p = .11$ ). For dreamer as victim there was a significant linear trend ( $F(1, 370) = 6.57, p = .011$ ). Dreamer as the victim decreased slightly from adolescence to old age. See Figure 4 for the pattern of aggressive interactions in dreams across the lifespan for women.

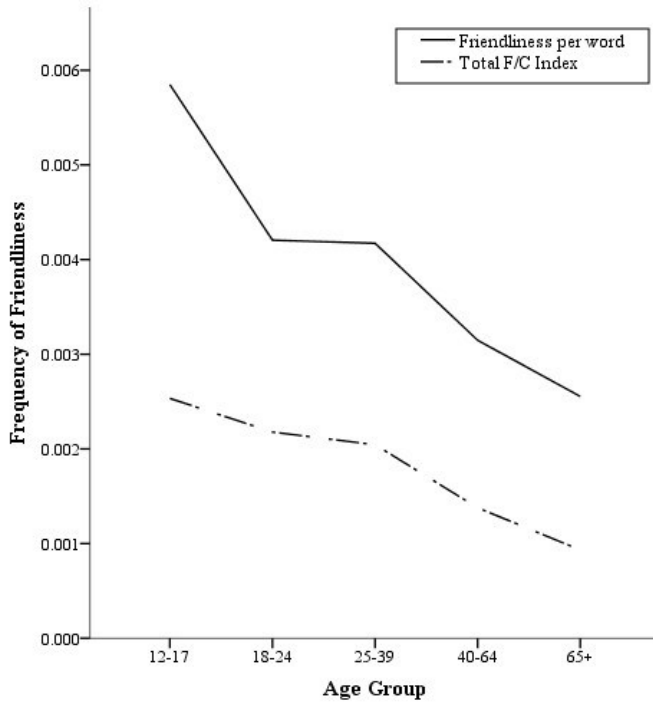


*Figure 3.* Pattern of aggressive interactions in the dreams of women across the lifespan. Significant linear trend for both Total aggressive interactions ( $F(1, 370) = 6.42, p = .012$ ) and Dreamer as victim ( $F(1, 370) = 6.57, p = .011$ ).

### 3.4 Friendliness

For Total friendly interactions there was a significant linear trend ( $F(1, 370) = 9.74, p = .002$ ). Total frequency of friendly interactions decreased across age groups from 12-17 to 65 years and older. For the Friendliness per character index (F/C index) there was also a

significant linear trend ( $F(1, 370) = 17.09, p < .0001$ ). The F/C index decreased across age groups from 12-17 to 65 years and older. See Figure 5 for the pattern of friendly interactions across the lifespan.



*Figure 4.* Pattern of friendliness in the dreams of women across the lifespan. Significant linear trend for both Total friendly interactions ( $F(1, 370) = 9.74, p = .002$ ) and the F/C index ( $F(1, 370) = 17.09, p < .0001$ ).

### 3.5 Sexual Interactions

There was no significant effect of age for sexual interactions ( $F(4, 370) = 2.65, p = .225$ ).

### 3.6 Emotions

For total frequency of emotions there was a significant linear ( $F(1, 370) = 9.34, p = .002$ ) and quadratic ( $F(1, 370) = 19.95, p < .0001$ ) trend. Total Frequency of emotions was highest in the 12-17 and 65 and older age groups. For total negative emotions there was a significant

quadratic trend ( $F(1, 370) = 4.52, p = .034$ ). Total negative emotions decreased slightly from 25-39 to old age. See Figure 6 for the pattern of emotions in the dreams of women across the lifespan.

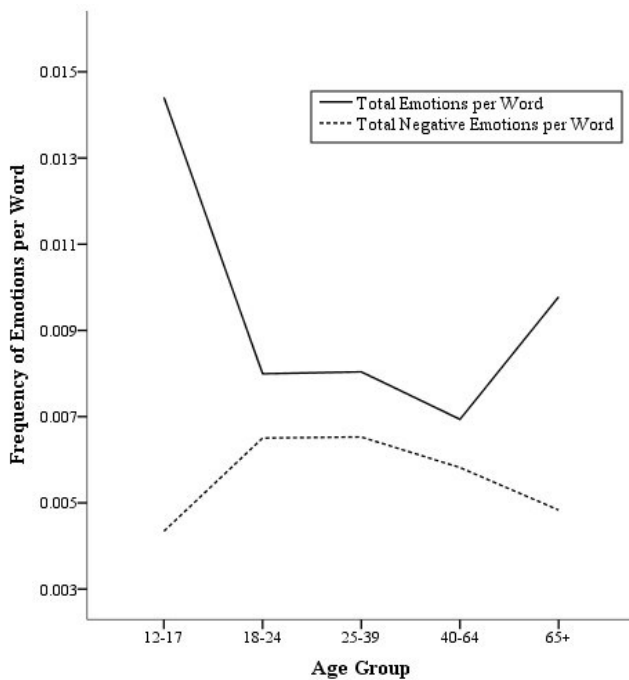


Figure 5. Pattern of emotions in the dreams of women across the lifespan. Significant linear ( $F(1, 370) = 9.34, p = .002$ ) and quadratic ( $F(1, 370) = 19.95, p < .0001$ ) trend for total frequency of emotions. Significant quadratic trend for total negative emotions ( $F(1, 370) = 4.52, p = .034$ ).

#### 4. Discussion

The continuity theory leads to the hypothesis that the dreams of women should reflect the psychological and social changes they experience in society as they age such as smaller social networks (Carstensen, 1992; Victor et al., 2000), better emotional regulation (LabouvieVief et al., 1989), and less hostility (Blanchard-Fields & Irion, 1988). Overall the present results tend to support the continuity hypothesis (Hall & Nordby, 1972; Schredl & Hofmann, 2003). Our study also provides support for previously found age differences in the dreams of women.

Specifically, with respect to characters, the first prediction was partially supported. There were no significant trends for either total characters or male characters in the dreams of women across the lifespan. These findings are at variance with those of Brenneis (1975) and Lortie-Lussier et al., (2000). However, the stability of total dream characters supports investigations by Waterman (1991) and Lortie-Lussier et al (2000). As predicted, there was however a significant linear trend for female and familiar characters as these variables decreased across the lifespan, an observation supported by Brenneis (1975).

Exploring more than total characters provides new information about the interactions with each gender across the lifespan for women. Further analyses revealed that the ratio of male to female characters is relatively even and remains stable across the lifespan, an area not yet investigated. Hall (1984) observed a sex difference in the representation of male characters in dreams; males dream more often of male characters than females do. The results of the additional analyses support Hall's observation that women have a more even male to female ratio of characters in dreams when compared to men.

Contrary to the second prediction, there was no significant trend in total dreamer involved activities. Additional analyses, not controlling for dream report length, however, revealed a decrease in both total activities and dreamer activities from young adulthood to old age. These results contradict the observation of more activities in older women compared to younger women's dreams (Brenneis, 1975; Côté et al. 1996). Côté et al. (1996) reporting more activity in older women's dreams supports the generativity hypothesis with more active involvement in life roles. The current study however, did not support the generativity hypothesis. In addition, the results of the second prediction in the current study, when controlling for dream

report length, support investigations by Waterman (1991) and Cumming et al. (1961). This contrast warrants further exploration.

As predicted in the third hypothesis, there was a slight decrease (linear trend) with age for both total aggressive interactions and dreamer as victim interactions, supporting the observed decline in aggressive interactions with age in the dreams of men and women (Avila-White et al., 1999; Brenneis, 1975; Hall & Domhoff, 1963; Waterman, 1991). There was no significant trend in the data for the dreamer as the aggressor in dream aggression. This finding contradicts a previous study which found that the dreams of older women were seen less often as the source of an aggressive threat when compared to younger women (Brenneis, 1975). Overall this prediction is consistent with the literature.

There was also a decline for total friendly interactions and the F/C index in the dreams of women from adolescence to old age (linear trend), as predicted by the fourth hypothesis and documented in previous investigations (Hall & Domhoff, 1964; Waterman, 1991). Brenneis (1975) explored the dreams of elderly women who were less concerned with the effects of aggression especially after child rearing and this is in contrast with younger women who tend to depict themselves and others in dream reports as potentially more aggressive and dangerous (Lortie-Lussier, 2012). These noted differences may be due to a shift in preoccupations in old age with more peace and inner reflection, with less focus on aggression and anger. This is demonstrated through the decline in aggression and negative emotions in dreams with age in the current sample. There seems to be a narrowing down of interactions among characters with age as aggression and friendliness both decrease. Furthermore, sexual dream interactions did not yield a significant trend, supporting the fifth prediction and the notion that sexual dream themes persist in the elderly (Brenneis, 1975; Van de Castle, 1994; Von Sydow, 1992).

The sixth prediction examining emotions was partially supported. A quadratic trend best fit the data although there was a significant linear trend as well for total emotions. Of particular interest was the slight increase in the 65 years and older age group in total emotions. These findings contradict the age differences in dream emotions for women (Blick & Howe, 1984; Waterman, 1991). Blicke and Howe (1984) suggested that since elderly women are spending less time in REM the shorter dream reports of the elderly would contain less emotional content. Since word count was controlled for in the current study, and the findings are contradictory to previous research. Further research is warranted to examine differences in total emotional dream content in elderly women compared to younger women. Subsequently for negative emotions, there was also a quadratic trend, supporting the documented decline in negative dream emotions with age for women (Brenneis, 1975; Côté et al, 1996; St. Onge et al., 2005).

Overall, the dream variables investigated do seem to reflect the waking day changes and development that occur with aging in many areas of women's social lives, supporting the continuity hypothesis (Lortie-Lussier, 2012). The aging theory of disengagement, a desire for less social interaction and decreased activity fits the current data. This is reflected in the dream imagery of decreases in total and dreamer involved activities as well as total aggressive and friendly interactions. Furthermore, the ontogenetic pattern of a decrease of both dream characters (female and familiar) and interactions (aggressive and friendly) reflect the literature discussed on the social aspects of aging with adults and specifically women.

Specifically, women's dreams reflect the transition with aging to smaller social networks, a loss of friendships, increased longevity, and a preference of quality over quantity in social contacts, interactions, and relationships (Carstensen, 1992; Gaylord, 1980; Victor et al., 2000). Subsequently, the observation of age related developmental decreases in dream emotions appears

to reflect the diminished intensity of waking emotions and increased emotional regulation experienced with aging (LabouvieVief et al., 1989; Schultz, 1985). Additionally, a decrease in negative dream emotions such as anger, aggression, and hostility reflects the more mature emotion-focused coping strategies, less hostility, and greater altruism, happiness, and life satisfaction in waking day found in older compared to younger adults and specifically women (Blanchard-Fields & Irion, 1988; Brody & Schoonover, 1986; Chappell & Haven, 1980; Gee & Kimball, 1987).

Since some of the participants reported only one dream there was only one dream scored for each participant. It would be interesting to have a larger sample of dreams per person for future analyses. Scoring more than one dream per participant would provide a more accurate portrayal of the dreams of women across the lifespan by averaging dream content categories across a series of dreams for each participant. Another limitation of the current study is a broadly defined age category for the oldest age group, as there are many changes that take place from age 65 and older. For example the dreams of 65 year olds may vary greatly from those who are 85 and older. In addition participants were not matched for education or social status. A larger sample would also be required to control for these dimensions so that this comparison can be made in future research. In addition, the current study investigated the standard Hall and Van de Castle (1966) categories and did not explore thematic content in dreams or specific categories of emotions which would provide more substance and make for very interesting investigations of ontogenesis in dreams in future work. Trend analyses should also be conducted with males to explore their ontogenetic pattern. In addition, it would provide the opportunity to examine the ontogenetic evolution of gender differences in dreams.

## 5. References

- Avila-White, D., Schneider, A., & Domhoff, G. W. (1999). The most recent dreams of 12–13 year-old boys and girls: A methodological contribution to the study of dream content in teenagers. *Dreaming*, 9(2-3), 163-171.
- Baird, A. A., Gruber, S. A., Fein, D. A., MASS, L. C., Steingard, R. J., Renshaw, P. F., ... & Yurgelun-Todd, D. A. (1999). Functional magnetic resonance imaging of facial affect recognition in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 38(2), 195-199.
- Baruch, G. K. & Barnett, R. C. (1986). Role quality, multiple role involvement, and psychological well-being in mid-life women. *Journal of Personality and Social Psychology*, 51, 578-585.
- Birditt, K. S., Brown, E., Orbuch, T. L., McIlvane, J. M. (2010). Marital conflict behaviours and implications for divorce over 16 years. *Journal of Marriage and Family*, 72(5), 1188-1204.
- Blake Jr, R., & Reimann, J. (1993). The pregnancy-related dreams of pregnant women. *The Journal of the American Board of Family Practice/American Board of Family Practice*, 6(2), 117-122.
- Blanchard-Fields, F., & Irion, J. C. (1988). The relation between locus of control and coping in two contexts: age as a moderator variable. *Psychology and Aging*, 3(2), 197-203.
- Blick, K. A., & Howe, J. B. (1984). A comparison of the emotional content of dreams recalled by young and elderly women. *The Journal of psychology*, 116(1), 143-146.
- Brenneis, C. B. (1975). Developmental aspects of aging in women: A comparative study of dreams. *Archives of General Psychiatry*, 32(4), 429-435.
- Brody, E. M., & Schoonover, C. B. (1986). Patterns of parent-care when adult daughters work and when they do not. *The Gerontologist*, 26, 372-381.
- Carstensen, L. L. (1992). Social and emotional patterns in adulthood: support for socioemotional selectivity theory. *Psychology and aging*, 7(3), 331-338.
- Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselroade, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of personality and social psychology*, 79(4), 644-655.
- Cassidy, J. & Shaver, P. R. (2008). *Handbook of attachment 2<sup>nd</sup> Edition: Theory, research, and clinical applications*. New York, The Guildford Press.
- Chappell, N. L., & Haven, B. (1980). Old and female: Testing the double jeopardy hypothesis. *The Sociological Quarterly*, 21, 157-171.
- Côté, L., Lortie-Lussier, M., Roy, M. J., & De Koninck, J. (1996). Continuity and change: The dreams of women throughout adulthood. *Dreaming*, 6(3), 187-199.

- Cumming, E., Henry, W. E., & Damianopoulos, E. (1961). A formal statement of disengagement theory. *Growing old: The process of disengagement*. New York, NY: Basic Books.
- Csikszentmihalyi, M., & Larson, R. (1984). *Being adolescent: Conflict and growth in the teenage years*. New York: Basic Books.
- Dale, A.L., & DeCicco, T L. (2011). Content and discovery in the dreams of Canadian male university students: A pilot study. *Dreaming*, 21(4), 257-276.
- Dale, A.L. & DeCicco, T.L. (2013). Examining The Storytelling Method with Canadian soldiers. *Imagination, Cognition, and Personality*, 33, 369-383.
- Dale, A.L., DeCicco, T.L., & Miller, N. (2013). Exploring the dreams of Canadian soldier with content analysis. *International Journal of Dream Research*, 6(1), 22-30.
- DeCicco, T. L. (2007b). What is the storytelling? Examining discovery with The Storytelling Method (TSM) and testing with a control group. *Dreaming*, 17, 227- 237.
- Domhoff, G. W. (1996). *Finding meaning in dreams: A quantitative approach*: Springer.
- Domhoff, G. W. (2003) *The scientific study of dreams: Neural networks, cognitive development, and content analysis*. American Psychological Association.
- Domhoff, G. W., & Schneider, A. (2008). Similarities and differences in dream content at the cross-cultural, gender, and individual levels. *Consciousness and cognition*, 17(4), 1257-1265.
- Erikson, E. H. (1963). *Childhood and Society*. 2d ed. New York, NY: Norton.
- Funkhouser, A. T., Hirsbrunner, H.-P., Cornu, C., & Bahro, M. (1999). Dreams and dreaming among the elderly: an overview. *Aging & Mental Health*, 3(1), 10-20.
- Gaylord, S. (1989). Women and aging: A psychological perspective. *Journal of Women & Aging*, 1(1-3), 69-93.
- Gee, E. M. & Kimball, M. M. (1987). *Women and aging*. Toronto: Buttenvorths.
- Giele, J. Z. & Stebbins, L. F. (2003). *Women and equality in the work-place*. Santa-Barbara, CA: ABC-CLIO Books.
- Greenwald, M. W. (1990). *Women, war, and work: The impact of World War I on women workers in the United States*. New York, NY: Cornell University Press.
- Grenier, J., Cappeliez, P., St-Onge, M., Vachon, J., Vinette, S., Roussy, F., & De Koninck, J. (2005). Temporal references in dreams and autobiographical memory. *Memory & cognition*, 33(2), 280-288
- Griffith, J. W. (1983a). Women's stressors according to age groups: Part I. *Health Care for Women International*, 4(6), 311-326
- Griffith, J. W. (1983b). Women's stress responses and coping patterns according to age groups: Part II. *Health Care for Women International*, 4(6), 327-340.

- Hall, C., & Domhoff, B. (1963). Aggression in dreams. *International Journal of Social Psychiatry*, 9, 259-267.
- Hall, C., & Domhoff, B. (1964). Friendliness in dreams. *The Journal of Social Psychology*, 62(2), 309-314.
- Hall, C. S. (1984). "A ubiquitous sex difference in dreams" revisited. *Journal of Personality and Social psychology*, 46(5), 1109-1117.
- Hall, C. S., Domhoff, G. W., Blick, K. A., & Weesner, K. E. (1982). The dreams of college men and women in 1950 and 1980: A comparison of dream contents and sex differences. *Sleep*, 5, 188-194.
- 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.
- Hartmann, E. (1996). Outline for a theory on the nature and functions of dreaming. *Dreaming*, 6(2), 147-170.
- Himelein, M. J. (1995). Risk factors for sexual victimization in dating: A longitudinal study of college women. *Psychology of Women Quarterly*, 19, 31-48.
- Howard, M. (1978). *Manifest Dream Content of Adolescents*. Ph.D. Dissertation. Iowa State University.
- Kretchmar, M D., & Jacobvitz, D. B. (2002). Observing mother-child relationships across generations. Boundary patterns, attachment, and the transmission of caregiving. *Family Process*, 41, 351-374.
- Krippner, S., & Rubenstein, K. (1990). Gender differences in dream content. *ASD Newsletter*, 7(4).
- Krippner, S., & Weinhold, J. (2002). Gender differences in a content analysis study of 608 dream reports from research participants in the United States. *Social Behaviour and Personality: an international journal*, 30(4), 399-409.
- Krippner, S., Winkler, M., Rochlen, A., & Yashar, B. (1998). Gender, national and regional differences in a content analysis of 799 dreams reports from research participants in Argentina, Brazil and the United States. *Interamerican Journal of Psychology*, 32, 71-98.
- Kron, T., & Brosh, A. (2003). Can dreams during pregnancy predict postpartum depression? *Dreaming*, 13(2), 67-81.
- Labouvie-Vief, Gisela, DeVoe, Marlene, & Bulka, Diana. (1989). Speaking about feelings: conceptions of emotion across the life span. *Psychology and aging*, 4(4), 425-437.
- Labouvie-Vief, G., Hakim-Larson, J., DeVoe, M., & Schoeberlein, S. (1989). Emotions and self regulation: A life span view. *Human Development*, 32(5), 279-299.

- Larson, R., & Ham, M. (1993). Stress and "storm and stress" in early adolescence: The relationship of negative events with dysphoric affect. *Developmental Psychology*, 29(1), 130-140.
- Larson, R. W., & Richards, M. H. (1994). Family emotions: Do young adolescents and their parents experience the same states? *Journal of Research on Adolescence*, 4(4), 567-583.
- Lortie-Lussier, M. (2012). Women's dreams across the life cycle. In D. Barrett & P. McNamara (Vol 2), *Encyclopedia of sleep and dreams: The evolution, function, nature, and mysteries of slumber* (pp. 806-808). California: ABC-CLIO.
- Lortie-Lussier, M., Côté, L., & Vachon, J. (2000). The consistency and continuity hypotheses revisited through the dreams of women at two periods of their lives. *Dreaming*, 10(2), 67-76.
- Lortie-Lussier, M. & Delorme, M-A. (1990). Les représentations de soi dans les rêves des femmes, de l'adolescence à la vieillesse. *Les Cahiers Internationaux de Psychologie Sociale*, 7-8, 57-71.
- Lortie-Lussier, M., De Koninck, J., Renaud, M-F., & Rinfret, N. (1990). *Mother's and daughter's dreams: Reflections of middle adulthood and adolescence*. Paper presented at the 7<sup>th</sup> Annual Conference of the Association for the Study of Dreams, Chicago, Illinois.
- Lortie-Lussier, M., Schwab, C., & De Koninck, J. (1985). Working mothers versus homemakers: Do dreams reflect the changing roles of women? *Sex roles*, 12(9), 1009-1021.
- Nakonezny, P. A., Shull, R. D., & Rogers, J. L. (1995). The effect of no-fault divorce law on the divorce rate across the 50 states and its relation to income, education, and religiosity. *Journal of Marriage and the Family*, 57, 477-488.
- Nielsen, T. A., Zadra, A. L., Simard, V., Saucier, S., Stenstrom, P., Smith, C., & Kuiken, D. (2003). The Typical Dreams of Canadian University Students. *Dreaming*, 13(4), 211-235.
- Osgood, D. W., & Lee, H. (1993). Leisure activities, age, and adult roles across the lifespan. *Loisir et Société/Society and Leisure*, 16(1), 181-207.
- Parr, J. (1995). *A diversity of women: Ontario*. Toronto, ON: University of Toronto Press.
- Roberts, P., & Newton, P. M. (1987). Levinsonian studies of women's adult development. *Psychology and Aging*, 2(2), 154-163.
- Sabourin, C., Touchette-Giroux, V., & De Koninck, J. (2008). Dreams during pregnancy: Relationship with waking depression. *Sleep*, 31, A380-A380.
- Schneider, A. & Domhoff, G.W. (2016). The quantitative study of dreams (online). Available from: <http://www.dreamresearch.net/> (Accessed Jan 10, 2014).
- Schredl, M., Ciric, P., Bishop, A., Göllitz, E., & Buschtöns, D. (2003). Content analysis of German students' dreams: Comparison to American findings. *Dreaming*, 13(4), 237-243.
- Schredl, M., & Hofmann, F. (2003). Continuity between waking activities and dream activities. *Consciousness and Cognition*, 12, 298-308.

- Schredl, M., Lognitzer, T., & Vetter, S. (1998). Is the ratio of male and female dream characters related to the waking-life pattern of social contacts? *Perceptual and motor skills*, 87(2), 513-514.
- Schredl, M., Paul, F., Lahl, O., & Göritz, A. S. (2010). Gender Differences in Dream Content: Related to Biological Sex or Sex Role Orientation? *Imagination, Cognition and Personality*, 30(2), 171-183.
- Schredl, M., & Piel, E. (2003). Gender differences in dream recall: data from four representative German samples. *Personality and Individual Differences*, 35(5), 1185-1189.
- Schredl, M. & Reinhard, I. (2008). Gender differences in dream recall: a meta-analysis. *Journal of Sleep Research*, 17(2), 125-131.
- Schredl, M., Schroder, A. & Lo, H. (1996). Traumer leben von alteren Menschen Teil 2: Empirische Studie und Diskussion. *Zeitschrift für Gerontopsychologie und psychiatrie*, 1, 43-53.
- Schultz, R. (1985). Emotion and affect. In J. E. Birren and K. W. Schaie (Eds.), *Handbook of the psychology of aging* (2<sup>nd</sup> ed.). New York: Van Nostrand Reinhold.
- Sered, S., & Abramovitch, H. (1992). Pregnant dreaming: Search for a typology of a proposed dream genre. *Social Science & Medicine*, 34(12), 1405-1411.
- Sirois-Berliss, M., & De Koninck, J. (1982). Menstrual stress and dreams: Adaptation or interference. *Psychiatric Journal of the University of Ottawa*, 7(2), 77-86.
- Smith, B. G. (2013). *Women's studies: The basics*. New York: Routledge.
- St-Onge, M., Lortie-Lussier, M., Mercier, P., Grenier, J., & De Koninck, J. (2005). Emotions in the Diary and REM Dreams of Young and Late Adulthood Women and Their Relation to Life Satisfaction. *Dreaming*, 15(2), 116-128.
- Szmigielska, B. & Holda, M. (2007). Students' views on the role of dreams in human life. *Dreaming*, 17, 152-158.
- Victor, C., Scambler, S., Bond, J., & Bowling, A. (2000). Being alone in later life: Loneliness, social isolation and living alone. *Reviews in Clinical Gerontology*, 10(4), 407-417.
- Van de Castle, R. L. (1994). *Our dreaming mind*. New York: Ballantine Books.
- Von Sydow, K. (1992). Eine Untersuchung zur weiblichen Sexualität im mittleren und höheren Erwachsenenalter. *Zeitschrift für Gerontologie*, 25, 105-112.
- Waterman, D. (1991). Aging and memory for dreams. *Perceptual and motor skills*, 73(2), 355-365.
- Wiebe, S. T., Lamarche, L. J., Sabourin, C., Lortie-Lussier, M., & De Koninck, J. (2007). The dreams of women with and without severe emotional behavioral premenstrual symptoms. *Dreaming*, 17(4), 199-207.

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**Dream Content of Males from Adolescence to Old Age: An Exploration of Ontogenetic Patterns**

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### **Abstract**

The present study was a first look at the ontogenetic pattern of dream content across the lifespan for men. The participants included 50 Canadian men in each of 5 age groups, from adolescence to old age including 12-17, 18-24, 25-39, 40-64, and 65-85. The last age group included 31 participants, totaling 231 males. One dream per participant was scored by two independent judges using content analysis. Trend analysis was used to determine the lifespan-developmental pattern of the dream content categories. Results demonstrated a predominance of aggressive dream imagery in the adolescent age group in line with social-developmental research. These patterns of dream imagery reflect the waking developmental patterns as proposed by social theories and recognized features of aging. Limitations and suggestions for future research, including the examining of the developmental pattern of gender differences across the lifespan, are discussed.

**Keywords:** dreams, men, development, aging, ontogenesis

## 1. Introduction

In modern scientific dream research there have been a host of hypotheses and theories addressing either dream formation (the sources of dream content) and/or dream function, and debates on their nature and their empirical support are ongoing (De Koninck, 2012; Domhoff, 2011; Hobson, Pace-Schott, & Stickgold, 2000; Malinowski & Horton, 2011; Schredl, 2012; Solms, 2000). One of the major theories addressing the question of dream content is the Continuity Hypothesis which states that dreams reflect waking experiences (Hall & Nordby, 1972). For example, this can be seen in the form of waking day events, desires and concerns, differences between populations, fears, or relationships (Schredl & Hoffmann, 2003). Regarding the dream function, the Mastery Hypothesis (for example, Breger, 1967) proposes that dreams allow the solving of contemporary problems including emotional processing. The Compensatory Theory, first proposed by Jung (1933), postulates that dreams compensate for conscious mental states and personality traits neglected during wakefulness (Dallett, 1973). Recent formulations of the theories mentioned are reviewed by De Koninck (2012).

Amongst the more recent theories, the Threat Simulation Theory focuses more on waking events and states that dreaming serves the function of simulating threatening situations in order to improve threat-avoidance skills (Revonsuo, 2000). The more recent Social Simulation Theory, proposed by Revonsuo, Tuominen, and Valli (2015), posits that dreaming is a simulation mechanism specialized in practicing and improving social and interaction skills. However, since none of the theories mentioned specifically address the patterns of the development of dream content with age, only speculations can be formulated. For example, according to the Continuity Hypothesis, changes in waking experience and cognition with age would be transformed and

integrated into the dream content. For the time being, research has attempted to explore the evolution of dreams with age comparing different age groups. Recently, we examined the developmental or ontogenetic pattern in the dream content of women from adolescence to old age (Dale, Lortie-Lussier, & De Koninck, 2015). We are now attempting to use the same framework to examine the dreams of men.

### **1.1 Dream Research with Males**

Dream literature has largely focused on studying women's dreams due to males reporting dreams less frequently, compared to women (Schredl, Nürnberg, & Weiler, 1996; Schredl, Sahin, & Schäfer, 1998). Areas of investigation with male participants have been predominantly related to gender differences in dream content (Domhoff, 1996; Domhoff & Schneider, 2008; Hall, Domhoff, Blick, & Weesner, 1982; Hall & Van de Castle, 1966; Krippner & Rubenstein, 1990; Krippner & Weinhold, 2002; Schredl, Ciric, Bishop, Gölit, & Buschtöns, 2003; Schredl & Piel, 2003) with aggression as the major distinction (Domhoff & Schneider, 2008; Krippner & Weinhold, 2001, 2002; Schredl & Piel, 2005). Compared to females, male university students had more negative attitudes towards dreams, lower dream recall frequency (Schredl & Piel, 2003; Schredl & Reinhard, 2008) and shorter and less detailed dream reports (Spanos, Stam, Radtke, & Nightingale, 1980; Wolcott & Strapp, 2002). Additionally, males believed less in the ability of dreams to influence behaviour (Szmigielska & Holda, 2007) and in dream control (Boerger, 2009). Other areas of investigation with males include the impact of family and occupational roles (Lortie-Lussier, Simond, Rinfret, & De Koninck, 1992), veterans and PTSD (Esposito, Benitez, Barza, & Mellman, 1999; Schreuder, Kleijn, & Rooijmans, 2000), combat arms soldiers and dream interpretations (Dale & DeCicco, 2013; Dale, DeCicco, & Miller, 2013; Dale, DeCicco, Miller, & Tavakoli, 2015), expectant fathers (Zayas, 1988), and males in small,

preliterate societies (Domhoff, 1996). The present study will focus on the main dream categories of the Hall and Van de Castle (1966) system including characters, activities, interactions, and emotions in Canadian males in order to make general comparisons to developmental trends and research on aging.

## **1.2 Characters**

Currently, research examining age differences (for example, comparing adolescents to adults) in the dreams of males is understudied, especially in relation to dream characters. The transition from childhood to adolescence involves cognitive maturation and developmental changes in dreaming including more complex narratives (Foulkes, 1982). Longitudinal investigations analyzed REM dreams with adolescents at three age levels 9–11, 11–13, and 13–15 and observed an increase in female characters in joint sex peer groups for the REM and home dreams for boys (Strauch, 2005; Strauch & Lederbogen, 1999). However, there have not been any documented age differences in the number of total dream characters for males after young adulthood. Stability in the number of dream characters was found in Waterman's (1991) study with males between 45 and 80 years old and also for both the home and REM dreams in an exclusively male sample between 27 and 64 years old (Zepelin, 1980). Therefore, the number of dream characters does not seem to be affected by the aging process after young adulthood, unlike other categories.

## **1.3 Activities**

Currently, investigations of age related changes in dream activities are inconclusive. Support for a decline in dream activities with age in early life was noted by Dale, Wong, and De Koninck (2014) who reported more total activities in adolescent dreams compared to young

adults for Canadians, collapsing genders. Interestingly, studies have demonstrated that activities in dreams persist into old age, as was observed in the dreams of a group of non-institutionalized elderly persons with an average age of 69 (Altshuler, Barad, & Goldfarb, 1963). The elderly participants who were leading active and self-sufficient lives reported both elaborate and active dreams relating to daily events. An ontogenetic increase in dream activities has been documented in studies with exclusively women (Brenneis, 1975; Lortie-Lussier, Côté, & Vachon, 2000). However, an evolutionary gender difference emerges for this category, as dream activities are documented to remain stable for males as was reported in a study with exclusively American males by Zepelin (1980), and with Dutch participants by Watermann (1991).

#### **1.4 Interactions**

Based upon Hall and Van de Castle' (1966) scoring system, interactions in the study of content of dreams consists of three different kinds: aggressive, friendly, and sexual. Research demonstrates a decline in aggressive dream interactions, occurring early in life. For example, preadolescents (10–11) have a higher percentage of dreams with physical aggression and are more often the victims (Saline, 1999; Strauch & Lederbogen, 1999) compared to adolescents (Crugnola, Maglioni, Carin, Martini, & Giudici, 2008). Additionally, preadolescents have a high aggression per characters (A/C) index which decreases in adolescence and again in young adulthood (Avila-White, Schneider, & Domhoff, 1999). Furthermore, Hall and Domhoff (1963) noted a decrease in aggression after the age of 30 (Domhoff, 1996).

Subsequently, Waterman (1991) reported that in a Dutch sample this decline occurred later, after the age of 45. Zepelin (1980) also observed a decrease in aggression for both REM and home dreams for 58 American males ranging from 27 to 64 years old. However, Kramer, Winget, and

Whitman (1971) observed less aggression in 35–49 year olds in a study of four age groups from young adulthood to old age (21–34, 35–49, 50–64, and 65 and over).

In contrast to aggression, the literature on age differences in friendliness are generally mixed. The percentage of dreams during REM with at least one friendly interaction remained stable in a longitudinal study of Swiss boys from age 9 until 15 (Strauch, 2005). When compared to adult males, Crugnola et al. (2008) reported that the most recent dream reports from preadolescent males were less likely to contain at least one friendly interaction for an Italian sample. Since both of these studies used the Hall and Van de Castle (1966) scales for analyzing dream reports, the discrepancy in the findings may be due to the differing methodologies of collecting dream reports in the lab versus the most recent dream collection method. The friendliness per character (F/C) index was documented in the past to be higher in adolescence and young adulthood (13–24) compared to children (2–12) and older adults for Americans (30–80; Hall & Domhoff, 1964). Interestingly, a lower F/C index was reported for preadolescents (ages 12–13; Avila-White et al., 1999) and a higher F/C index was reported for adolescents (ages 13–18; Domhoff, 1996), compared to college-aged males. The overlapping age ranges in these studies make the findings difficult to compare. Furthermore, similar to aggression, Waterman (1991) found large reductions in friendliness after the age of 45. Zepelin's (1980) investigations, however, did not support this finding as friendly interactions remained stable in American males from 27 to 64, presenting mixed findings where further investigation is warranted.

Sexual dream interactions present a contrasting developmental pattern, as they tend to remain stable over the lifespan. A paucity of information exists in this area. However, studies demonstrate that sexual dream imagery is present in adulthood, comprising approximately 8% of every day dream reports (Zadra, 2007) and persists into old age (Brenneis, 1975; Stramba-

Badiale, Ceretti, & Forni, 1979). Age related differences in sexual dream interactions with men have yet to be examined as research has focused on other areas of interest including sex dreams, wet dreams and nocturnal emissions (Yu & Fu, 2011), and the sexual dreams of males in an old-age care facility, which were characterized by failure, anxiety, and a lack of mastery (Barad, Altshuler, & Goldfarb, 1961).

### **1.5 Emotions**

Limited studies have explored age related differences in emotions, with very few including male participants. Research in this area has largely focused on changes in emotional dream content with younger and older women (Brenneis, 1975; Lortie-Lussier et al., 2000). In addition, dream studies with adolescents have not had a large focus on dream emotions as opposed to other variables of dream content. Foulkes (1982) suggested that the development that occurs in children's dreams as they transition from childhood to adolescence, reflects cognitive emotional development. Children's dreams are emotionally neutral and become more complex as the child grows and has more emotional experiences. Investigations with an Italian sample by Zanasi, De Persis, Caporali, and Siracusano (2005) explored the relation between dream reports and age in young ( $m = 20$ ) and older ( $m = 75$ ) Italian participants and reported more explicit statements of emotional states in the younger adults. Furthermore, Waterman (1991) noted a reduction in dream emotions for men and women after the age of 45. To make general comparisons with dream content, it is important to discuss developmental and aging research on the lives of men.

## 1.6 Brain Imaging and Social Interactions Research of Waking Life

Research in the field of neuroscience has noted neurobiological differences in the brains of adolescents compared to younger and older age groups. Due to immature prefrontal circuitry, there is an imbalance in the functioning of brain regions. More specifically, adolescent behaviour is influenced more by the limbic region of the brain, responsible for emotions, than the prefrontal region, responsible for self-control (Somerville & Casey, 2010). In children, these regions have not yet matured while in adults the prefrontal regions exercise a control on the limbic system. (Casey, Jones, & Hare, 2008). Adolescents tend to respond to situations more emotionally, as opposed to with rational control (Baird et al., 1999), proper emotional regulation during sensation seeking behaviour, or emotionally charged situations, is awaiting development (Vidal, Mills, Pang, & Taylor, 2012).

The literature suggests that these structural and functional brain changes may be a factor in the differences in executive and social behaviour between adolescents and adults (Blakemore, 2008; Yurgelun-Todd, 2007). In comparison to adults, adolescents report more emotions (Csikszentmihalyi & Larson, 1984; Larson & Ham, 1993; Larson & Richards, 1994) and have an inclination towards seeking incentives (Somerville, Hare, & Casey, 2011) and risk taking (Galvan, Hare, Voss, Glover, & Casey, 2007). Furthermore, some adolescents (especially males) impulsively react to threatening cues and approach rather than retreat from potential threats (Dreyfuss et al., 2014). This lack of self-control and emotional regulation might explain their immature, aggressive, and emotionally driven behaviour, especially for males (Dreyfuss et al., 2014). These retaliatory aggressive acts were found to peak at the onset of puberty and then decline through the late stages of adolescence and into adulthood (Cairns, Cairns, Necerkman, Ferguson, & Gariepy, 1989; Loeber, 1982).

With respect to adulthood, aging involves engaging in less social interactions (Carstensen, 1992), a decline in number of friendships (Roberts & Newton, 1987), and a smaller average social network size (Victor, Scambler, Bond, & Bowling, 2000). However, older adults become increasingly selective with age and invest greater resources in emotionally meaningful goals (Carstensen, 1992) and relationships have been characterized as more satisfying and fulfilling (Birditt & Fingerman, 2003; Lansford, Sherman, & Antonucci, 1998). Older adults also tend to have more positive perceptions of social support (Field & Minkler, 1988; Schnittker, 2007), fewer interpersonal conflicts and stressors (Almeida & Horn, 2004).

Furthermore, Blanchard-Fields and Irion (1988) noted that compared to young adults, older adults blame people less, have a greater capacity for altruism, and express less hostility. Additionally, there was a positive correlation with the big five personality factor of agreeableness (traits such as consideration and kindness) with age (Donnellan & Lucas, 2008). Older adults tend to report experiencing more positive emotions and less intense negative emotions (Charles & Piazza, 2007) and have more emotion-focused coping strategies (Blanchard-Fields & Irion, 1988). Furthermore, Erickson's (1963) generativity hypothesis suggests that aging involves a more active involvement in life roles and the community as opposed to stagnation and isolation. These observations further suggest the presence of marked developmental trends in the life of males that warrants the exploration of their expression in dreams. It should be noted that the samples from the various dream research studies reviewed above come from different cultures and national origins and they did not take this factor into consideration in their analyses. Therefore, we are not in a position to attempt to take this cultural variable into account in the present study.

## 1.8 Purpose

Currently, a limited amount of literature exists on age differences in the dreams of male populations. The majority of these studies have included male and female participants with differing methodologies and age ranges (Foulkes, 1982; Hall & Domhoff, 1963, 1964; Kramer et al., 1971; Strauch, 2005; Strauch & Lederbogen, 1999; Waterman, 1991). Of these studies, only two from the 1960s included adolescent participants (in comparison to middle and late adulthood), and only examined aggression and friendliness (Hall & Domhoff, 1963, 1964). Furthermore, the adolescent participants were grouped together with young adults with an age range of 12–24 years (Hall & Domhoff, 1963, 1964). Interestingly, there has only been one study by Zepelin (1980), which investigated age related differences in dream content exclusively for males (ages 27–64).

The purpose and design of this study was to further document the developmental pattern of dream elements across a broad range of age groups, and make general comparisons with both previous dream research and waking social-psychological developmental patterns for males. As in our previous report (Dale et al., 2015), the ontogenetic framework in this study alludes to a broadly used term in developmental psychology referring to age-related periods of development (LaBarba, 2013) including adolescence, early adulthood, middle adulthood, old age or late adulthood (Hewstone, Fincham, & Foster, 2005). This paper attempts to expand on both the methodology (with the use of a dream diary and daily logs) and age ranges used previously and to go beyond the above mentioned limitations. In addition, in order to maximize differentiation of development stages and to allow for future comparison with ontogenetic trends in female dreams reported earlier (Dale et al., 2015), the present study separated adolescents from young

adults and divided its sample into five age groups (12–17, 18–24, 25–39, 40–64, and 65–85) and used the same methodology.

## 1.9 Hypotheses

It was hypothesized that the ontogenetic patterns of dream content categories for males would remain consistent with previous research on age differences in male dreams. In addition, ontogenetic dream patterns were also predicted to reflect, generally, the developmental patterns as offered by social-psychological and, neurobiological research, although this could not be directly tested. Where both social-psychological and dream research on age differences for males was insufficient to make a prediction, exploratory analyses were used. More specifically, the following predictions were formulated.

1. It was predicted that the number of total characters per dream would remain stable (with no significant trends) across the lifespan. The total number of male, female, and known characters per dream were all exploratory variables.
2. It was predicted that for the number of total activities per dream there would be a quadratic trend. More specifically, there would be a decrease from adolescence to young adulthood and then remain stable, until old age. The total number of dreamer involved activities per dream was an exploratory variable.
3. It was predicted that for the total number of aggressive interactions per dream, there would be a linear decrease from adolescence to old age. The total number of aggressive interactions with the dreamer as the aggressor per dream and the total number of aggressive interactions with the dreamer as the victim per dream were exploratory variables. However, the total number of aggressive interactions with the dreamer as the victim was expected to peak in adolescence.

4. It was predicted that the total number of friendly interactions per dream would remain stable (with no significant trends), as found with a sample of exclusively males. For the friendliness/character index, it was predicted that there would be a linear decrease from adolescence to old age.
5. It was predicted that the number of total sexual interactions per dream would remain stable (with no significant trends) from adolescence to old age.

It was predicted that there would be a linear decrease, from adolescence to old age, for the number of total emotions and for the number of negative emotions per dream.

## **2. Methods**

### **2.1 Participants**

The participants in the current study were 231 Canadian males divided into 5 age groups including adolescence, 12–17 ( $m = 15.62$ ); early adulthood, 18–24 ( $m = 20.5$ ) and 25–39 ( $m = 28.17$ ); middle adulthood, 40–64 ( $m = 51.47$ ); and old age or late adulthood, 65–85 ( $m = 70.5$ ) years old, as defined by developmental periods (Hewstone et al., 2005). Each group contained 50 men (Anglophone and Francophone) with the exception of the oldest group which only contained 31 males due to difficulty collecting dreams from males in this age category. Research has noted a difference in achievement motivation in dreams between Anglophones and Francophones (De Koninck & Sirois Berlis, 1978). However, a more recent study on cultural differences in dreams conducted *t*-tests on all the main Hall and Van de Castle categories comparing Anglophones and Francophones (Dale, Lortie Lussier, Wong, & De Koninck, 2016). There were no significant differences on any of the scales for characters, interactions, activities, success, failure, and emotions. Therefore for this study, as in the previous one (Dale et al., 2016), the sample combined Francophones and Anglophones. The participants were recruited using

many different methods including contact with school boards, student participation at the University of Ottawa, public presentations, media invitations, conferences, and word of mouth by the researchers.

## **2.2 Measures and Procedure**

A dream package including information on basic demographics dream frequency, and sleep quality was completed by each participant. Further, they recorded the day's events and dreams for ten days or until two dreams were reported using the questionnaire and diary format used in previous studies in the laboratory at the University of Ottawa (Dale et al., 2015; Grenier et al., 2005; St. Onge et al., 2005). The first dream reported in the diary was retained for coding as a number of participants reported one dream while others reported up to four. Dream reports containing a minimum of 50 words and a maximum of 300 words were scored by two independent judges using Hall and Van de Castle's (1966) method of content analysis, with high inter-rater reliability of over 80 percent agreement. Due to the correlation of many of the dream content variables with dream report length, all variables were controlled for this by dividing total frequencies by word count, which was consistent with the study with women (Dale et al., 2015).

The main Hall and Van de Castle (1966) categories included in the analyses were characters; activities; aggressive, friendly, and sexual interactions; and emotions. More specifically for characters, total characters, male characters, female characters, and familiar characters were scored. For activities, total number of dream activities were scored. For interactions total aggressive interactions, dreamer as aggressor, dreamer as victim, total friendly interactions, friendliness per character (F/C), and total sexual interactions were scored. For emotions there were two categories, one for total emotions and one for total negative emotions.

With regard to emotions, it is important to note that contrary to individuals' waking experiences with numerous different emotions, Hall and Van de Castle (1966) scales offer scoring of only five separate emotions for psychometric reasons (Domhoff, 1996). Happiness is the only positive emotion and the negative emotions are Sadness, Anger, Confusion, and Apprehension/Fear. In addition, Studies using Hall and Van de Castle (1966) scales and external raters have consistently found more negative than positive emotions (Domhoff, 1996; Hall & Van de Castle, 1966; Hall et al., 1982; Schredl & Doll, 1998), it has been suggested this may be due to bias in judge ratings or an underestimation of positive emotions (Schredl & Doll, 1998). In contrast, there are mixed findings from self-reported emotions with some findings of a predominance of positive emotions (Fosse, Stickgold, & Hobson, 2001; Sikka, Valli, Virta, & Revonsuo, 2014), more balanced positive and negative emotions (Schredl & Doll, 1998), while others found a predominance of negative emotions (Roussy, Raymond, & De Koninck, 2000).

All variables were entered into a program called dreamSAT that was developed for computer coding of Hall and Van de Castle's (1966) content analysis method and is available on Domhoff's dream bank website (Schneider & Domhoff, 2009).

### **3. Results**

Trend analysis was used to test for ontogenetic patterns in the dreams of men for the various Hall and Van de Castle (1966) dream content categories. The mean word count for the dreams per each age group were: 12-17 ( $m = 97.1$  words), 18-24 ( $m = 156.86$  words), 25-39 ( $m = 137.24$ ), 40-64 ( $m = 135.5$  words), and 65-85 ( $m = 102.39$  words). A family wise post hoc correction was used for any exploratory variables for each main dream category.

### 3.1 Characters

There were no significant effects of age or trends in the data for Total number of characters (See Figure 1, graph a;  $F(4,226) = .74, p = .566$ ). For the exploratory variables for characters (Males, Females, and Familiar), the corrected alpha after the family wise post-hoc correction was .017. There were no significant effects of age or trends in the data for Male characters (See Figure 1, graph b;  $F(4, 226) = .933, p = .446$ ) and Female characters (see Figure 1, graph c;  $F(4, 226) = .752, p = .558$ ). For Familiar characters, there was a significant fourth order trend (See Figure 1, graph d;  $F(1, 226) = 20.24, p < .0001$ ). Familiar characters was lowest at the 18-24 and 40-64 age groups. See Figure 1 for the pattern of the frequency of characters.

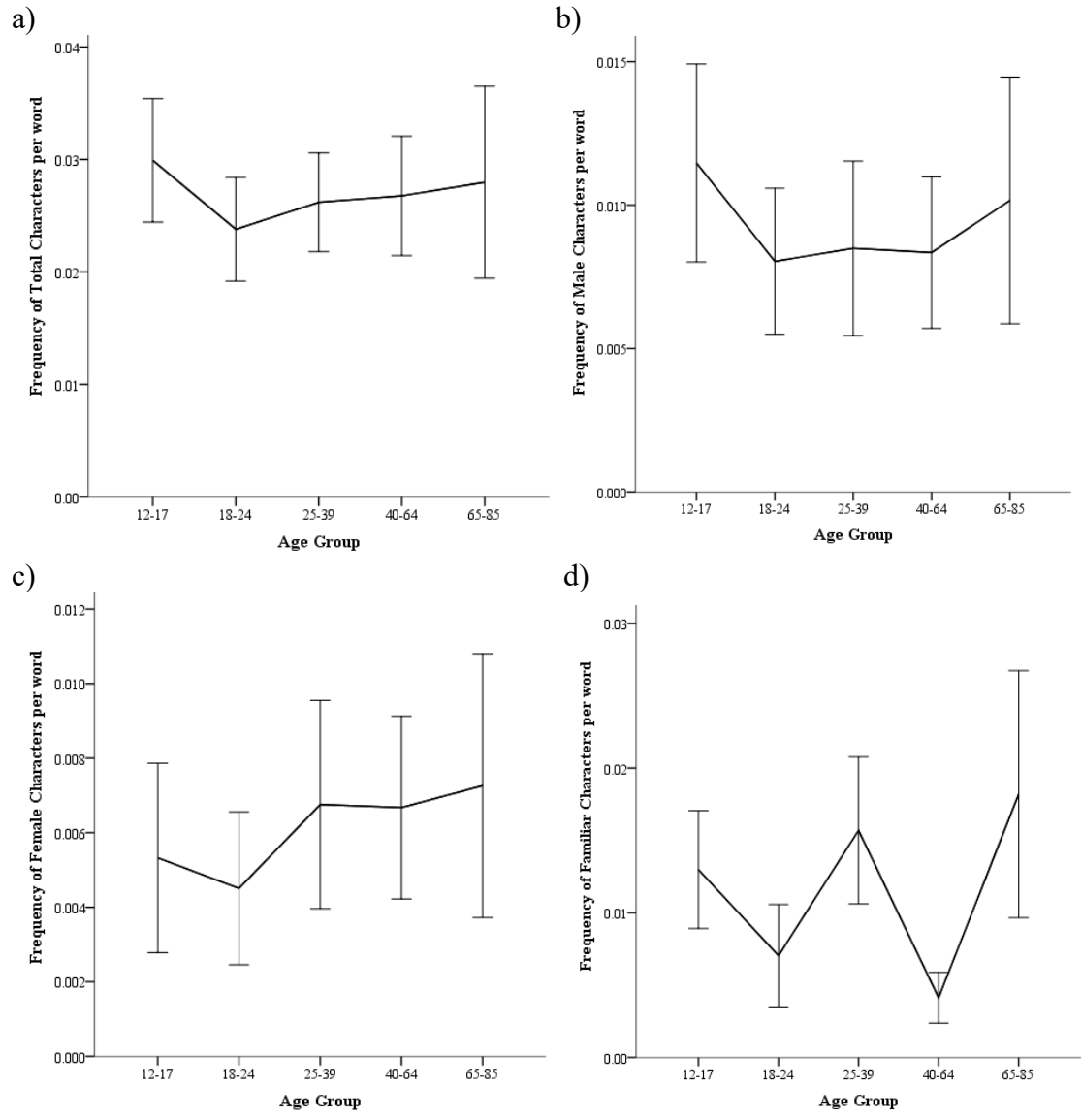


Figure 1. Pattern of characters in the dreams of men across the lifespan. Significant fourth order trend for Familiar characters in graph d ( $F(1, 226) = 5.23, p = .023$ ).

Further analyses did not find a significant ontogenetic trend in the male to female ratio of dream characters, equal to the total number of males divided by the total number of males and females, reported by Hall (1984) when examining gender differences. The male to female ratio for characters in dreams was fairly even and remained stable across the lifespan.

### 3.2 Activities

For Total activities there was a significant quadratic trend ( $F(1, 226) = 4.40, p = .037$ ). Total activities was highest at 12-17, decreased from 12-17 to 18-24 and increased slightly until old age (65-85). There were no significant trends in the data for Total dreamer involved activities ( $F(4, 226) = 1.103, p = .356$ ). See Figure 2 for the pattern of the frequency of activities.

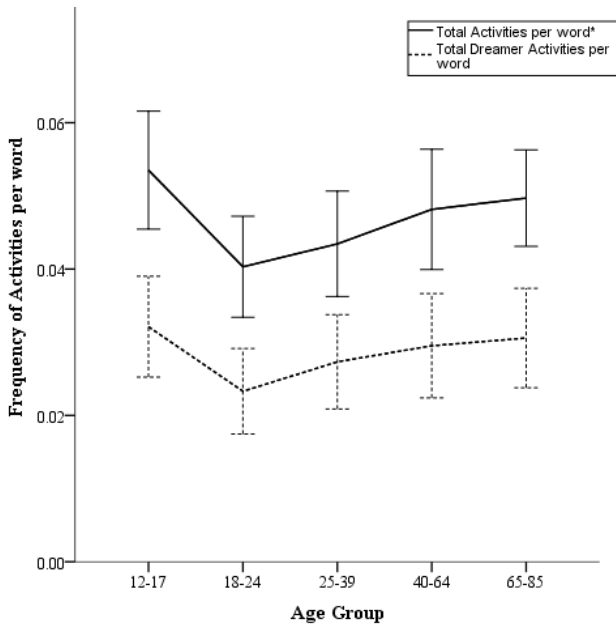


Figure 2. Pattern of activities in the dreams of men across the lifespan. Significant quadratic trend for total activities ( $F(1, 226) = 4.40, p = .037$ ).

### 3.3 Aggression

For total aggressive interactions there was a significant linear ( $F(1, 370) = 4.93, p = .027$ ) and quadratic ( $F(1, 370) = 6.62, p = .011$ ) trend. Total aggressive interactions decreased from 12-17 to 25-39 and then increased slightly until old age. For the exploratory variables Dreamer as Victim and Dreamer as Aggressor, the corrected alpha after the family wise post hoc correction was .025. There was a significant quadratic trend ( $F(1, 370) = 6.64, p = .011$ ) for

Dreamer as victim which also decreased from 12-17 to 25-29, increasing until 40-64 and then remained stable until old age. See Figure 3 for the pattern of the frequency of aggression.

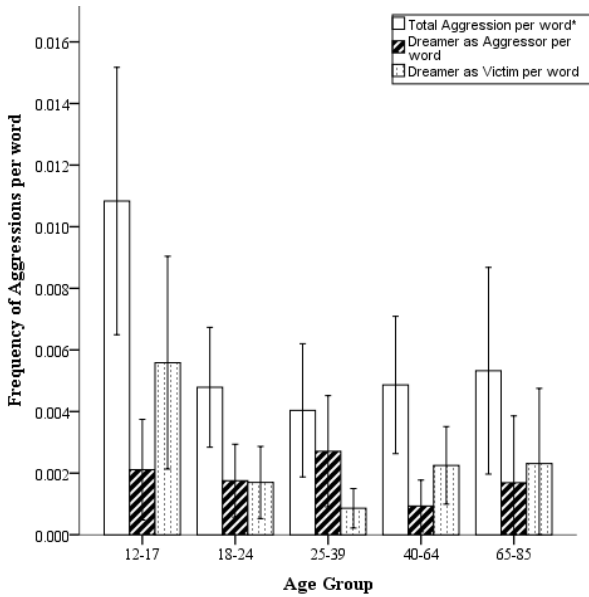


Figure 3. Pattern of aggression in the dreams of men across the lifespan. Significant linear ( $F(1, 226) = 4.93, p = .027$ ) and quadratic ( $F(1, 226) = 6.62, p = .011$ ) trends for Total Aggression and significant quadratic trend for Dreamer as victim ( $F(1, 226) = 6.64, p = .011$ ).

### 3.4 Friendliness

There were no significant patterns or trends in the data for Total friendliness ( $F(4, 226) = .867, p = .484$ ). There was a significant linear trend for the F/C index ( $F(1, 226) = 4.86, p = .029$ ) as it increased from 18 to 24 until old age. See Figure 4 for the pattern of the frequency of friendliness.

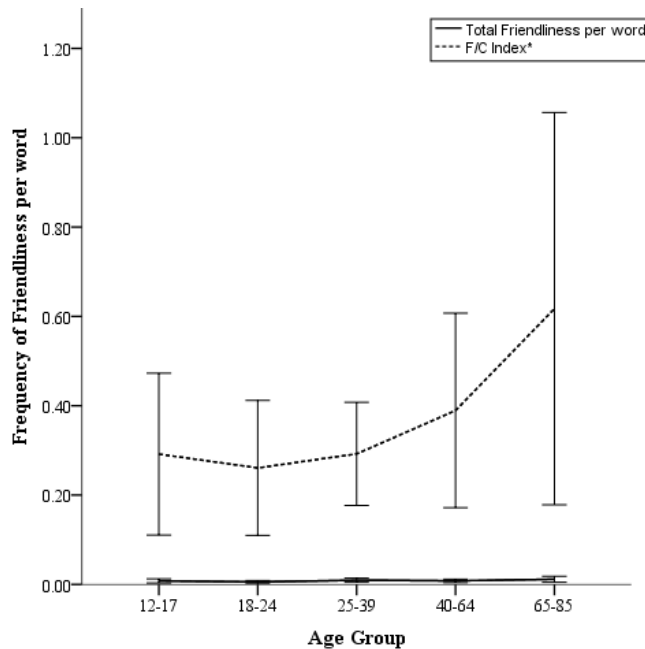


Figure 4. Pattern of friendliness in the dreams of men across the lifespan. Significant linear trend for the F/C index ( $F(1, 226) = 4.86, p = .029$ ).

### 3.5 Sexual Interactions

There was no significant effect of age for sexual interactions ( $F(4, 226) = .87, p = .483$ ).

In addition, there were no sexual interactions reported for the two older age groups (40-64 and 65-85).

### 3.6 Emotions

There were no significant effects of age or trends in the data for Total emotions ( $F(4, 226) = .69, p = .602$ ) or Total negative emotions ( $F(4, 226) = .59, p = .669$ ).

### 3.7 Further Analyses: Daily Logs

Daily logs were analyzed and are presented in Table 1 to conduct further exploratory analyses of the relationship between dream content and reported waking experiences. The daily log for the day preceding the first reported dream was analyzed for each participant to remain

consistent. Twelve participants that did not report a daily log for the day preceding the first dream were removed from the analyses which resulted in a final sample of 219 daily logs. Daily logs were analyzed using the same Hall and Van de Castle (1966) scales. Table 1 presents the total and mean frequencies for the main variables used in the current study and for total interactions (combining aggression, friendliness, and sexuality).

Table 1

*Frequency of main Hall and Van de Castle (1966) content categories for dream reports and daily logs by age group*

|                    | Age Categories |           |         |           |         |           |         |           |         |           |
|--------------------|----------------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
|                    | 12-17          |           | 18-24   |           | 25-39   |           | 40-64   |           | 65-85   |           |
|                    | Total          | Mean      | Total   | Mean      | Total   | Mean      | Total   | Mean      | Total   | Mean      |
| Characters         | 128/38         | 2.56/0.83 | 157/74  | 3.14/1.54 | 158/80  | 3.16/1.74 | 174/68  | 3.48/1.39 | 78/39   | 2.52/1.3  |
| Aggression         | 47/0           | .94/0     | 32/6    | .64/.13   | 33/8    | .66/.17   | 28/2    | .56/.04   | 17/1    | .55/.03   |
| Friendliness       | 17/7           | .34/.15   | 21/14   | .42/.29   | 23/15   | .46/.33   | 28/15   | .56/.30   | 17/10   | .55/.33   |
| Sexuality          | 1/1            | .02/.02   | 4/1     | .08/.02   | 4/2     | .08/.04   | 0/0     | 0/0       | 0/0     | 0/0       |
| Total interactions | 65/8           | 1.3/.17   | 57/21   | 1.14/.44  | 60/25   | 1.2/.54   | 56/17   | 1.12/.35  | 34/11   | 1.10/.37  |
| Activities         | 259/198        | 5.18/4.30 | 285/287 | 5.7/5.98  | 275/266 | 5.5/5.78  | 297/221 | 5.94/4.51 | 151/137 | 4.87/4.57 |
| Emotions           | 37/6           | .74/.13   | 43/12   | .86/.25   | 51/14   | 1.02/.30  | 41/6    | .82/.12   | 23/6    | .74/.2    |

*Note.* First number in the table refers to the dream reports and the second refers to the daily logs (*dream / daily logs*)

It can be seen that there were very few total interactions in the daily logs in relation to the dream reports. *T*-tests confirmed that there were significantly fewer Total Interactions in the daily logs ( $M = 0.36$ ,  $SD = 0.74$ ) compared to the dream reports ( $M = 1.78$ ,  $SD = 1.24$ ),  $t(230) = 8.80$ ,  $p = 0.001$ . This remained significant when also controlling for word length,  $t(230) = 2.60$ ,  $p = 0.01$ . It was concluded that very few mentioned interactions in the

daily logs (for example, approximately 17 Aggressive interactions in the whole sample), preclude the comparison to the dream reports.

#### 4. Discussion

In agreement with the first prediction, total characters remained stable across age groups, as previously observed by Waterman (1991) and Zepelin (1980). Additionally, there was a fourth order trend for familiar characters, with peaks at adolescence, late twenties and thirties, and the elderly. As this was an exploratory variable, it requires further research to elucidate the implications of this interesting pattern. Furthermore, the ratio of male to female characters also remained stable across age groups. These findings imply that gender representation in dream characters remains relatively stable across the lifespan and is not influenced by the aging process after young adulthood. The observation that total characters remained stable contrasts social-psychological research which reported that aging involves a decline in the size of the social network (Victor et al., 2000), although they included both male and female participants and so there could have been a different pattern exclusively for males.

For activities, the second prediction was supported. Total activities did decrease from adolescence to young adulthood, and then showed a slight linear increase from young adulthood to old age as observed previously (Zepelin, 1980). This ontogenetic trend also supports the notion that activities in dreams still persist in the elderly (Altshuler et al., 1963). Furthermore, the linear increase from young adulthood to old age for activities supports the generativity hypothesis with more active involvement in life roles (Erikson, 1963).

The third prediction, that there would be a linear decrease in aggression with age, was supported. However, a quadratic trend was also significant and better fit the data. This

speculatively considered observation reflects the neurobiological differences in adolescence and the propensity towards aggressive, risk taking, and emotionally driven behaviour in comparison to adulthood. Furthermore, the frequency of aggression increased slightly from 25 to 39 years until old age. This finding contrasts aging research which suggests that with age comes less hostility and interpersonal conflict (Blanchard-Fields & Irion, 1988).

In line with the fourth prediction, total friendliness remained stable, supporting observations by Zepelin (1980). However, there was an unexpected increase, from adolescence to old age, for the friendliness/characters index, contrasting our prediction and also observations by Hall and Domhoff (1964). It is important to note that only the latter study documented a decline in friendliness. Furthermore, the increase in the F/C index generally reflect the socioemotional selectivity theory where there seems to be more investment in selective meaningful relationships (Carstensen, 1992). We speculate that the F/C index also reflects developmental trends, as aging involves a tendency to blame people less, a greater capacity for altruism and, subsequently, more satisfying and fulfilling social interactions. (Lansford et al., 1998). Additionally, more positive perceptions of social support (Field & Minkler, 1988; Schnittker, 2007) and more agreeableness have been documented with aging (Donnellan & Lucas, 2008).

Sexual interactions were also found to remain stable with age, supporting the fifth prediction. However one interesting observation was the absence of sexual content in the dreams of the last two age groups (40–64 and 65–85). It is likely that this finding is related to references to sexual content not being very common (Zadra, 2007) and having only one dream per participant. However, it is still surprising that not a single subject reported sexual content in dreams, in these two age groups. In addition, these findings contrast with the dream literature

which suggests that sexual content in dreams can persist into old age for males and females (Brenneis, 1975; Stramba-Badiale et al., 1979). Zadra (2007) found that sex dreams make up 8% of dream content, for both males and females in middle adulthood. The current observation suggests that sexual dream content decreases in old age for males.

With regards to emotions, the sixth prediction, that there would be a linear decrease with age, for total and negative emotions, was not supported. The ontogenetic pattern for emotions also seem to contrast aging research, as studies have documented heightened levels of emotions in adolescence, especially for males (Csikszentmihalyi & Larson, 1984; Dreyfuss et al., 2014; Larson & Ham, 1993; Larson & Richards, 1994; Somerville & Casey, 2010). As well, the observation of improved emotional regulation (Blanchard-Fields & Irion, 1988), increases in positive emotions, and less intensive negative emotions with aging (Charles & Piazza, 2007), is also in contrast with the observed categories of dream emotions. However, it should be noted again that the majority of the social-psychological studies of development lump together male and female participants. Thomas (2003) conducted sociological research on men's emotions and reported that men's anger is often misunderstood. Our protocol used the dreamSAT program, which does not allow for differentiating between the five specific emotions, but simply between positive and negative ones. It would be interesting to examine, for example, the anger dimension in dreams as this variable is currently understudied in men, in relation to age, in both dreams and waking development.

#### **4.1 Limitations**

The most obvious limitation in the current study was the smaller sample size of only 31 males in the last age group, as this sample was notoriously difficult to collect. Future work should investigate new techniques to encourage participation in dream research studies with

elderly males. Additionally, since some of the participants reported only one dream, this limited the range of content material that was scored. For future analyses, scoring more than one dream per participant would provide a more accurate portrayal of men's dream content by using a series of dreams. Furthermore, the last age category was broadly defined and this is a limitation due to the many changes that take place between 65 and 85 years old that could be reflected in dream content. Another limitation to the current study, is that the participants were not matched for education or social status as a larger sample would be required to control for these dimensions. Also of note, is that the current study investigated the standard Hall and Van de Castle (1966) categories and did not explore thematic content in dreams or specific categories of emotions. Exploring these variables would have provided more substance in the investigation of ontogenesis in male dreams. Finally, the question arises as to how these findings would fit with theories on waking life influences on dream content (Dallett, 1973; Hall & Nordby, 1972; Revonsuo, 2000; Revonsuo et al., 2015; Schredl & Hoffman, 2003). Future studies should include specific daytime measures that go beyond the daily log measures used here. For example, in order to test the continuity hypothesis, one would need to take measures of various dimensions of waking such as personality traits, waking concerns, and daily activities across all age groups. To test the Threat Simulation Theory for Canadian males, measures of various types of waking threats would be necessary.

## **4.2 Conclusion and Future Research**

The present study's first look at the ontogenetic patterns of dream content for males raises interesting questions. Overall, ontogenetic patterns observed are consistent with dream research conducted on males and generally correspond to both social-psychological research findings on waking life. However some observations are of interest. For example, the fourth

order trend in the distribution of familiar characters, the slight increase in aggression in older adults, and the absence of sexual interactions in the older age groups. These variables require further exploration in dreaming experience and potentially their waking counterpart. Finally, it will be interesting to examine gender differences in all of these age groups by systematically comparing the current results with those of our comparable study of the ontogenetic trends in female dreams (Dale et al., 2015). This will provide the foundation for exploring the evolution and developmental patterns of gender differences from adolescence to old age in both waking and dreaming.

## 5. References

- Almeida, D. M., & Horn, M. C. (2004). *How healthy are we? A national study of well-being at midlife*. Chicago, Illinois: University of Chicago Press.
- Altshuler, K. Z., Barad, M., & Goldfarb, A. I. (1963). A survey of dreams in the aged: Part II: Noninstitutionalized subjects. *Archives of General Psychiatry*, 8(1), 33-37.
- Avila-White, D., Schneider, A., & Domhoff, G. W. (1999). The most recent dreams of 12–13 year-old boys and girls: A methodological contribution to the study of dream content in teenagers. *Dreaming*, 9(2-3), 163-171.
- Baird, A. A., Gruber, S. A., Fein, D. A., Mass, L. C., Steingard, R. J., Renshaw, P. F., ... & Yurgelun-Todd, D. A. (1999). Functional magnetic resonance imaging of facial affect recognition in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 38(2), 195-199.
- Barad, M., Altshuler, K. Z., & Goldfarb, A. I. (1961). A survey of dreams in aged persons. *Archives of general psychiatry*, 4(4), 419-424.
- Birditt, K. S., & Fingerman, K. L. (2003). Age and gender differences in adults' descriptions of emotional reactions to interpersonal problems. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 58(4), 237-245.
- Blakemore, S. J. (2008). The social brain in adolescence. *Nature Reviews Neuroscience*, 9(4), 267-277
- Blanchard-Fields, F., & Irion, J. C. (1988). The relation between locus of control and coping in two contexts: age as a moderator variable. *Psychology and Aging*, 3(2), 197-203.

- Boerger, E. A. (2009). Associations among boundary structure, gender, and beliefs about control of dreams. *Dreaming*, 19(3), 172-186.
- Breger, L. (1967). The functions of dreams. *Journal of Abnormal Psychology Monograph*, 72, 1-28.
- Brennan, S. & Dauvergne, M. (2011). *Statistiques sur les crimes déclarés par la police au Canada, 2010*, Ottawa (Ontario), Statistique Canada.
- Brenneis, C. B. (1975). Developmental aspects of aging in women: A comparative study of dreams. *Archives of General Psychiatry*, 32(4), 429-435.
- Cairns, R.B., Cairns, B.D., Necerkman, J.J., Ferguson, L.L., & Gariepy, K. (1989). Social networks and aggressive behavior: Peer support or peer rejection. *Developmental Psychology*, 24, 815-823.
- Carstensen, L. L. (1992). Social and emotional patterns in adulthood: support for socioemotional selectivity theory. *Psychology and aging*, 7(3), 331-338.
- Charles, S. T., & Piazza, J. R. (2007). Memories of social interactions: age differences in emotional intensity. *Psychology and Aging*, 22(2), 300-309.
- Casey, B. J., Jones, R. M., & Hare, T. A. (2008). The adolescent brain. *Annals of the New York Academy of Sciences*, 1124(1), 111-126.
- Crugnola, C. R., Maggiolini, A., Caprin, C., Martini, C., & Giudici, F. (2008). Dream content of 10-to 11-year-old preadolescent boys and girls. *Dreaming*, 18(3), 201-216.
- Csikszentmihalyi, M., & Larson, R. (1984). *Being adolescent: Conflict and growth in the teenage years*. New York: Basic Books.
- Dale, A.L. & DeCicco, T.L. (2013). Examining The Storytelling Method with Canadian soldiers. *Imagination, Cognition, and Personality*, 33, 369-383.
- Dale, A.L., DeCicco, T.L., & Miller, N. (2013). Exploring the dreams of Canadian soldier with content analysis. *International Journal of Dream Research*, 6(1), 22-30.
- Dale, A. L., DeCicco, T. L., Miller, N. J., & Tavakoli, P. (2015). Predictive value of the dreams of Canadian soldiers. *Dreaming*, 25(3), 220-231.
- Dale, A., Wong, C., & De Koninck, J. (2014). Gender and age differences in the dreams of adolescents and young adults. *Sleep*, 37, A72.
- Dale, A., Lortie-Lussier, M., De Koninck, J. (2015). Ontogenetic patterns in the dreams of women across the lifespan, *Consciousness and Cognition*, 37, 214-224.

- Dale, A. L., Lortie-Lussier, M., Wong, C., & De Koninck, J. (2016). Dreams of Canadians: Norms, gender differences, and comparison with American norms. *Journal of Cross-Cultural Psychology*, 47 (7), 941-955.
- Dale A., Wong C. and De Koninck J. (2014). Gender and age differences in the dreams of adolescents and young adults, *Sleep* 37, A72.
- Dallett, J. (1973). Theories of dream function. *Psychological Bulletin*, 79(6), 408-416.
- De Koninck, J. (2012). Sleep, dreams, and dreaming. In C. A. Espie & C. M. Morin (Ed.) *The oxford handbook of sleep and sleep disorders* (pp. 150-171). New York, NY: Oxford University Press.
- De Koninck, J., & Sirois-Berliss, M. (1978). Achievement motivation in dreams and during awakening in French-Canadian and English-Canadian students. *Canadian Journal of Behavioural Science*, 10, 329 –338.
- Domhoff, G. W. (2011). Dreams are embodied simulations that dramatize conception and concerns: The continuity hypothesis in empirical, theoretical, and historical context. *International Journal of Dream Research*, 4(2), 50-62.
- Domhoff, G. W. (1996). *Finding meaning in dreams: A quantitative approach*: Springer
- Domhoff, G., & Schneider, A. (2008). Similarities and differences in dream content at the crosscultural, gender, and individual levels. *Consciousness and Cognition*, 17(4), 1257-1265.
- Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the Big Five across the life span: evidence from two national samples. *Psychology and aging*, 23(3), 558-566.
- Dreyfuss, M., Caudle, K., Drysdale, A. T., Johnston, N. E., Cohen, A. O., Somerville, L. H., ... & Casey, B. J. (2014). Teens impulsively react rather than retreat from threat. *Developmental Neuroscience*, 36(3-4), 220-227.
- Erikson, E. H. (1963). *Childhood and Society*. 2d ed. New York, NY: Norton.
- Esposito, K., Benitez, A., Barza, L., & Mellman, T. (1999). Evaluation of dream content in combat-related PTSD. *Journal of Traumatic Stress*, 12(4), 681-687.
- Field, D., & Minkler, M. (1988). Continuity and change in social support between young-old and old-old or very-old age. *Journal of Gerontology*, 43(4), 100-106.
- Fosse, M. J., Stickgold, R. J., & Hobson, J. A. (2001). The mind in REM sleep: Reports of emotional experience. *Sleep*, 24, 947–955.
- Foulkes, D. (1982). *Children's dreams: Longitudinal studies*. New York: John Wiley & Sons.

- Galvan, A., Hare, T., Voss, H., Glover, G., & Casey, B. J. (2007). Risk-taking and the adolescent brain: who is at risk?. *Developmental Science*, 10(2), F8-F14.
- Giambra, L. M., Jung, R. E., & Grodsky, A. (1996). Age changes in dream recall in adulthood. *Dreaming*, 6(1), 17-31.
- Grenier, J., Cappeliez, P., St-Onge, M., Vachon, J., Vinette, S., Roussy, F., & De Koninck, J. (2005). Temporal references in dreams and autobiographical memory. *Memory & Cognition*, 33(2), 280-288.
- Hall, C. S. (1984). "A ubiquitous sex difference in dreams" revisited. *Journal of Personality and Social Psychology*, 46(5), 1109-1117.
- Hall, C., & Domhoff, B. (1963). Aggression in dreams. *International Journal of Social Psychiatry*, 9, 259-267.
- Hall, C., & Domhoff, B. (1964). Friendliness in dreams. *The Journal of Social Psychology*, 62(2), 309-314.
- Hall, C. S., Domhoff, G. W., Blick, K. A., & Weesner, K. E. (1982). The dreams of college men and women in 1950 and 1980: A comparison of dream contents and sex differences. *Sleep*, 5, 188-194.
- 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.
- Hewstone, M., Fincham, F. D., & Foster, J. (2005). *Psychology*. Malden, MA: Blackwell.
- Hobson, J. A., Pace-Schott, E. F., & Stickgold, R. (2000). Dreaming and the brain: toward a cognitive neuroscience of conscious states. *Behavioral and Brain Sciences*, 23(06), 793-842.
- Jung, C. G. (1933). *Modern man in search of a soul*. New York, NY: Harcourt, Brace and World.
- Kramer, M., Winget, C., & Whitman, R. M. (1971). A city dreams: A survey approach to normative dream content. *American Journal of Psychiatry*, 127(10), 1350-1356.
- Krippner, S., & Rubenstein, K. (1990). Gender differences in dream content. *ASD Newsletter*, 7(4).
- Krippner, S., & Weinhold, J. (2002). Gender differences in a content analysis study of 608 dream reports from research participants in the United States. *Social Behaviour and Personality: an International Journal*, 30(4), 399-409.

- Krippner, S., & Weinhold, J. (2001). Gender differences in the content analysis of 240 dream reports from Brazilian participants in dream seminars. *Dreaming*, 11(1), 35.
- LaBarba, R. C. (2013). *Foundations of developmental psychology*. New York, NY: Academic Press.
- Lansford, J. E., Sherman, A. M., & Antonucci, T. C. (1998). Satisfaction with social networks: an examination of socioemotional selectivity theory across cohorts. *Psychology and Aging*, 13(4), 544-552.
- Larson, R., & Ham, M. (1993). Stress and "storm and stress" in early adolescence: The relationship of negative events with dysphoric affect. *Developmental Psychology*, 29(1), 130-140.
- Larson, R. W., & Richards, M. H. (1994). Family emotions: Do young adolescents and their parents experience the same states? *Journal of Research on Adolescence*, 4(4), 567-583.
- Loeber, R. (1982). The stability of antisocial behavior: A review. *Child Development*, 53, 1431-1446.
- Lortie-Lussier, M., Côté, L., & Vachon, J. (2000). The consistency and continuity hypotheses revisited through the dreams of women at two periods of their lives. *Dreaming*, 10(2), 67-76.
- Lortie-Lussier, M., Simond, S., Rinfret, N., & De Koninck, J. (1992). Beyond sex differences: Family and occupational roles' impact on women's and men's dreams. *Sex Roles*, 26(3-4), 79-96.
- Malinowski, J., & Horton, C. L. (2011). Themes of continuity. *International Journal of Dream Research*, 4(2), 86-92.
- Revonsuo, A. (2000). The reinterpretation of dreams: an evolutionary hypothesis of the function of dreaming. *Behavioral and Brain Sciences*, 23, 877-901.
- Revonsuo, A., Tuominen, J., & Valli, K. (2015). *The Avatars in the Machine*. In T. K. Metzinger & J. M. Windt (Eds.), *Open MIND* (pp. 1-28). Frankfurt am Main: MIND Group.
- Roberts, P., & Newton, P. M. (1987). Levinsonian studies of women's adult development. *Psychology and Aging*, 2(2), 154-163.
- Roussy, F., Raymond, I. & De Koninck, J. (2000). Affect in REM dreams: Exploration of a time-of-night effect. *Sleep*, 23, A174-A175.
- Saline, S. (1999). The most recent dreams of children ages 8-11. *Dreaming*, 9(2-3), 173-181.

- Schneider, A. & Domhoff, G.W. (2016). *The quantitative study of dreams* (online). Available from: <http://www.dreamresearch.net/> (Accessed Jan 10, 2014).
- Schnittker, J. (2007). Look (Closely) at All the Lonely People Age and the Social Psychology of Social Support. *Journal of Aging and Health, 19*(4), 659-682.
- Schredl, M. (2012). Continuity in studying the continuity hypothesis of dreaming is needed. *International Journal of Dream Research, 5*(1), 1-8.
- Schredl, M., Ciric, P., Bishop, A., Gölit, E., & Buschtöns, D. (2003). Content analysis of German students' dreams: Comparison to American findings. *Dreaming, 13*(4), 237-243.
- Schredl, M., & Doll, E. (1998). Emotions in diary dreams. *Consciousness and Cognition, 7*(4), 634-646.
- Schredl, M. & Hofmann, F. (2003). Continuity between waking activities and dream activities. *Consciousness and Cognition, 12*, 298-308.
- Schredl, M., Nürnberg, C., & Weiler, S. (1996). Dream recall, attitude toward dreams, and personality. *Personality and Individual Differences, 20*(5), 613-618.
- Schredl, M., & Piel, E. (2005). Gender differences in dreaming: Are they stable over time? *Personality and Individual Differences, 39*(2), 309-316.
- Schredl, M., & Piel, E. (2003). Gender differences in dream recall: data from four representative German samples. *Personality and Individual Differences, 35*(5), 1185-1189.
- Schredl, M., & Reinhard, I. (2008). Gender differences in dream recall: a meta-analysis. *Journal of Sleep Research, 17*(2), 125-131.
- Schredl, M., Sahin, V., & Schäfer, G. (1998). Gender differences in dreams: do they reflect gender differences in waking life?. *Personality and Individual Differences, 25*(3), 433-442.
- Schreuder, B. J., Kleijn, W. C., & Rooijmans, H. G. (2000). Nocturnal re-experiencing more than forty years after war trauma. *Journal of Traumatic Stress, 13*(3), 453-463.
- Sikka, P., Valli, K., Virta, T., & Revonsuo, A. (2014). I know how you felt last night, or do I? Self-and external ratings of emotions in REM sleep dreams. *Consciousness and cognition, 25*, 51-66.
- Solms, M. (2000a). Dreaming and REM sleep are controlled by different brain mechanisms. *Behavioral and Brain Sciences, 23*, 843-850.
- Somerville, L. H. & Casey, B. J. (2010). Developmental neurobiology of cognitive control

- failure to appetitive cues in adolescence. *Journal of Cognitive Neuroscience*, 23, 2123-2134.
- Somerville, L. H., Hare, T., & Casey, B. J. (2011). Frontostriatal maturation predicts cognitive control failure to appetitive cues in adolescents. *Journal of Cognitive Neuroscience*, 23(9), 2123-2134.
- Spanos, N. P., Stam, H. J., Radtke, H. L., & Nightingale, M. E. (1980). Absorption in imaginings, sex-role orientation, and the recall of dreams by males and females. *Journal of Personality Assessment*, 44(3), 277-282.
- Stramba-Badiale, M., Ceretti, A., & Forni, G. (1979). Sleep characteristics of elderly and very long-lived subjects. *Minerva Medica*, 70(36), 2551-2554.
- Strauch, I. (2005). REM dreaming in the transition from late childhood to adolescence: A longitudinal study. *Dreaming*, 15(3), 155-169.
- Strauch, I., & Lederbogen, S. (1999). The home dreams and waking fantasies of boys and girls between ages 9 and 15: A longitudinal study. *Dreaming*, 9(2-3), 153-161.
- Szmigielska, B. & Holda, M. (2007). Students' views on the role of dreams in human life. *Dreaming*, 17, 152-158.
- Thomas, S. P. (2003). Men's anger: A phenomenological exploration of its meaning in a middle class sample of American men. *Psychology of Men & Masculinity*, 4(2), 163-175.
- Victor, C., Scambler, S., Bond, J., & Bowling, A. (2000). Being alone in later life: Loneliness, social isolation and living alone. *Reviews in Clinical Gerontology*, 10(4), 407-417.
- Vidal, J., Mills, T., Pang, E. W. & Taylor, M. J. (2012). Response inhibition in adults and teenagers: Spatiotemporal differences in the prefrontal cortex. *Brain and Cognition*, 79, 49-59.
- Waterman, D. (1991). Aging and memory for dreams. *Perceptual and Motor Skills*, 73(2), 355-365.
- Wolcott, S., & Strapp, C. M. (2002). Dream recall frequency and dream detail as mediated by personality, behavior, and attitude. *Dreaming*, 12(1), 27-44.
- Yu, C. K. C., & Fu, W. (2011). Sex dreams, wet dreams, and nocturnal emissions. *Dreaming*, 21(3), 197.
- Yurgelun-Todd, D. (2007). Emotional and cognitive changes during adolescence. *Current Opinion in Neurobiology*, 17(2), 251-257.
- Zadra, A. (2007). 1093: Sex dreams: What do men and women dream about? *Sleep*, 30, A376.

- Zanasi, M., De Persis, S., Caporali, M., & Siracusano, A. (2005). Dreams and age. *Perceptual and Motor Skills*, 100 (3c), 925-938.
- Zayas, L. H. (1988). Thematic features in the manifest dreams of expectant fathers. *Clinical Social Work Journal*, 16(3), 282-296.
- Zepelin, H. (1980). Age differences in dreams: I. Men's dreams and thematic apperceptive fantasy. *International Journal of Aging and Human Development*, 12, 171-186.

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## **General Discussion and Conclusions**

This section of the dissertation begins by summarizing and highlighting the implications of the findings of the first paper on gender differences in Canadian dreams compared to the American norms. Next, findings from the final two papers examining ontogenetic patterns of dream content for women and men, and their implications, are highlighted. A discussion of the challenges that were faced during the review process for article three, in terms of the framework used for hypothesis testing, is also included in this section. This is followed by a discussion of the original contribution of each individual article to the scientific dream literature. Next is a discussion of the theoretical implications of the major observations of the individual articles and the dissertation as whole. Subsequently, the findings from this dissertation will be related to De Koninck's (2012) model on the layers of dream formation. Finally, limitations on the methodology of the dissertation, as well as concluding remarks and directions for future research, complete this general discussion and conclusions section.

### **Dreams of Canadian Students: Norms, Gender Differences, and Comparison with Americans**

The main purpose of the first study of this dissertation was to establish the first normative data for the dreams of Canadian students using a large sample of dreams ( $N = 600$ ) and a large number of young adult male ( $n = 150$ ) and female ( $n = 150$ ) participants, as was done in many other countries. The second purpose was to determine whether negative as opposed to positive dream elements prevail, as suggested by the threat simulation theory of dreams (Revonsuo, 2000). Third, we wanted to determine whether gender differences in dream content were consistent with waking life gender differences, as suggested by the continuity hypothesis of dreaming, as well as by previous research. The final objective was to compare the Canadian data

with normative data established with the original American sample by Hall and Van de Castle (1966).

Overall, the findings supported both the threat simulation and the continuity hypothesis theories of dreaming. Negative dream elements outnumbered positive ones and gender differences in the dreams of our Canadian participants reflected those noted in psychological and sociological research on gender differences in the waking lives of young adults. Furthermore, the cross cultural component of this investigation compared the Canadian norms and gender differences to the American findings conducted fifty years previously by Hall and Van de Castle (1966).

Our findings revealed that, overall, gender differences in dream content for Canadians are consistent with those of Americans. Of interest was the absence of the previously observed gender difference of males having more sexual content and striving in the Canadian sample, an observation noted by other researchers (Zadra, 2007; Zadra & Domhoff, 2011). This observation likely reflects changes in social cultural evolution in the lives of females in terms of sexuality and the workforce that have occurred over the past fifty years. Zadra & Domhoff (2011) also suggested that these changes could be due to the changing social roles of women and also that women are more comfortable today reporting dreams with sexual content. The similarities between Canadian and American cultures observed for patterns of gender differences and male and female norms reflect the waking similarities in North American culture noted by Grabb & Curtis (2010), as per the continuity hypothesis. The next step was to expand this methodology to examine the larger picture of the patterns of dream content categories across development from adolescence to old age.

## **Ontogenetic Patterns in the Dreams of Women across the Lifespan**

The second study of this dissertation examined the ontogenetic dimensions of the dreams of females from adolescence to old age. The purpose of this paper was to extend the literature on age differences in the dreams of women by including a wider spectrum of age categories (from adolescence to old age) with much narrower age ranges, using a large number of female participants ( $N = 375$ ). It was hypothesized that the ontogenesis of dream content for women would support previous research for the various predictions for each category and also generally reflect their waking ontogenetic and developmental patterns as proposed by social theories and recognized features of aging, as per the continuity hypothesis.

Overall, the ontogenetic patterns from trend analyses tend to support the continuity hypothesis. Specifically, the patterns are generally consistent with the waking day development and changes that women undergo beginning in adolescence and continuing into old age, as reviewed in the introduction. The significant linear decreases observed from adolescence to old age for characters (female and familiar), interactions (aggression and friendliness), and negative emotions (after middle adulthood) in dreams reflect the transition with aging to smaller social networks with a preference of quality over quantity in social contacts and interactions (Carstensen, 1992; Gaylord, 1980; Victor et al., 2000). These findings are also consistent with the more mature emotion-focused coping strategies, less hostility, and greater altruism and life satisfaction observed in aging women (Blanchard-Fields & Irion, 1988; Brody & Schoonover, 1986; Chappell & Haven, 1980; Gee & Kimball, 1987). Now that a profile of the ontogenetic dream content of women with a wide range of ages was established, the question remained as to what these dream characteristics would look like in male subjects.

## **Dream Content of Males from Adolescence to Old Age: An exploration of Ontogenetic Patterns**

The final study of this dissertation examined the ontogenetic patterns of dream content categories for males from adolescence to old age. This paper was submitted to *Consciousness and Cognition* and presented challenges during the review process. In the previous paper with females, we compared ontogenetic patterns in dream content for women to the sociological and psychological research on waking developmental patterns and aging theories. However, for this paper, issues were raised about the validity of making claims about the continuity hypothesis based on general waking literature on neurological and sociological changes with age for males. The continuity hypothesis has been a topic of an ongoing debate in terms of study design, methodology required to best test the theory, and the scope of continuity in the spectrum from concerns and emotions to events and all waking activities (Domhoff, 2011; Malinowski & Horton, 2011; Schredl, 2012).

Attempting to satisfy the reviewers, we claimed to no longer to be able to fully test the continuity hypothesis with our study design, but to instead be making only general comparisons between waking and dreaming solely from social-psychological and neurobiological literature. Additionally, we conducted analyses of the daily logs for the day preceding the dreams to determine if we could conduct a more direct test of the continuity hypothesis, as suggested by one of the reviewers. However, due to the extremely low number of interactions in the daily logs, it was not feasible to compare these with the dream reports and we provided documentation of these analyses in the paper. Therefore, the objective of the final study specified in this third paper, was to further document the ontogenesis of dream elements for males using a wider spectrum of age categories, with more narrow age ranges, and a large number of participants (N

= 231). It was hypothesized that the ontogenetic patterns observed would remain consistent with the previous research on age-related changes in male dreams (although research in this area is limited) and reflect, generally, the waking developmental patterns as posited by social-psychological and neurobiological research with males

In accordance with our predictions, the overall developmental patterns observed in our sample of dreams from male participants were consistent with dream research findings obtained from male participants. Where discrepancies occurred, these may have been due to the variety of methodologies and age ranges used in previous research. Furthermore, the ontogenetic patterns observed for the various categories also generally corresponded to both social-psychological and neurobiological research findings on age differences for males. The main finding that occurred during this investigation was the observation of a much higher frequency of aggression in the dreams of adolescents compared to the older age groups. This pattern is consistent with the neurobiological differences in adolescence for males and the propensity towards aggressive, risk taking, and emotionally driven behaviour in comparison to older age groups. The paper also mentions some interesting observations that require additional research with both waking and dreaming measures, such as the slight increase in aggression in older adults, and the absence of sexual interactions in the two oldest age groups.

### **Original Contributions to Scientific Knowledge and Dream Literature**

The opening paper of this dissertation is the first to establish a normative database of a large sample of the dreams of young adult Canadians. This is an original contribution to the literature as this paper examined overall dream characteristics and associated gender differences, and compared these findings to the American data using the original Hall and Van de Castle (1966) categories. The thorough and comprehensive examination of the various dream elements

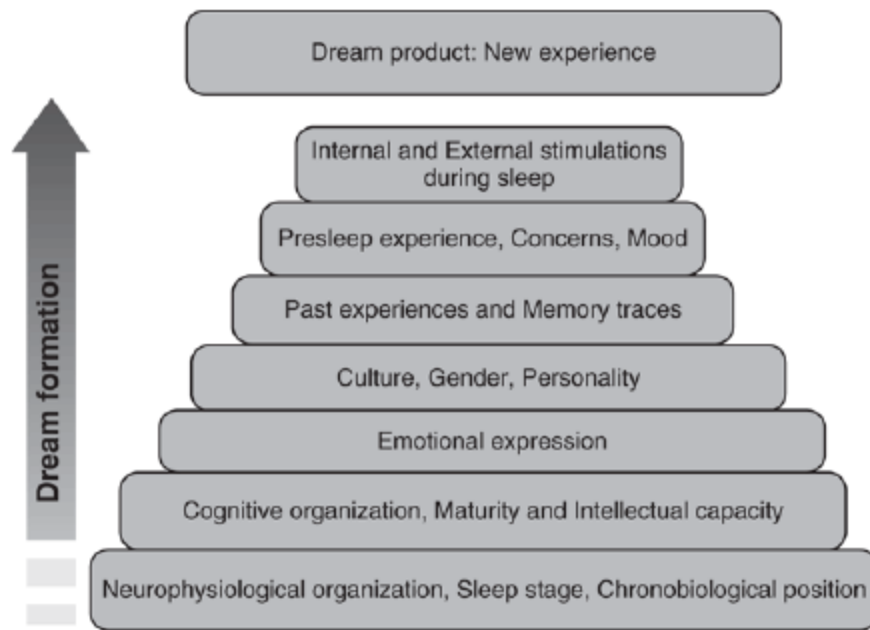
for Canadian students provides the foundation for the comparison of other groups of Canadians such as those with mental or neurological disorders or differences in education and social class. Establishing this Canadian normative data further provides the foundation for cross-cultural research with the use of a more current database for normative dream content and has already attracted some inquiries from researchers in other countries such as Egypt.

Taken together, the final two papers also make a significant original contribution to the scientific literature, as they represent the first examination of ontogenetic patterns in the dream content of a large sample of both female and male participants whose ages covered adolescence to old age. This will provide a comparison point and much needed dream normative data for research focusing on developmental features in dream content. Studies examining age differences in dreams have used differing methodologies and the findings have not always been consistent. The current methodology provides a wider spectrum of age groups from 12-17 to 65-85 which makes it a useful benchmark for future research using different age groups.

In addition, much more narrow age ranges were used. For example, as opposed to combining 40 to 85 year olds as done by Brenneis (1975) or combining adolescents and young adults as done by Hall and Domhoff (1963; 1964), the current study separates these age groups. This provided the opportunity to highlight differences between developmental periods and age groups. For example, more aggressive interactions in the dreams of adolescent males compared to those in young adulthood reflected the neurobiological differences between these age groups. The final paper with exclusively males, is a much needed addition to the literature on age differences in male dreams as it is an area that has not been given as large a focus in the literature, with very few studies. We have now expanded on the findings from this small number

of studies and provided a larger picture of the dream characteristics for males across lifespan development.

In terms of the theoretical implications of these three studies, as discussed in the overview of the findings, they provide support for threat simulation theory and the continuity hypothesis. Furthermore, they provide support for De Koninck's (2012) model of the layers of dream formation (See Figure 1). This model describes how factors that are more important in dreams are those related to neurophysiology and cognitive capacity and make up the core features of the dream experience (near the bottom of the pyramid). As one moves up the pyramid, fine details such as culture and gender are not core features and their reflection in dreams is more variable and does not have as large of an influence. Internal and external stimulation are at the top of the pyramid as they have the least influence and are the most variable.



*Figure 1.* Layers in the construction of dreams. The various factors in the elaboration of dreaming illustrated as a pyramid suggesting their order and importance. Reproduced from De Koninck (2012).

The influence of neurophysiology as a core feature in dreams, is demonstrated in the ontogenetic patterns of dream content in the final two studies. In adolescence, there is a protracted development of the prefrontal control system combined with a more mature limbic system (Sommerville & Casey, 2010). This neurophysiology is unique compared to children where these systems are still developing, and adults where these systems are both already matured (Casey, Jones, & Hare, 2008). This neurophysiology has been found to result in a tendency toward aggression, incentive seeking, and risk taking behaviour in adolescence, compared to children and adults. Although there is a dissociation of the frontal lobes in REM sleep dreaming, these characteristics of adolescent behaviour are reflected in the ontogenetic patterns of dream content in adolescents compared to older age groups in articles two and three.

Specifically, the highest frequency of aggression in the final two studies occurred in adolescence for both males and females.

In terms of gender and culture, this layer of dream formation appears to be more variable with less influence on dreams in comparison to the core neurophysiological and cognitive features. Specifically, many studies including our first paper, have found that males have more aggression in dreams than females, a gender difference well established in the literature. However, normative studies with Japanese students observed the opposite pattern (Yamanaka, Morita, & Matsumoto, 1982). This discrepancy could be due to a cultural difference, although this was not tested. Further exploration of gender dimensions in the dreams of Japanese and American students, in relation to waking measures of aggression, are required to further explore this difference in patterns of aggression. Furthermore, previous research has found that cultural differences for variables such as environment (Bose & Pramilla, 1993; Grey & Kalsched, 1971) and aggression (Waterman, De Jong, & Magdelijns, 1988) are reflected in dreams. However, De Koninck and Sirois-Berliss (1978) noted more achievement motivation in Anglophone compared to Francophone Canadians, with the opposite occurring in dreams, which could be evidence of the compensatory theory of dream formation and needs further exploration. Taken together, these findings demonstrate the variability of gender and cultural features in dream formation. With regards to cultural components, the variables we examined were limited by the nature of the Hall and Van de Castle scales and we were unable to explore thematic content which may be more appropriate for highlighting cultural differences in dream content.

This dissertation was only able to investigate the more core physiological and cognitive features of the layers of dream formation, in relation to characteristics of adolescent behaviour being reflected in dream content, and also gender and culture. Regarding continuity, although

dreams have been found to be clear, coherent, and detailed accounts of realistic situations (Snyder, 1970), dreams are not perfect simulations of episodic memory events that occur in our waking lives but rather undergo a transformation such as metaphors, hyper association, and more intense emotions (Malinowski & Horton, 2015). Additionally, it appears that dreams do not just reflect continuity with wakefulness, but also transform waking activity, such in special dreams involving creativity. Specifically, new associations and goal directed mental activity constitute this creative component and this was recently thoroughly reviewed and added to the layers of dream formation as an adaptation to De Koninck's model between the layers pre-sleep experience and internal and external stimulations (Dale & De Koninck, 2016).

Regarding the threat simulation theory, this could only be studied in the first paper where we observed a predominance of negative dream content. Recently, waking threats and autobiographical information from dream reports were examined in order to more directly test this theory (Lafrenière, Dale, Robidoux, & De Koninck, 2016), an investigation that is currently ongoing. After establishing normative data for the dreams of young adult Canadian students, we can now use the information in the University of Ottawa database to explore how other dream elements, such as threatening and emotionally impactful dreams, vary with age across the lifespan and also in terms of gender.

### **Limitations and Future Directions**

The most obvious limitations of the methodology in this dissertation became evident in the final study investigating ontogenetic patterns in dream reports of male participants. The daily logs used in the dream diary packages instructed the participant to record the activities and events of the day. As a result, after these daily logs recording daytime activities were coded using the Hall and Van de Castle (1966) method of content analysis, there were very few

interactions. For example, many of the in the logs of daily activities were written in point form with almost no details, making it difficult to code the daily log report. Using a measure of waking behaviour for each participant in order to more directly test the continuity hypothesis, might be better accomplished in future studies with different approaches for daytime activity measures. Specifically, other approaches successfully used in other research include diaries involving detailed questions about various activities, concerns, and preoccupations of the dreamer (Malinowski & Horton, 2011), or interviews with the dreamer about waking concerns and preoccupations (Domhoff, 2003). The use of one of these approaches, focused on the current concerns and preoccupations of the dreamer, may have yielded better data to properly address this question and is recommended in future research.

The existing debate as to what is the nature and scope of the continuity theory in the field of dream research is still ongoing. The issue with this theory is that the definition of what constitutes continuity is very vague and can range from daily activities to waking thoughts and concerns. Additionally, this continuity ranges on a continuum from an examination of general characteristics in sociological literature on the waking lives of different groups, to the comparison of such groups on more direct waking measures of daily activities and concerns. Examining general characteristics and behaviours of different groups in sociological literature is important to provide the bigger picture of how these variables are reflected in dreams. For example, examining literature on aggression in the waking lives of soldiers and civilians can help us draw parallels between waking and dream aggression for these different groups, using a more general framework of the continuity hypothesis. Therefore, we believe study design and methodology of this nature, as used in the first two articles, is still important to better understand the features of continuity and transformation that make up the relationship between waking and

dreaming. However, applying more stringent study design and methodology, by using more direct measures of waking behaviour such as recording daily waking thoughts and concerns, would enhance future work by propelling forward the understanding of the theory and its implications.

With regards to the recruitment of the participants, a limitation of this work was the small sample size of males and specifically males in the older age range (65-85). This age group was an extremely difficult one to recruit and we believe several reasons may account for this. The first might be due to the fact that males tend to report dreams less frequently compared to women (Schredl, Sahin, & Schafer, 1998; Schredl, Nurnberg, & Weiler, 1996), which may explain the larger number of females that we were able to recruit in comparison to males. Secondly, recall for dreams begins to decrease with old age which has been found to occur more rapidly for males compared to females (Giambra, Jung, & Grodsky, 1996). These issues make this sample especially difficult to recruit.

Regarding the Hall and Van de Castle (1966) method of content analysis, although the rating scales are thorough and detailed, they do not allow for the exploration of thematic content or other specific categories in dreams, although this was not their goal. For example, one cannot code for various types of threats or their severity using the system. Regarding emotions, the Hall and Van de Castle rating scales only rely on external raters and do not take into account self-rated dream emotions. The literature has found a predominance of negative emotions when dreams are rated by external judges instead of the dreamer (Schredl & Doll, 1998; Sikka et al., 2014). Therefore, future normative studies should allow for the analysis of dream emotions using a variety of methodologies such as other external rating scales for dream content and self-reported emotions combined with Hall and Van de Castle's scales.

Finally, the current dissertation provides an exploration of the ontogenetic patterns of females and males separately. Interestingly, gender differences in the developmental patterns for certain dream characteristics are highlighted. Specifically, the F/C index, a measure of the amount of friendly interactions per character, decreases from adolescence to old age for females but increases for males. This observation highlights strong gender differences in how friendliness is experienced in dreams between males and females with age. Future research should combine these samples into the same model using more sophisticated statistics such as factorial analysis of variance or multivariate analysis of variance to examine how the variables of gender and age affect each main dream category for males and females and examine any observed differences. A cross-sectional study of this nature would ultimately provide a first look at the evolution of gender differences across the lifespan. Since studies of gender differences for older adults are not as given as much focus in the literature compared to young adults, investigations of this nature would provide a more thorough profile of the dream characteristics of older age groups and a deeper understanding of how gender differences and other dream features change and evolve with age.

### **Conclusions**

In summary, this dissertation provides support for two different theories; the threat simulation theory and the continuity hypothesis. The three different investigations provide a thorough examination of gender, cultural, and ontogenetic dimensions present in the dream experience. It seems that when dreams are scored by external raters, certain dream characteristics tend to be universal. Specifically, examining a large sample of Canadian dreams reveals a predominance of negative as opposed to positive elements in everyday dream reports. This observation provides support for the threat simulation theory of dreams (Revonsuo, 2000) which

states that dreams prepare us for waking threats regardless of whether these threats are physical, social, or psychological in nature.

Furthermore, while some dream characteristics appear to be universal in nature, it seems that other factors, such as physical, social, psychological, environmental, and cultural variables also influence the dream experience. Support for the continuity hypothesis (that dream content reflects a range of waking life experiences) is evident in all three of the present studies involving gender, cultural, and ontogenetic variables. With regards to gender, the first paper establishing normative data for young adult Canadians noted that gender differences observed in the waking lives of young adults is reflected in the dreams of men and women. In terms of culture, the very few differences observed between American and Canadian young adults in this investigation highlighted the cultural similarities between these North American sub regions (Grab & Curtis, 2010; Waugh, 2011). Finally, some ontogenetic patterns of dream content categories for males and females across the lifespan reflect some waking developmental patterns as proposed by social theories, neurobiological research, and recognized features of aging for males and females, as postulated by the continuity hypothesis.

The current dissertation makes available normative data for the dreams of Canadians for global or cross-cultural investigations of the dream experiences for both men and women as well as across various age groups. Given the long-standing existence of American norms, as well as the establishment of norms across various other populations and countries, this contribution is both significant and long overdue. Furthermore, this new dataset provides the foundation for more extensive investigation of age-related changes and their expression in dreaming across the lifespan. Finally, taken together, the three studies presented in this dissertation shed light on the issue of the layers of dream formation and the influence of various elements such as

neurophysiological characteristics, cognitive maturity, gender, and culture on dream expression.

By encouraging future work of this nature we can further investigate and better understand the sources of the dream experience.

## Bibliography

- Allyn, D. (2001). *Make love, not war: The sexual revolution, an unfettered history*. New York, NY: Taylor & Francis.
- Almeida, D. M., & Horn, M. C. (2004). *How healthy are we? A national study of well-being at midlife*. Chicago, Illinois: University of Chicago Press.
- Altshuler, K. Z., Barad, M., & Goldfarb, A. I. (1963). A survey of dreams in the aged: Part II: Noninstitutionalized subjects. *Archives of General Psychiatry*, 8(1), 33-37.
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders*, 4th Ed. Washington, DC: American Psychiatric Association.
- Avila-White, D., Schneider, A., & Domhoff, G. W. (1999). The most recent dreams of 12–13 year-old boys and girls: A methodological contribution to the study of dream content in teenagers. *Dreaming*, 9(2-3), 163.
- Baird, A. A., Gruber, S. A., Fein, D. A., MASS, L. C., Steingard, R. J., Renshaw, P. F., ... & Yurgelun-Todd, D. A. (1999). Functional magnetic resonance imaging of facial affect recognition in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 38(2), 195-199.
- Barad, M., Altshuler, K. Z., & Goldfarb, A. I. (1961). A survey of dreams in aged persons. *Archives of General Psychiatry*, 4(4), 419-424.
- Barrett, D., & McNamara, P. (2007). *The new science of dreaming*. (Vol. 2). Westport: Praeger Publishers.
- Barrett, D., & Loeffler, M. (1992). Comparison of dream content of depressed vs non-depressed dreamers. *Psychological Reports*, 70(2), 403-406.
- Baruch, G. K. & Barnett, R. C. (1986). Role quality, multiple role involvement, and psychological well-being in mid-life women. *Journal of Personality and Social Psychology*, 51, 578-585.
- Bell, A. J., & Cook, H. (1998). Empirical evidence for a compensatory relationship between dream content and repression. *Psychoanalytic Psychology*, 15, 154-163.
- Bell, A. P. & Hall, C. S. (1971). *The personality of a child molester. An analysis of dreams*. New Brunswick, New Jersey: Transaction Publishers.
- Birditt, K. S., Brown, E., Orbuch, T. L., McIlvane, J. M. (2010). Marital conflict behaviours and implications for divorce over 16 years. *Journal of Marriage and Family*, 72(5), 1188-1204.

- Birditt, K. S., & Fingerman, K. L. (2003). Age and gender differences in adults' descriptions of emotional reactions to interpersonal problems. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 58(4), 237-245.
- Blake, R. L., & Reimann, J. (1993). The pregnancy-related dreams of pregnant women. *The Journal of the American Board of Family Practice*, 6(2), 117-122.
- Blakemore, S. J. (2008). The social brain in adolescence. *Nature Reviews Neuroscience*, 9(4), 267-277.
- Blanchard-Fields, F., & Irion, J. C. (1988). The relation between locus of control and coping in two contexts: age as a moderator variable. *Psychology and Aging*, 3(2), 197-203.
- Blick, K. A., & Howe, J. B. (1984). A comparison of the emotional content of dreams recalled by young and elderly women. *The Journal of psychology*, 116(1), 143-146.
- Boerger, E. A. (2009). Associations among boundary structure, gender, and beliefs about control of dreams. *Dreaming*, 19(3), 172-186.
- Bose, V. S., & Pramila, V. (1993). Do Indian and American college students dream differently? Unpublished manuscript, Department of Psychology, Andhra University, India.
- Breger, L. (1967). The functions of dreams. *Journal of Abnormal Psychology Monograph*, 72, 1-28.
- Brennan, S. & Dauvergne, M. (2011). *Statistiques sur les crimes déclarés par la police au Canada, 2010*, Ottawa (Ontario), Statistique Canada.
- Brenneis, C. B. (1975). Developmental aspects of aging in women: A comparative study of dreams. *Archives of General Psychiatry*, 32(4), 429-435.
- Brody, E. M., & Schoonover, C. B. (1986). Patterns of parent-care when adult daughters work and when they do not. *The Gerontologist*, 26, 372-381.
- Cairns, R.B., Cairns, B.D., Necerkman, J.J., Ferguson, L.L., & Gariepy, K. (1989). Social networks and aggressive behavior: Peer support or peer rejection. *Developmental Psychology*, 24, 815-823.
- Calkins, M. W. (1893). Statistics of dreams. *American Journal of Psychology*, 5, 311-343.
- Carstensen, L. L. (1992). Social and emotional patterns in adulthood: support for socioemotional selectivity theory. *Psychology and aging*, 7(3), 331-338.
- Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselroade, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of personality and social psychology*, 79(4), 644-655.
- Casey, B. J., Jones, R. M., & Hare, T. A. (2008). The adolescent brain. *Annals of the New York*

- Academy of Sciences*, 1124(1), 111-126.
- Cassidy, J. & Shaver, P. R. (2008). *Handbook of attachment 2<sup>nd</sup> Edition: Theory, research, and clinical applications*. New York, The Guildford Press.
- Cavallero, C., & Foulkes, D. (1993). Conclusions. In C. Cavallero & D. Foulkes (Eds.), *Dreaming as cognition* (pp. 133–138). New York: Harvester-Wheatsheaf.
- Chappell, N. L., & Haven, B. (1980). Old and female: Testing the double jeopardy hypothesis. *The Sociological Quarterly*, 21, 157-171.
- Charles, S. T., & Piazza, J. R. (2007). Memories of social interactions: age differences in emotional intensity. *Psychology and Aging*, 22(2), 300-309.
- Clarke, J., DeCicco, T. L., & Navara, G. (2010). An investigation among dreams with sexual imagery, romantic jealousy and relationship satisfaction. *International Journal of Dream Research*, 3, 45-50.
- Cohen, J. (1977). *Statistical Power for the Behavioral Sciences*. New York: Academic Press.
- Cohen, D. B., & Cox, C. (1975). Neuroticism in the sleep laboratory: Implications for representational and adaptive properties of dreaming. *Journal of Abnormal Psychology*, 84(2), 91-108.
- Côté, L., Lortie-Lussier, M., Roy, M.-J., & De Koninck, J. (1996). Continuity and change: The dreams of women throughout adulthood. *Dreaming*, 6(3), 187.
- Crugnola, C. R., Maggiolini, A., Caprin, C., Martini, C. D., & Giudici, F. (2008). Dream content of 10-to 11-year-old preadolescent boys and girls. *Dreaming*, 18(3), 201.
- Csikszentmihalyi, M., & Larson, R. (1984). *Being adolescent: Conflict and growth in the teenage years*. New York: Basic Books.
- Cumming, E., Henry, W. E., & Damianopoulos, E. (1961). A formal statement of disengagement theory. *Growing old: The process of disengagement*. New York, NY: Basic Books.
- Dale, A. L., & DeCicco, T. L. (2011). Content and discovery in the dreams of Canadian male university students: A pilot study. *Dreaming*, 21, 257-276.
- Dale, A.L. & DeCicco, T.L. (2013). Examining The Storytelling Method with Canadian soldiers. *Imagination, Cognition, and Personality*, 33, 369-383.
- Dale, A. L., DeCicco, T. L., & Miller, N. J. (2013). Exploring the dreams of Canadian soldiers with content analysis. *International Journal of Dream Research*, 6(1), 22-30.
- Dale, A. L., DeCicco, T. L., Miller, N. J., & Tavakoli, P. (2015). Predictive value of the dreams of Canadian soldiers. *Dreaming*, 25(3), 220-231.

- Dale, A. L. & De Koninck, J. (2016). *Dreams and creativity: Fact or fiction*. Manuscript in Preparation.
- Dale, A., Lortie-Lussier, M., De Koninck, J. (2015). Ontogenetic patterns in the dreams of women across the lifespan, *Consciousness and Cognition*, 37, 214-224.
- Dale, A.L., Wong, C., & De Koninck, J. (2013). *Gender differences in the dreams of Canadian adolescents*. Poster presented at the 5<sup>th</sup> International World Association of Sleep Medicine Congress, Valencia, Spain.
- Dale, A., Wong, C., & De Koninck, J. (2014). Gender and age differences in the dreams of adolescents and young adults. *Sleep*, 37, A72.
- Dallett, J. (1973). Theories of Dream Function. *Psychological Bulletin*, 79(6), 408-416.
- DeCicco, T. L. (2007a). Dreams of female university students: content analysis and the relationship to discovery via the Ullman method. *Dreaming*, 17, 98-112.
- DeCicco, T. L. (2007b). What is the storytelling? Examining discovery with The Storytelling Method (TSM) and testing with a control group. *Dreaming*, 17, 227-237.
- DeCicco, T. L. (2008). Pondering the consequences of uninterpreted dreams. *Dreamtime*. Winter, p.12-13.
- DeCicco, T. L. (2009). *The giant compass: navigating your life with your dreams*. NC: Mailto Press.
- De Koninck, J. (2012). Sleep dreams and dreaming. In C. A. Espie & C. M. Morin (Eds.), *The oxford handbook of sleep and sleep disorders* (pp. 150-171). New York: Oxford University Press.
- De Koninck, J., & Sirois-Berliss, M. (1978). Achievement motivation in dreams and during awakening in French-Canadian and English-Canadian students. *Canadian Journal of Behavioural Science*, 10, 329 –338.
- Delorme, M. A., Lortie-Lussier, M., & De Koninck, J. (2002). Stress and coping in the waking and dreaming states during an examination period. *Dreaming*, 12(4), 171.
- Domhoff, G. W. (1996). *Finding meaning in dreams: A quantitative approach*. New York: Springer.
- Domhoff, G. W. (2003) *The scientific study of dreams: Neural networks, cognitive development, and content analysis*. Washington, DC: American Psychological Association.

- Domhoff, G. W. (2005). *The Dreams of Men and Women: Patterns of Gender Similarity and Difference*. Retrieved July 31, 2015 from the World Wide Web: [http://dreamresearch.net/Library/domhoff\\_2005c.htm](http://dreamresearch.net/Library/domhoff_2005c.htm)
- Domhoff, G. W. (2011). Dreams are embodied simulations that dramatize conception and concerns: The continuity hypothesis in empirical, theoretical, and historical context. *International Journal of Dream Research*, 4(2), 50-62.
- Domhoff, G. W., Meyer-Gomes, K., & Schredl, M. (2006). Dreams as the expression of conceptions and concerns: A comparison of German and American college students. *Imagination, Cognition and Personality*, 25(3), 269-282.
- Domhoff, G. W., Nishikawa, N., & Brubaker, L. (2004). A research note on the male/female percentage in the dreams of Japanese women: A failed attempt at replication. *Dreaming*, 14(1), 50-53.
- Domhoff, G., & Schneider, A. (2008). Similarities and differences in dream content at the cross cultural, gender, and individual levels. *Consciousness and Cognition*, 17(4), 1257-1265.
- Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the Big Five across the life span: evidence from two national samples. *Psychology and Aging*, 23(3), 558-566.
- Dreyfuss, M., Caudle, K., Drysdale, A. T., Johnston, N. E., Cohen, A. O., Somerville, L. H., ... & Casey, B. J. (2014). Teens impulsively react rather than retreat from threat. *Developmental Neuroscience*, 36(3-4), 220-227.
- Dudley, L., & Fungaroli, J. (1987). The dreams of students in a women's college: Are they different? *ASD Newsletter* 4(6):6-7.
- Dudley, L., & Swank, M. (1990). A comparison of the dreams of college women in 1950 and 1990. *ASD Newsletter* 7(5).
- Eagly, A. H. (1987). *Sex differences in social behaviour: A social role interpretation*. Hillsdale: Lawrence Erlbaum.
- Erikson, E. H. (1963). *Childhood and Society*. 2d ed. New York, NY: Norton.
- Escoffier, J. (2003). *Sexual revolution*. New York, NY: Running Press.
- Esposito, K., Benitez, A., Barza, L., & Mellman, T. (1999). Evaluation of dream content in combat-related PTSD. *Journal of Traumatic Stress*, 12(4), 681-687.
- Field, D., & Minkler, M. (1988). Continuity and change in social support between young-old and old-old or very-old age. *Journal of Gerontology*, 43(4), 100-106.
- Fiss, H. (1983). Toward a clinically relevant experimental psychology of dreaming. *Hillside Journal of Clinical Psychiatry*, 5(2), 147-159.

- Fiss, H. (1986). An empirical foundation for a self-psychology of dreaming. *Journal of Mind and Behavior*, 7(2-3), 161-191.
- Fosse, M. J., Stickgold, R. J., & Hobson, J. A. (2001). The mind in REM sleep: Reports of emotional experience. *Sleep*, 24, 947-955.
- Foulkes, D. (1982). *Children's dreams: Longitudinal studies*. New York: John Wiley & Sons.
- Foulkes, D., Larson, J. D., Swanson, E. M., & Rardin, M. (1969). Two studies of childhood dreaming. *American Journal of Orthopsychiatry*, 39(4), 627-643.
- Foulkes, D., & Rechtschaffen, A. (1964). Presleep determinants of dream content: Effects of two films. *Perceptual and Motor Skills*, 19(3), 983-1005.
- Foulkes, D., Hollifield, M., Sullivan, B., Bradley, L., & Terry, R. (1990). REM dreaming and cognitive skills at ages 5-8: A cross-sectional study. *International Journal of Behavioral Development*, 13(4), 447-465.
- Funkhouser, A. T., Hirsbrunner, H. P., Cornu, C., & Bahro, M. (1999). Dreams and dreaming among the elderly: an overview. *Aging & Mental Health*, 3(1), 10-20.
- Gackenbach, J. & Boyes, A. (in press). Social media versus gaming associations with typical and recent dreams. *Dreaming*.
- Galvan, A., Hare, T., Voss, H., Glover, G., & Casey, B. J. (2007). Risk-taking and the adolescent brain: who is at risk?. *Developmental Science*, 10(2), F8-F14.
- Gannon, M. (2001). Crime comparisons between Canada and the United States. Juristat 21, 11. Catalogue 85-002. Ottawa: Statistics Canada.
- Gardiner, A. H. (1935). *Hieratic Papyri in the British Museum*, no.3, *The Dream Book*. London: British Museum.
- Gates, M. A. (1997). The dream content of women with a history of sexual abuse: An examination of self-reflectiveness and bizarreness in dreams and their relationship to personality [Abstract]. Dissertation Abstracts International: Section B: The Sciences and Engineering, 58, 3353.
- Gaylord, S. (1989). Women and aging: A psychological perspective. *Journal of Women & Aging*, 1(1-3), 69-93.
- Gee, E. M. & Kimball, M. M. (1987). *Women and aging*. Toronto: Butterworths.
- Giambra, L. M., Jung, R. E., & Grodsky, A. (1996). Age changes in dream recall in adulthood. *Dreaming*, 6(1), 17-31.
- Giele, J. Z. & Stebbins, L. F. (2003). *Women and equality in the work-place*. Santa-Barbara, CA:

ABC-CLIO Books.

- Grabb, E. G. (2011). Comparing Canadians and Americans. *Think Sociology*, 1(8):4-5.
- Grabb, E. G. & Curtis, J. E. (2010). *Regions apart: The four societies of Canada and the United States*. Toronto, ON: Oxford University Press.
- Greenwald, M. W. (1990). *Women, war, and work: The impact of World War I on women workers in the United States*. New York, NY: Cornell University Press.
- Grenier, J., Cappeliez, P., St-Onge, M., Vachon, J., Vinette, S., Roussy, F., & De Koninck, J. (2005). Temporal references in dreams and autobiographical memory. *Memory & cognition*, 33(2), 280-288.
- Grey, A., & Kalsched, D. (1971). Oedipus east and west: An exploration via manifest dream content. *Journal of Cross-Cultural Psychology*, 2, 337-352.
- Griffith, R. M., Miyagi, O., & Tago, A. (1958). The universality of typical dreams: Japanese vs. Americans. *American Anthropologist*, 60(6), 1173-1179.
- Griffith, J. W. (1983a). Women's stressors according to age groups: Part I. *Health Care for Women International*, 4(6), 311-326
- Griffith, J. W. (1983b). Women's stress responses and coping patterns according to age groups: Part II. *Health Care for Women International*, 4(6), 327-340.
- Hall, C. S. (1953). *The meaning of dreams*. New York, NY: Harper & Brothers.
- Hall, C. S. (1984). "A ubiquitous sex difference in dreams" revisited. *Journal of Personality and Social psychology*, 46(5), 1109-1117.
- Hall, C., & Domhoff, B. (1963). Aggression in dreams. *International Journal of Social Psychiatry*, 9, 259-267.
- Hall, C., & Domhoff, B. (1964). Friendliness in dreams. *The Journal of Social Psychology*, 62(2), 309-314.
- Hall, C., Domhoff, G. W., Blick, K., & Weesner, K. (1982). The dreams of college men and women in 1950 and 1980: A comparison of dream contents and sex differences. *Sleep*, 5, 188-194.
- Hall, C. S., & Lind, R. E. (1970). *Dreams, life, and literature: A study of Franz Kafka*. Chapel Hill, NC: University of North Carolina Press.
- Hall, C. S., & Van de Castle, R. L. (1966). *The content analysis of dreams*. New York: Appleton Century Crofts.

- Hall, C. S., & Nordby, V. J. (1972). *The individual and his dreams*. New York: Signet
- Harris-McCoy, D.E. (2012). *Artemidorus' Oneirocritica: Text, Translation, and Commentary*. New York: Oxford University Press.
- Hartmann, E., Elkin, R., & Garg, M. (1991). Personality and dreaming: The dreams of people with very thick or very thin boundaries. *Dreaming*, 1(4), 311.
- Hewstone, M., Fincham, F. D., & Foster, J. (2005). *Psychology*. Malden, MA: Blackwell.
- Hill, C. E. (1996). *Working with dreams in psychotherapy*. New York: Guildford Press.
- Himelein, M. J. (1995). Risk factors for sexual victimization in dating: A longitudinal study of college women. *Psychology of Women Quarterly*, 19, 31-48.
- Hobson, J. A., Pace-Schott, E. F., & Stickgold, R. (2000). Dreaming and the brain: toward a cognitive neuroscience of conscious states. *Behavioral and Brain Sciences*, 23(06), 793-842.
- Hobson, A., & Schredl, M. (2011). The continuity and discontinuity between waking and dreaming: A Dialogue between Michael Schredl and Allan Hobson concerning the adequacy and completeness of these notions. *International Journal of Dream Research*, 4(1), 3-7.
- Howard, M. (1978). *Manifest Dream Content of Adolescents*. Ph.D. Dissertation. Iowa State University.
- Howarth, E. (1962). Extroversion and dream symbolism: An empirical study. *Psychological reports*, 10(1), 211-214.
- Howe, J. B., & Blick, K. A. (1983). Emotional content of dreams recalled by elderly women. *Perceptual and Motor Skills*, 56(1), 31-34.
- Jung, C. G. (1933). *Modern man in search of a soul*. New York, NY: Harcourt, Brace and World.
- Karagianni, M., Papadopoulou, A., Kallini, A., Dadatsi, A., Abatzoglou, G., & Zilikis, N. (2013). Dream content of Greek children and adolescents. *Dreaming*, 23(2), 91-96.
- King, D. B., & DeCicco, T. L. (2007). The relationship among dream content, physical health, mood and self-construal. *Dreaming*, 17, 127-139.
- King, D. B., & DeCicco, T. L. (2009). Dream relevance and the continuity hypothesis: Believe it or not? *Dreaming*, 19, 207-217.
- King, D. B., DeCicco, T. L., & Humphreys, T. P. (2009). Investigating sexual dream imagery in

- relation to daytime sexual behaviours and fantasies among Canadian university students. *Canadian Journal of Human Sexuality*, 18(3), 135-146.
- Kramer, M., Winget, C., & Whitman, R. M. (1971). A city dreams: A survey approach to normative dream content. *American Journal of Psychiatry*, 127(10), 1350-1356.
- Kretchmar, M D., & Jacobvitz, D. B. (2002). Observing mother-child relationships across generations. Boundary patterns, attachment, and the transmission of caregiving. *Family Process*, 41, 351-374.
- Krippner, S., & Rubenstein, K. (1990). Gender differences in dream content. *ASD Newsletter*, 7(4).
- Krippner, S., & Weinhold, J. (2002). Gender difference in a content analysis study of 608 dreams reports from research participants in the united states. *Social Behavior and Personality*, 30, 299-410.
- Krippner, S., & Weinhold, J. (2001). Gender differences in the content analysis of 240 dream reports from Brazilian participants in dream seminars. *Dreaming*, 11(1), 35-42.
- Krippner, S., Winkler, M., Rochlen, A., & Yashar, B. (1998). Gender, national and regional differences in a content analysis of 799 dreams reports from research participants in Argentina, Brazil and the United States. *Interamerican Journal of Psychology*, 32, 71-98.
- Kron, T., & Brosh, A. (2003). Can dreams during pregnancy predict postpartum depression? *Dreaming*, 13(2), 67-81.
- LaBarba, R. C. (2013). *Foundations of developmental psychology*. New York, NY: Academic Press.
- Labouvie-Vief, Gisela, DeVoe, Marlene, & Bulka, Diana. (1989). Speaking about feelings: conceptions of emotion across the life span. *Psychology and aging*, 4(4), 425-437.
- Labouvie-Vief, G., Hakim-Larson, J., DeVoe, M., & Schoeberlein, S. (1989). Emotions and self regulation: A life span view. *Human Development*, 32(5), 279-299.
- Lafrenière, A., Dale, A. L., Robidoux, R., & De Koninck, J. *Threat simulation theory: A link with threats experienced in the remote past*. Manuscript in Preparation.
- Lansford, J. E., Sherman, A. M., & Antonucci, T. C. (1998). Satisfaction with social networks: an examination of socioemotional selectivity theory across cohorts. *Psychology and Aging*, 13(4), 544-552.
- Larson, R., & Ham, M. (1993). Stress and "storm and stress" in early adolescence: The relationship of negative events with dysphoric affect. *Developmental Psychology*, 29(1), 130-140.

- Larson, R. W., & Richards, M. H. (1994). Family emotions: Do young adolescents and their parents experience the same states? *Journal of Research on Adolescence*, 4(4), 567-583.
- Loeber, R. (1982). The stability of antisocial behavior: A review. *Child Development*, 53, 1431-1446.
- Lortie-Lussier, M. (2012). Women's dreams across the life cycle. In D. Barrett & P. McNamara (Vol 2), *Encyclopedia of sleep and dreams: The evolution, function, nature, and mysteries of slumber* (pp. 806-808). California: ABC-CLIO.
- Lortie-Lussier, M., Côté, L., & Vachon, J. (2000). The consistency and continuity hypotheses revisited through the dreams of women at two periods of their lives. *Dreaming*, 10(2), 67-76.
- Lortie-Lussier, M. & Delorme, M-A. (1990). Les représentations de soi dans les rêves des femmes, de l'adolescence à la vieillesse. *Les Cahiers Internationaux de Psychologie Sociale*, 7-8, 57-71.
- Lortie-Lussier, M., De Koninck, J., Renaud, M-F., & Rinfret, N. (1990). *Mother's and daughter's dreams: Reflections of middle adulthood and adolescence*. Paper presented at the 7<sup>th</sup> Annual Conference of the Association for the Study of Dreams, Chicago, Illinois.
- Lortie-Lussier, M., Schwab, C., & De Koninck, J. (1985). Working mothers versus homemakers: Do dreams reflect the changing roles of women? *Sex Roles*, 12(9-10), 1009-1021.
- Lortie-Lussier, M., Simond, S., Rinfret, N., & De Koninck, J. (1992). Beyond sex differences: Family and occupational roles' impact on women's and men's dreams. *Sex Roles*, 26(3-4), 79-96.
- Maggiolini, A., Cagnin, C., Crippa, F., Persico, A & Rizzi, P. (2010). Content analysis of dreams and waking narratives. *Dreaming*, 20(1), 60-76.
- Malinowski, J. E., & Horton, C. L. (2015). Metaphor and hyperassociativity: the imagination mechanisms behind emotion assimilation in sleep and dreaming. *Frontiers in psychology*, 6: 1132. <https://doi.org/10.3389/fpsyg.2015.01132>.
- Malinowski, J., & Horton, C. L. (2011). Themes of continuity. *International Journal of Dream Research*, 4(2), 86-92.
- Mathes, J., Schredl, M., & Göritz, A. S. (2014). Frequency of typical dream themes in most recent dreams: An online study. *Dreaming*, 24(1), 57-66.
- Mazandarani, A. A., Aguilar-Vafaie, M. E., & Domhoff, G. W. (2013). Content analysis of Iranian college students' dreams: Comparison with American data. *Dreaming*, 23(3), 163-174.

- Mellman, T. A., David, D., Bustamante, V., Torres, J., & Fins, A. (2001). Dreams in the acute aftermath of trauma and their relationship to ptsd. *Journal of Traumatic Stress, 14*, 241-247.
- Niedźwieńska, A. (2003). Gender differences in vivid memories. *Sex Roles, 49*(7-8), 321-331.
- Nielsen, T. A., Zadra, A. L., Simard, V., Saucier, S., Stenstrom, P., Smith, C., & Kuiken, D. (2003). The Typical Dreams of Canadian University Students. *Dreaming, 13*(4), 211.
- Nolen-Hoeksema, S. (1990). *Sex differences in depression*. Stanford: Stanford University Press.
- Oberst, U., Charles, C., & Chamarro, A. (2005). Influence of gender and age in aggressive dream content of Spanish children and adolescents. *Dreaming, 15*(3), 170.
- Oliver, M. B., & Hyde, J. S. (1993). Gender differences in sexuality: a meta-analysis. *Psychological Bulletin, 114*(1), 29-51.
- Oppenheim, A. L. (1956). The interpretation of dreams in the Ancient Near East. With a Translation of an Assyrian Dream-book. *Transactions of the American Philosophical Society, 179-373*.
- Osgood, D. W., & Lee, H. (1993). Leisure activities, age, and adult roles across the lifespan. *Loisir et Société/Society and Leisure, 16*(1), 181-207.
- Ouellet, D., Duchesne-Pérusse, A., Paquet-Biron, M., Sabourin, C., De Koninck, J. (2009). Disappearance of gender differences in the dreams of university students. *Sleep, 32*, A424.
- Palmer, M. (1986). *T'ung shu, the ancient Chinese almanac of life*. Boston: Shambhala Publications.
- Parr, J. (1995). *A diversity of women: Ontario*. Toronto, ON: University of Toronto Press.
- Prasad, B. (1982). Content analysis of dreams of Indian and American college students—A cultural comparison. *Journal of Indian Psychology, 4*, 54-64.
- Punamaki, R- L. (1998). The role of dreams in protecting psychological well-being in traumatic conditions. *International Journal of Behavioral Development, 22*, 559-588.
- Rainville, R. E., & Rush, L. L. (2009). A contemporary view of college-aged students' dreams. *Dreaming, 19*(3), 152-171.
- Revonsuo, A. (2000). The reinterpretation of dreams: An evolutionary hypothesis of the function of dreaming. *Behavioural and Brain Sciences, 23*(6), 877-901.

- Revonsuo, A., Tuominen, J., & Valli, K. (2015). The Avatars in the Machine. In T. K. Metzinger & J. M. Windt (Eds.), *Open MIND* (pp. 1-28). Frankfurt am Main: MIND Group.
- Rinfret, N., Lortie-Lussier, M., & De Koninck, J. (1991). The dreams of professional mothers and female students: An exploration of social roles and age impact. *Dreaming*, 1(3), 179.
- Roberts, P., & Newton, P. M. (1987). Levinsonian studies of women's adult development. *Psychology and Aging*, 2(2), 154-163.
- Roussy, F., Raymond, I. & De Koninck, J. (2000). Affect in REM dreams: Exploration of a time-of-night effect. *Sleep*, 23, A174–A175.
- Sabourin, C. (2010). *Rêves de grossesse et du post-partum: leurs caractéristiques et leur relation avec les symptômes dépressifs et anxieux*. Unpublished Doctoral Thesis, Université d'Ottawa.
- Sabourin, C., Touchette-Giroux, V., & De Koninck, J. (2008). Dreams during pregnancy: Relationship with waking depression. *Sleep*, 31, A380-A380.
- Saline, S. (1999). The most recent dreams of children ages 8–11. *Dreaming*, 9, 173-181.
- Sándor, P., Szakadát, S., & Bódizs, R. (2014). Ontogeny of dreaming: a review of empirical studies. *Sleep medicine reviews*, 18(5), 435-449.
- Schneider, A. & Domhoff, G.W. (2016). The quantitative study of dreams (online). Available from: <http://www.dreamresearch.net/> (Accessed Feb 10, 2016).
- Schnittker, J. (2007). Look (Closely) at All the Lonely People Age and the Social Psychology of Social Support. *Journal of Aging and Health*, 19(4), 659-682.
- Schredl, M. (2002a). Factors influencing the gender difference in dream recall frequency. *Imagination, Cognition and Personality*, 22(1), 33-39.
- Schredl, M. (2002b). Questionnaires and diaries as research instruments in dream research: Methodological issues. *Dreaming*, 12(1), 17-26.
- Schredl, M. (2012). Continuity in studying the continuity hypothesis of dreaming is needed. *International Journal of Dream Research*, 5(1), 1-8.
- Schredl, M., Ciric, P., Bishop, A., Golitz, E., & Buschtons, D. (2003). Content analysis of German students' dreams: Comparison to American findings. *Dreaming*, 13(4), 237-243.
- Schredl, M., Ciric, P., Götz, S., & Wittmann, L. (2004). Typical dreams: stability and gender differences. *The Journal of Psychology*, 138(6), 485-494.
- Schredl, M., & Doll, E. (1998). Emotions in diary dreams. *Consciousness and Cognition*, 7(4), 634-646.

- Schredl, M. & Hofmann, F. (2003). Continuity between waking activities and dream activities. *Consciousness and Cognition*, 12, 298-308.
- Schredl, M., Lognitzer, T., & Vetter, S. (1998). Is the ratio of male and female dream characters related to the waking-life pattern of social contacts? *Perceptual and motor skills*, 87(2), 513-514.
- Schredl, M., Nürnberg, C., & Weiler, S. (1996). Dream recall, attitude toward dreams, and personality. *Personality and Individual Differences*, 20(5), 613-618.
- Schredl, M., Palmer, R., & Montasser, A. (1996). Anxiety dreams in school-aged children. *Dreaming*, 6(4), 265.
- Schredl, M., Paul, F., Lahl, O., & Göritz, A. S. (2010). Gender Differences in Dream Content: Related to Biological Sex or Sex Role Orientation? *Imagination, Cognition and Personality*, 30(2), 171-183.
- Schredl, M., & Piel, E. (2005). Gender differences in dreaming: Are they stable over time?. *Personality and Individual Differences*, 39(2), 309-316.
- Schredl, M., & Piel, E. (2003). Gender differences in dream recall: data from four representative German samples. *Personality and Individual Differences*, 35(5), 1185-1189.
- Schredl, M. & Reinhard, I. (2008). Gender differences in dream recall: a meta-analysis. *Journal of Sleep Research*, 17(2), 125-131.
- Schredl, M., Sahin, V., & Schäfer, G. (1998). Gender differences in dreams: do they reflect gender differences in waking life? *Personality and Individual Differences*, 25(3), 433-442.
- Schredl, M., Schäfer, G., Hofmann, F., & Jacob, S. (1999). Dream content and personality: Thick vs. Thin boundaries. *Dreaming*, 9(4), 257.
- Schredl, M., Schroder, A. & Lo, H. (1996). Traumer leben von alteren Menschen Teil 2: Empirische Studie und Diskussion. *Zeitschrift für Gerontopsychologie und psychiatrie*, 1, 43-53.
- Schreuder, B., Kleijn, W., & Rooijmans, H. (2000). Nocturnal re-experiencing more than forty years after war trauma. *Journal of Traumatic Stress*, 13, 453-463.
- Schultz, R. (1985). Emotion and affect. In J. E. Birren and K. W. Schaie (Eds.), *Handbook of the psychology of aging* (2<sup>nd</sup> ed.). New York: Van Nostrand Reinhold.
- Sered, S., & Abramovitch, H. (1992). Pregnant dreaming: Search for a typology of a proposed dream genre. *Social Science & Medicine*, 34(12), 1405-1411.

- Sikka, P., Valli, K., Virta, T., & Revonsuo, A. (2014). I know how you felt last night, or do I? Self-and external ratings of emotions in REM sleep dreams. *Consciousness and Cognition*, 25, 51-66.
- Sirois-Berliss, M., & De Koninck, J. (1982). Menstrual stress and dreams: Adaptation or interference. *Psychiatric Journal of the University of Ottawa*, 7(2), 77-86.
- Smith, B. G. (2013). *Women's studies: The basics*. New York: Routledge.
- Snyder, F. (1970). The phenomenology of dreaming. In L. Madow & L. Snow (Eds.), *The psychodynamic implications of the physiological studies on dreams* (pp. 124-151). Springfield, IL: Thomas.
- Solms, M. (2000a). Dreaming and REM sleep are controlled by different brain mechanisms. *Behavioral and Brain Sciences*, 23, 843-850.
- Somerville, L. H. & Casey, B. J. (2010). Developmental neurobiology of cognitive control failure to appetitive cues in adolescence. *Journal of Cognitive Neuroscience*, 23, 2123-2134.
- Somerville, L. H., Hare, T., & Casey, B. J. (2011). Frontostriatal maturation predicts cognitive control failure to appetitive cues in adolescents. *Journal of Cognitive Neuroscience*, 23(9), 2123-2134.
- Somprasong, C. (2012). A Comparative Study of the Characteristics, Content and Meanings of Dreams in Classical and Modern Thai Literature with the Phrommachat. *The International Journal of East Asian Studies*, 17(1), 54-66.
- Spanos, N. P., Stam, H. J., Radtke, H. L., & Nightingale, M. E. (1980). Absorption in imaginings, sex-role orientation, and the recall of dreams by males and females. *Journal of Personality Assessment*, 44(3), 277-282.
- St-Onge, M., Lortie-Lussier, M., Mercier, P., Grenier, J., & De Koninck, J. (2005). Emotions in the Diary and REM Dreams of Young and Late Adulthood Women and Their Relation to Life Satisfaction. *Dreaming*, 15(2), 116.
- Stramba-Badiale, M., Ceretti, A., & Forni, G. (1979). Sleep characteristics of elderly and very long-lived subjects. *Minerva Medica*, 70(36), 2551-2554.
- Strauch, I. (2005). REM dreaming in the transition from late childhood to adolescence: A longitudinal study. *Dreaming*, 15(3), 155-169.
- Strauch, I., & Lederbogen, S. (1999). The home dreams and waking fantasies of boys and girls between ages 9 and 15: A longitudinal study. *Dreaming*, 9(2-3), 153-161.
- Strauch, I., & Meier, B. (1995). *In search of dreams: Results of experimental dream*

- research. Albany: State University of New York Press.
- Szmigielska, B. & Holda, M. (2007). Students' views on the role of dreams in human life. *Dreaming*, 17, 152-158.
- Thomas, S. P. (2003). Men's anger: A phenomenological exploration of its meaning in a middle class sample of American men. *Psychology of Men & Masculinity*, 4(2), 163-175.
- Tonay, V. (1990). California women and their dreams: A historical and sub-cultural comparison of dream content. *Imagination, Cognition, and Personality* 10, 83-97.
- Tremblay, S. (1999). Crime statistics in Canada, 1998. Juristat 19, 9. Catalogue 85-002. Ottawa: Statistics Canada.
- Underwood, M. K. (2003). *Social aggression among girls*. New York, Guilford Press.
- Valli, K., & Revonsuo, A. (2009). The threat simulation theory in light of recent empirical evidence: a review. *The American journal of psychology*, 17-38.
- Van de Castle, R. L. (1994). *Our dreaming mind*. New York: Ballantine Books.
- Victor, C., Scambler, S., Bond, J., & Bowling, A. (2000). Being alone in later life: Loneliness, social isolation and living alone. *Reviews in Clinical Gerontology*, 10(4), 407-417.
- Vidal, J., Mills, T., Pang, E. W. & Taylor, M. J. (2012). Response inhibition in adults and teenagers: Spatiotemporal differences in the prefrontal cortex. *Brain and Cognition*, 79, 49-59.
- Von Sydow, K. (1992). Eine Untersuchung zur weiblichen Sexualität im mittleren und höheren Erwachsenenalter. *Zeitschrift für Gerontologie*, 25, 105-112.
- Waterman, D. (1991). Aging and memory for dreams. *Perceptual and motor skills*, 73(2), 355-365.
- Waterman, D., M. De Jong, & Magdelijns, R. (1988). Gender, sex role orientation and dream content. *Sleep* '86, pp. 385-387. New York: Gustav Fischer Verlag.
- Waugh, B. (2011). Canadians and Americans are more similar than assumed. *University of British Columbia News*. Retrieved from <http://news.ubc.ca/2011/07/07/canadians-and-americans-are-more-similar-than-assumed/>.
- Weed, S. C. & Hallam, F. M. (1896). A study of the dream consciousness. *American Journal of Psychology*, 7, 405-411.
- Wiebe, S. T., Lamarche, L. J., Sabourin, C., Lortie-Lussier, M., & De Koninck, J. (2007). The dreams of women with and without severe emotional behavioral premenstrual symptoms. *Dreaming*, 17(4), 199-207.
- Wolcott, S., & Strapp, C. M. (2002). Dream recall frequency and dream detail as mediated by

- personality, behavior, and attitude. *Dreaming*, 12(1), 27-44.
- Wright, J., & Koulack, D. (1987). Dreams and contemporary stress: A disruption-avoidance adaptation model. *Sleep*, 10(2), 172-179.
- Yamanaka, T., Morita, Y., & Matsumoto, J. (1982). Analysis of the Dream Contents in Japanese College Students by REMP-Awakening Technique. *Psychiatry and Clinical Neurosciences*, 36(1), 33-52.
- Yu, C. K. C., & Fu, W. (2011). Sex dreams, wet dreams, and nocturnal emissions. *Dreaming*, 21(3), 197.
- Yurgelun-Todd, D. (2007). Emotional and cognitive changes during adolescence. *Current Opinion in Neurobiology*, 17(2), 251-257.
- Zadra, A. (2007). 1093: Sex dreams: What do men and women dream about? *Sleep*, 30, A376.
- Zadra, A., & Domhoff, G. W. (2011). Dream content: quantitative findings. *Principles and practice of sleep medicine*, 5, 585-94.
- Zanasi, M., DeCicco, T. L., Dale, A. L., Musolino, G., & Wright, C. (2012). Dreams with sexual imagery: Gender differences in content between Canadians and Italians. *Imagination, Cognition and Personality*, 32(2), 151-164.
- Zanasi, M., De Persis, S., Caporali, M., & Siracusano, A. (2005). Dreams and age. *Perceptual and Motor Skills*, 100 (3c), 925-938.
- Zayas, L. H. (1988). Thematic features in the manifest dreams of expectant fathers. *Clinical Social Work Journal*, 16(3), 282-296.
- Zepelin, H. (1980). Age differences in dreams: I. Men's dreams and thematic apperceptive fantasy. *International Journal of Aging and Human Development*, 12, 171-186.