Dreams' Impact in Life and Fiction:

An Analysis of Dreams in a Normative Canadian Sample and in Shakespearean Plays

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Curriculum Studiorum

Raphaëlle Robidoux received a B.A. with honors from the University of Ottawa in the Faculty of Social Sciences, School of Psychology, in June 2015.

Articles

Sabourin, C., **Robidoux, R**., Pérusse, A.D. & De Koninck, J. (2018). Dream Content in Pregnancy and Post-Partum: Refined Exploration of Continuity Between Waking and Dreaming. *Dreaming, . Volume 28,* Issue 2, 122–139.

Nixon, A., **Robidoux, R**., Dale, A. & De Koninck, J. (2017). Pre-sleep and post-sleep mood as a complementary evaluation of emotionally impactful dreams. *International Journal of Dream Research, 10*(2), 141-150.

Lafrenière, A., Lortie-Lussier, M., **Robidoux, R**., Dale, A., & De Koninck, J. (in press, available online 2017). Autobiographical Memory Sources of Threats in Dreams. *Consciousness and Cognition.* Volume 58, 124–135.

Summary of published work

Robidoux, R., Dale, A., De Koninck, J. (2016). A modern scientific exploration of dream content in Shakespeare's plays. Presented at the meeting of the European Sleep Research Society, Bologna, September 2016. Abstract published in *Journal of Sleep Research, 25*, Supplement 1, 244.

Robidoux, R. & Chartier, S. (2016). Simulation comparative de l'apprentissage graphique acontextuel: délai d'apprentissage en fonction de la flexiblité linguistique des transpositions écrites. Presented at the 5th conference of the Association for Research in Neuroeducation, Montréal, Québec, May 2016. Abstract published in *Neuroéducation, 4*(1), 17.

Robidoux, R., Dale, A., Lafrenière, A., Nixon, A., De Koninck, J. (2015). Dream Mood and Morning Mood Differentiates Emotionally Impactful Versus Mundane Dreams For Negative But Not For Positive Valence. *Sleep Medicine*, WASM 2015 Editorial, May 2015.

Lafrenière, A., **Robidoux, R.,** Dale, A., De Koninck, J. (2015). Waking Threats and the Temporal References of Dream Threat Simulations. *Sleep Medicine,* WASM 2015 Editorial, May 2015.

Dale, A., Wong, C., **Robidoux, R**., & De Koninck, J. (2014). Incorporation of inverted vision in dreams and daytime adaptation to visual inversion. *International Journal of Dream Research, 7*, S72.

Articles in preparation

Robidoux, R., Lafrenière, A., & Girard-Joyal, O. (In preparation). The new ethics of cognition.

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Abstract

Dreams have been widely shared, analyzed, and explored for centuries. Throughout cultures and contexts, some dreams seem to leave a lasting trace on waking life, whereas other dreams are forgotten as quickly as they appear. This thesis focuses its efforts on the former category, known as impactful dreams. Impactful dreams are rare and distinguished by their effect on the dreamer's thoughts, feelings, and/or behavior. Some dreams, including impactful dreams, also contain threatening oneiric material, which may be seen as mirroring threatening content the dreamer will have to face, or has already faced, in waking life.

This thesis contributes to the study of dream content by using modern dream analysis methods to investigate impactful dreams and threats in dreams, drawing from a large normative sample of Canadians' dreams, but also from the oneiric content found in works written by William Shakespeare. It was expected that both samples would share certain oneiric traits, but that Shakespeare's in-play dreams would contain more oneiric threats, would have an impact on the dreamer by default, and would most notably affect the narrative of the play. In contrast, normative Canadian dreams were expected to show a lesser tendency towards both impact and threatening content.

The first article explores all impactful dreams found within a normative sample of Canadian dreams, investigating their impactful dream type and their link to waking and dreaming mood. The second article does the same within the scope of Shakespeare's fictional works, and compares the two samples in terms of dream impact, threats, and overall oneiric content.

Contributions

Article 1

This article was an extensive reworking of the rationale underlying my honors thesis, using a focused and homogenous sample of dreams judged to show concrete impact. This paper has been submitted to *International Journal of Dream Research* and is currently in print under a shortened form. Ashley Janet Nixon is the first author on the published paper; she ran the analyses and provided the preliminary framework to the manuscript. Dr. Joseph De Koninck oversaw the preparation of the manuscript and provided invaluable guidance.

My unique contribution entailed the original idea and research as well as the sample selection, literature review, writing, and interpretation.

Article 2

This article is the result of work on oneiric content in Shakespeare's plays. This article was originally a presentation, given by myself, Dr. Joseph De Koninck, Dr. Antonio Zadra, and Dr. Allyson Dale, on the occasion of Shakespeare's 400th anniversary of death in 2016. As part of the Shakespeare 400 series organized by the University of Ottawa's English department, we were invited to give a presentation on the oneiric content found within the Bard's works. A wealth of novel content was found using modern dream analysis. This discovery led to further analysis, conducted by me, for the purposes of the School of Psychology's master's practicum symposium, and to two further presentations. This extended work became an article, upon which an additional analysis of threats and impact was made to create the finalized, present version. Alexandre Lafrenière, who has extensively studied threatening material in dreams, gave helpful guidance and agreed to share his threat scoring criteria, as seen in the article *Autobiographic Memory Sources of Threats in Dreams* (available online in 2017). Kaitlyn Butterfield and myself conducted analysis on narrative and personal impact.

My unique contribution entailed the sample selection, design, literature review, redaction, analysis, and interpretation. Ashley Nixon generously gave advice and guidance on the comparison of the second and first articles' results. Dr. Joseph De Koninck also provided guidance and oversaw collaborative work on the project. As a completely original focus for the paper, Dr. De Koninck suggested that the impact of characters' dreams on the storyline be analyzed. This analysis combines psychology and literature in a novel manner, and is the key contribution of the article at present.

1.0 Introduction

Throughout so-called "primitive" human history, dreams have often been of paramount importance. They have played an important psychosocial role within communities, in addition to serving as a key indicator of psychological and physiological changes on an individual level (Van de Castle, 1994). As time went on, most societies kept a special consideration for dreaming life, even as empiricism become more and more prevalent as a core decision-making tool (Hall, 1996). Dreams, which were often associated with religious or spiritual influences, would sometimes be seen as subconscious messages, with roots into the psyche or soul of the dreamer (Frazier, 1922).

Times changed, however, and with them humankind's understanding of the dreaming life. The contemporary view of dreams is markedly different from that which was held by our ancestors. Most scientifically-inclined dream research, a fairly recent domain, presents dreams as a highly unique mix of complex elements having to do with one's traits, life experiences, preferred imagery, fearful ideas, and social interactions, to name but a few possible factors (Bogzaran & Deslauriers, 2012; Domhoff, 1996).

Current views on the study of dreaming highlight the multiple layers of dream formation; from this perspective, dreams are constructed through a variety of influences operating in a hierarchal fashion (De Koninck, 2012). Layers of formation begin at a neurological level, and integrate endogenous and exogenous stimuli experienced by the dreamer. Cognitive, emotional,

sociocultural, and autobiographical influences thus become superimposed onto biological foundations to create a novel experience, that of a dream.

New theories, derived from empirical facts through the extensive observation of dreaming life, see dreams as extensions of waking, interweaved with daily events and perhaps having a role to play in the dreamer's waking psyche. Dreams do indeed seem to mirror aspects of daily life, especially in the context of lasting life events; for example, pregnancy and child-rearing in waking life are typically associated with related oneiric content (Sabourin, Robidoux, Pérusse & De Koninck, 2018). In contrast, mundane daily events, without associated emotional context, are extremely difficult to match to specific oneiric elements, with success thresholds close to those expected from chance (Roussy et al, 2000). Ultimately, oneiric activity is widely described as a way to process and integrate real-life experiences into the dreamer's existing base of worldly knowledge, albeit in varying ways (Hall & Norby, 1972).

Dreams and their Impacts

Although we typically dream several times a night, most of us do not remember those dreams, save for a few fragments; and even when we do remember a dream, it is often quickly forgotten. This has been hypothesized to have an adaptive function; dreams may take up mental space that could be better used by the analysis of waking life elements (Domhoff, 1999).

However, some dreams are indeed remembered, and the majority of those dreams involve negative content, such as negative emotions, failures, aggressions, and misfortunes (Sirois-Berliss, 1982). It has been suggested that this is due to specificities of the tools used to quantify dream content, including external judges' tendency to rate negative emotions as more present and more intense than would have the dreamer (Shredl & Doll, 1998), rather than to a

characteristic inherent to dreaming itself. Indeed, dream content coding systems such as the Hall and Van de Castle system, a popular tool for dream content analysis, may be biased in favor of negative emotions; this possibility is made likely by the fact that alternate scoring methods tend to yield a more even balance between positive and negative oniric elements (Merritt, Stickgold, Pace-Scholl, Williams, & Hobson, 1994; Roussy, Raymond, & De Koninck, 2000). Although this may indeed be the case, negative preponderance in dreams is a widely held finding that was found throughout a range of samples and situations (Dale, Lafrenière & De Koninck, 2017; Dale, Lortie-Lussier & De Koninck, 2015; summarized in De Koninck, 2012).

Negative tone can certainly be found in threatening dreams, which is to say, dreams often contain at least some elements experienced as menacing by the dreamer. Explored and detailed by Revonsuo, as part of his suggested Threat Simulation Theory (e.g., Revonsuo, 2000), threatening material in dreams may be seen as having had an adaptive function. According to Revonsuo, prehistoric humans who dreamed of certain threats may have been more likely to successfully face those threats in waking life, and as such to win the natural selection lottery. In other words, men and women who dreamed of threats they had encountered in waking life, and presumably were likely to encounter again, had the chance to experiment with different problem-solving methods in a completely safe context. In addition, the dreams might have also allowed for a degree of emotional desensitization to upsetting events, lessening the likelihood of a maladaptive response due to an overload of stress. Dreams would have, in essence, helped humans survive waking life in more dangerous times.

The Threat Simulation Theory does not state that modern dreams serve a similar purpose through the materialization of oneiric threats; its premise is that dreams used to be useful, and that they may now still be so but could also be an evolutionary remnant (Valli & Revonsuo, 2009). This

being said, in modern times, threatening dreams would still recreate daily events that are linked to a negative emotional charge for the dreamer (Valli & Revonsuo, 2009). Furthermore, dreams with threats would more typically contain elements related to the dreamer's remote past, although recent minor waking threats would activate the threat simulation mechanism that uses such remote negative elements to create dream material (Lafrenière, Lortie-Lussier, Dale, Robidoux, & De Koninck, 2017). Many threatening dreams contain negative elements that the dreamer remembers upon waking; in that sense, the dreams may be said to leave a mark, however slight.

However, it must be mentioned that dreams are often negative in tone; it is not uncommon to experience threatening content in dreams, usually to a greater extent than could be expected from daily waking life (Valli, 2008). Despite the preponderance of negative content in typical dreams, oneiric experiences rarely leave a lasting impression. Dreams still tend to be quickly forgotten, and are rarely identified as either emotionally disturbing or uplifting past the point of waking. Notwithstanding this typical lack of remembered impact, the very concept of dreaming may be understood as being steeped in emotionality.

Dreaming: The Emotional Life

Although dreamers do not tend to explicitly state oneiric emotions in a spontaneous manner, they will almost always choose an emotion for every single segment of a reported dream when prompted, suggesting that little oneiric activity is utterly emotionless (Nielsen, Deslauriers & Bayor, 1991). Such an assertion is made biologically likely through the association of limbic and paralimbic brain structures, instrumental in the treatment and manifestation of emotional content, with REM sleep activation (Nir & Tononi, 2010). Moreover, dreams are theorized to show intensified emotions as

compared with daily life, in accordance with the exaggerated, bizarre narrative elements frequently found in dream life (Hobson, Pace-Schott, & Stickgold, 2003). As an addendum, emotionality in dreams might not always find a perfect correspondence with dream elements, as would be expected from a waking life transposition; dreamers frequently mention, for example, that a bizarre dream element was not found to be "weird", or that emotional reactions to dream elements were disproportionate to what they would expect to occur in waking life, were they confronted to the same situations. This discrepancy speaks of dreams as a "safe space", where, perhaps, dreamers might develop a type of emotional maturity through the contextualization and eventual integration of relevant emotionality (Hartmann, 1996).

Both genders and all age groups, although they may experience and describe dream emotions in differing patterns, exhibit emotionality in dreams (Merritt & al, 1994; Dale, Lortie-Lussier & De Koninck, 2015). Everyday dreams typically contain elements that are both positive and negative in affect, without being necessarily conducive to a corresponding emotional reaction upon waking. As mentioned above, emotionality tends to be skewed towards the negative in the ordinary dreamer's experience, although some researchers have argued for an even balance between positive and negative valance (Schredl & Doll, 1998; Stairs & Blick, 1979; Stewart & Koulack, 1993).

All in all, emotion is a driving force behind dream study and theory. In fact, it is not uncommon for theories of dream formation to cite emotion as the dominant force behind oneiric creation (Davidson, Lee-Archer, & Sanders, 2005; Hartmann, 1996), typically accompanied by life experience and narrative facets (Kramer & Glucksman, 2006). Emotions have even been suggested to shape the very process of dreaming creation (Seligman & Yellin, 1987). Kuiken and Busik (1996), for example, propose that individuals who self-report impactful dreams tend to experience the same type of impactful dream over time, exhibiting specific emotions, motivations, and in-dream sensations,

although not necessarily narrative threads, in a consistent manner that may be linked to individual emotional profiles.

Furthermore, specific personality traits tend to be correlated with dream vividness and recall across time and themes (Hartmann, Rosen, & Rand, 1998), suggesting that the dreamer's individual predispositions may be associated with real-life emotions and impact following a dream, content notwithstanding. Of course, it goes without saying that dissociating personality traits in waking life from those appearing as symbolism, interactions, and content tendencies in dreaming life is nigh impossible. Waking and dreaming life appear to be inextricably linked, and a mutually exclusive definition of the forces influencing them is practically impossible (Lang & O'Connor, 1984; De Koninck & Koulack, 1975). Dreams may or may not serve an adaptive purpose, but they can certainly inform us as to the nature of the men and women who produced and recalled them in the first place.

Emotionally Impactful Dreams

Most, if not all, dreams contain emotions; yet dreams are still rarely remembered or felt upon waking. It is a rare and specific category of dreams, known as impactful dreams, that leaves a conscious emotional mark on the dreamer. In fact, impactful dreams create a strong impression on the dreamer's waking life. Importantly, this occurs in a completely spontaneous manner. If one adheres to the evolutionary hypothesis that dreams take up too much unnecessary space in one's mind not to be erased quickly (Pagel, 2014), then it would appear that those impactful dreams, those that do not disappear without a conscious trace, may well be exceptionally useful, adaptively speaking. This interpretation of impactful dreams certainly lends great interest to their study and furthered understanding.

First codified by Kuiken two decades ago, impactful dreams may be broadly defined as belonging to three distinct types, or categories: there are anxiety dreams, existential dreams, and transcendent dreams (Kuiken & Sikora, 1993). Although the first two types of dreams are predominantly negative in tone and content, they are not necessarily nightmares, which are usually defined as dreams so negative that one will be woken up by the disturbing emotional intensity of the experience (Robert & Zadra, 2008). As for the latter category of impactful dreams, it is distinctly positive in nature. Positively toned dreams have seldom been studied in the context of impact and usefulness, perhaps because humans are predisposed to remember negative events with greater emotional attachment (Rozin & Royzman, 2001). Impactful dreams will nevertheless leave a lasting emotional impression on the dreamer, whether positive or negative, upon waking. In this regard, impactful dreams can, as a whole, be distinguished from the most typical and common form of dreams, that is to say mundane dreams. The latter are primarily characterized by an absence of impactful characteristics, and involve little to no emotional and intellectual carry-over into the dreamer's waking life and feelings (Busink & Kuiken, 1995).

To the contrary, the underlying purpose of an impactful dream may be to provide a deeper layer of personal understanding. As Kuiken and Sikora (1993) suggest, "Dreaming…sensitizes us to additional layers of significance; it alerts us to aspects of our life-worlds that we typically ignore." Impactful dreams indeed have, as their name indicates, an impact on their dreamer, and especially on their waking thoughts and feelings (Busink & Kuiken, 1995). As a consequence, such dreams may be identified through asking the dreamer whether the dream "most definitely and significantly influenced" emotions and thoughts following the dream- that is to say, in waking life (Kuiken, Lee, Eng, & Singh, 2006).

Of course, one must first admit the prevalent theory that dreams serve some kind of adaptive function in order to believe impactful dreams, and perhaps dreams containing threats, do so to a greater degree. Not all dream researchers see oneiric content as meaningful (Domhoff, 2001), and not all researchers see dreaming itself as a productive endeavor, beyond its biological link to sleep and memory consolidation (Foulkes, 1985). This being said, both the Threat Simulation Theory and the theory of impactful dreams evolve from a framework that proposes at least some dreams have a value, whether historical or current. Although no definitive answer can be given, this thesis' framework may best be conceptualized as an investigation of possible dream function(s), and of the oneiric underpinnings of such functions through the exploration of dreaming experiences. One of those experiences involves dream construction, in parallel to its emotional valence, incorporating threats to the dreamer's well-being. Another experience is that of atypical, impactful dreams.

Theoretical Implications

At the root of those assumptions, and as the basis of Revonsuo's Threat Simulation Theory, lies the continuity theory, which states that dreams are a reflection of waking life, to a more or less precise degree. According to the continuity theory, objects, individuals, feelings, and situations of waking life may find themselves creatively incorporated into dream fabric. The continuity theory has been supported by numerous studies (Nielson & Levin, 2007; Stewart & Koulack, 1993; Van der Kolk & al., 1984, to name but a few) and is compatible with most additional theories of dream function and construction alike. However, there is still controversy as to its nature and the spectrum of its application (Hobson & Schredl, 2011; Schredl, 2012). Early proponents of the notion (Hall, 1953; Domhoff, 2011; Foulkes, 1985) mention continuity with

respect to cognitive ability and daily concerns, while concurrent research expands it to daily activities and, in essence, all waking experiences (Eichenlaub, Cash & Blagrove, 2017; Schredl & Hoffmann, 2003; Schredl & Reinhard, 2012).

The mastery theory is an alternate yet compatible theory, which stipulates that the goal of dreaming is to increase mastery in real life (Breger, 1967). This goal would be accomplished through the representation of problematic events within dream narrative, albeit under a disguised appearance and resorting to significant contextual shifts, most typically regarding settings and interpersonal interactions. Those changes are seen as protective to the dreamer's psyche, constructed in order to avoid triggering the dreamer into feeling the full weft of the disturbing situation's negative emotional charge (Hall & Norby, 1972). This contextual difference allows the dreamer to experiment with various techniques aimed at problem-solving, without unnecessary upset or the indelible real-life consequences of a clumsy waking attempt. The predominance of negative elements in dreams would be linked to the activation of the amygdala during REM sleep, which has been shown to be time-locked to the rapid eye movements characteristic of REM sleep and dreams (Corsi-Cabrera et al, 2016).

Yet another theory is known as the disruption-avoidance-adaptation model, and suggests that sleep introduces both problem-solving phases linked to the mastery hypothesis, and balancing phases that would allow for the incorporation of creative elements, with the additional aim of allowing emotional and cognitive rest from the cyclical mastery phases (Wright & Koulack, 1987). The conceptualization of balancing phases is closely linked to the compensation theory, typically less supported by current research. This last theory suggests that dreams provide a balance to waking life by integrating elements that are missing from daily experiences (Bokert, 1958; Cartwright, 1972).

For the purposes of this thesis, the continuity theory will be adopted as a global framework, in its broadest sense. The mastery theory is also an undeniable underpinning of the rationale behind the study of threats.

In this context, Revonsuo's Threat Simulation Theory may be seen as a subset of the mastery theory. Recent research suggests that the TST may play a key role in shaping threatening oneiric content linked to remote autobiographical memories (Lafrenière, Lortie-Lussier, Dale, Robidoux & De Koninck, 2017; Vallat, Chatard, Blagrove, & Ruby, 2017), arguably providing a broader interpretation of the classical continuity framework of dream formation.

Purposes and Hypotheses

Through the framework of continuity, it is hypothesized that studying dreams may tell us something about waking life; but also that waking life may tell us something about our dreams. The global purpose of this work is to analyze the representation of waking life in dreams, including a sample of imagined, fictionalized dreams. This research involves the investigation of overall dream content, threats, and impactful traits, but also an observation of waking mood and impact as may be linked to dream content.

However, the more specific purpose of this work will be, first, to investigate whether impactful dreams do have an impact on mood. Very little is known about impactful dreams' relationship with waking mood, as much as can be measured, in addition to their impact on emotions and thoughts. We also seek to obtain more information regarding the presence of threats in dreams and their impact. Finally, we wish to examine how oneiric elements translate into the works of Shakespeare, and whether his acute understanding of human nature allowed for his plays to be consistent with dimensions of dreaming revealed by modern scientific research.

In the first article, *Pre-Sleep and Post-Sleep Mood as a Complementary Evaluation of Emotionally Impactful Dreams*, a normative sample of Canadians provided impactful dreams. Those atypical dreams were then studied in terms of their relationship to mood in the evening, during the dream, and in the morning.

Although waking mood may seem to be directly linked to dreaming mood, this is not always the case, as the directionality of the relationship may shift or become bidirectional (Antunes-Alves & De Koninck, 2012; Kramer, 1993). Emotionally impactful dreams are, by definition, thought to have influenced morning mood, according to the dreamers' self-assessments. They are also very rare. It may then be that specific evening conditions, emotionally speaking, are most conductive to their generation. The relationship between evening mood, dream mood, and morning mood was consequently explored as a construct of interest.

It was hypothesized that there would be a strong link between evening and dream mood, and between dream and morning mood, in the case of impactful dreams. It was also hypothesized that this link would not be found to the same degree in mundane dreams. In line with general observations on the valence of dream content, it was further hypothesized that negative mood in the evening would be linked with a negative mood during the impactful dream and with negative mood upon waking. Similarly, positive mood in the evening was expected to be linked with positive mood during the impactful dreams and with a positive mood upon waking.

In the second article, *An Exploration of Shakespeare's Dreams with Modern Scientific Tools and Theories: Normative Comparison with Canadian Dreams,* a somewhat atypical sample was used. Modern dreams have been studied empirically and normatively within a number of previous studies. However, the oneiric content of Shakespeare's plays has been little studied outside of the literary community and Freudian analysis (e.g., Armstrong, 2001). Shakespeare's dreams have so

far escaped thorough quantitative psychological analysis. In this context, the study of Shakespeare's dreams provided an original context to study dream content through the imagination of a classical writer. How does Shakespeare's intuitive dream construction insert itself within modern theories of dream construction and formation?

If the oneiric content of Shakespearean plays mirrors that found by current dream research, the elements of the play are expected to find themselves integrated into dream narratives onstage. Furthermore, if the Threat Simulation Theory is either strongly supported, and/or intuitively understood, by Shakespeare, it may be that Shakespearean characters' dreams contain a high number and intensity of threats, as their daily lives also tend to be threatening. Finally, dreams were expected to have some influence on either the character or the story, and as such to be impactful, in order to be included within the story at all. This expectation is in contrast with the rare occurrence of impactful dreams in "real" modern life. Furthermore, it also introduces the idea of dreams as narratively impactful, changing the storyline and narrative thread, as opposed to or in conjunction to changing characters' feelings upon waking. This is in line with Shakespeare's occasional use of dreams as prophetic, and relates to Antiquity-era traditions regarding the representation of dreams in artistic material. It is hopefully a novel understanding of impactful dreams from a psychological standpoint, enriching the modern study of Shakespeare's classics with a fresh perspective.

All in all, it was hypothesized that dreams in Shakespeare's plays would be impactful as a rule, rather than as the exception. It was also thought that Shakespeare's written dreams would contain more threats, of a more severe nature, and more examples of negatively toned impactful dream types, than modern Canadian dreams.

Throughout both studies, the continuity theory was expected to hold sway: dreams were, at their core, expected to reflect waking life. This would mean than oneiric content in Shakespeare's plays would differ from that of everyday Canadians, since the waking lives of interest would also differ. In the latter sample, that of Canadians, the continuity theory would also mean that mood changes across evening, dream, and morning would vary differently if the dream were impactful than if it were not. Underlying those hypotheses is the theory that dreams and waking life fundamentally mirror each other, in emotions as in intellectual concerns. It is this overarching conceptualization that will be explored throughout the thesis as a whole. In this sense, the two separate topics of the present work can be seen as being united into a cohesive unit, and to follow a logical course of investigation, as the first article discusses current applications of the continuity hypothesis, whereas the second article explores its implications beyond this framework and perspective.

2. Methods and Results: Research Articles

2.1 Article 1

Pre-Sleep and Post-Sleep Mood as a Complementary Evaluation of Emotionally Impactful Dreams

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Pre-Sleep and Post-Sleep Mood as a Complementary Evaluation of Impactful Dreams

Abstract

Introduction: Impactful dreams are reported by the dreamer to have an effect on waking mood. However, the time course relationship of negative and positive impactful dreams with pre-sleep and post-sleep mood has not been examined closely.

Methods: A total of 32 participants (21 females) reported one dream self-rated as either very or extremely emotionally impactful and one dream self-rated as not at all emotionally impactful (mundane dream), totalling 64 dreams. Participants completed a dream diary as well as pre-sleep, dream, and post-sleep mood checklists. They also completed rating scales of the impact of their dreams. The Hall & Van de Castle method was used for dream coding and analysis. A dream containing more positive than negative emotions was classified as positively impactful and vice versa.

Results: The 2 x 3 analysis of variance demonstrated a significant difference between mundane dreams and both negative and positive impactful dreams. Overall, negative impactful dreams were associated with higher negative mood levels at pre-sleep, in dream, and at post-sleep, compared to mundane dreams. Conversely, positive impactful dreams were associated with more positive mood levels during the dream and at post-sleep, but not at pre-sleep. Correlational analyses demonstrated that in negative impactful dreams, negative dream mood strongly correlated with negative post-sleep mood. Similarly, in positive impactful dreams, positive dream mood strongly correlated with positive post-sleep mood. However, pre-sleep and dream

mood, whether positive or negative, did not significantly correlate. Additionally, there was a significant correlation between pre-sleep and post-sleep positive mood in positive impactful dreams and mundane dreams.

Conclusion: These results confirm that dream mood and post-sleep mood are positively related, further suggesting a potential effect of dreams on post-sleep mood. The absence of a relationship between pre-sleep and dream mood undermines the continuity theory as well as modern dream function theories for emotions. The threat simulation theory is also used to interpret results.

Key words: impactful dreams, emotions, mood

Introduction

Dreams and their Impacts

Dreams have often been of paramount importance. Although one typically dreams several times a night, most do not remember their dreams. Even when one does remember a dream, it is often quickly forgotten. This forgetfulness has been hypothesized to have an adaptive function. Specifically, if dreams were always remembered, they would take up mental space that could be otherwise used for the analysis of real-life events (Domhoff, 2000).

A particular category of dreams, known as impactful dreams, can have a lasting impression on the dreamer's waking feelings and thoughts. If one adheres to the evolutionary hypothesis that thinking is adaptive, then there is no reason to believe typical dreams serve an adaptive function (Domhoff, 2000). However, it would then appear that impactful dreams may serve a purpose from an adaptive standpoint since they are not as easily forgotten as mundane (non-impactful) dreams. This interpretation of impactful dreams certainly lends interest to their study and furthered understanding.

Impactful Dreams

First coined by Kuiken, impactful dreams are emotionally charged, can be spontaneously remembered, and influence the dreamer in some way (Kuiken & Sikora, 1993). They can have an influence on waking thoughts, emotions, or both. The present study investigates the affect of an emotionally impactful dream and its interplay with evening to morning mood. This affect, which is of particular interest in the present study, can be broken down into two categories: positive dreams, associated with positive emotions and oneiric events, and negative dreams, which are linked to negative emotions and oneiric events.

Impactful dreams are typically identified through asking the dreamer whether the dream had an influence on their emotions and thoughts in waking life (Kuiken & al., 2006). In this study, impactful dreams will be explored by focusing on the element of emotion, an overarching trait present in virtually all impactful dreams, according to both the dreamer and independent judges (Kuiken & Sikora, 1993).

Emotions and the Hall and Van de Castle Method

The Hall and Van de Castle (HVDC) method of content analysis (1966) was born out of a need to score and reliably measure dream content in a consistent manner across differing individuals and dreamer circumstances (Hall & Van de Castle, 1966). A widely used tool in dream studies, the HVDC method allows for almost all elements of a dream report to be classified (Schneider, 2015). For the purpose of this study, only the emotion category will be examined in order to compare positive and negative dreams and their relationships to experienced waking emotions.

Dream Emotion: Reports and Interpretation

It is not uncommon for theories of dream formation to cite emotion as one of the dominant forces behind oneiric creation (Davidson, Lee-Archer, & Sanders, 2005; Kramer & Glucksman, 2006). Emotions may even shape the narrative process of dreaming to begin with (Seligman & Yellin, 1987). Such an assertion is made biologically likely through the associations of limbic and para-limbic brain structures, which are instrumental in the treatment and manifestation of emotional content during REM sleep (Nir & Tononi, 2010). However, the issue of isolating emotions that have been felt by the dreamer, as opposed to emotions that might be inferred from dream content by judges, has been explored for decades. Even as they built their dream scoring system, Hall and Van de Castle noticed that written language allows for many variations of emotional states

and that reducing those possibilities to only five inclusive coding subcategories was arduous (Hall & Van de Castle, 1966).

Perhaps as a result of this difficulty, the Hall and Van de Castle method only takes an emotion into account when the dreamer explicitly designates it by name in his or her report (Hall & Van de Castle, 1966). An exception to this direct stating criterion can only be made if the dreamer provides a description of a typically emotional physical reaction accompanied by a clear emotional reason for such a physical display. The most commonly cited example in the HVDC training material is "I cried because I knew my mother was dead" (Hall & Van de Castle, 1966). This may create an underrepresentation of emotions in scored dreams. Indeed, it would appear that dreamers, when prompted, will almost always choose an emotion for every segment of a reported dream, suggesting that little oneiric activity is utterly emotionless (Nielsen, Deslauriers & Bayor, 1991).

The HVDC method has also been claimed to specifically underestimate the prevalence of positive emotions (Schredl & Doll, 1998). Because the HVDC system presents only one unambiguously positive coding category for emotions, as compared with three unambiguously negative ones, it might conceivably limit coding opportunities for positive feelings. Schredl and Doll (1998) explored this possibility by asking participants to identify specific emotions as they described their dreams, and this without being exposed to emotional categories such as the ones that are found in the HVDC method. Positive and negative content was almost evenly found by Schredl and Doll (1998), which contrasts with other findings indicating an increase in the presence of negative emotions, compared to positive emotions, in dreams, both in oniric narratives and in dreamer self-evaluations (Merritt, Stickgold, Pace-Scholl, Williams, & Hobson, 1994; Roussy, Raymond, & De Koninck, 2000).

What seems to differentiate monotonous dreams from those that truly impact the dreamer, however, is not the mere presence of emotion, but rather its degree of intensity and perceived significance upon waking.

Mood Shifts and Dreaming

The relationship between evening, sleep, and morning mood has yet to be clearly defined by existing literature. Multiple studies have attempted to elucidate this question by using self-rated mood checklists with adjectives such as "angry", "afraid", or "elated" for evening, dream, and morning mood (De Koninck and Koulack, 1975; Antunes-Alves & De Koninck, 2012; Schultz & Koulack, 1980; Sirois-Berliss & De Koninck, 1982).

Mood checklists have progressively revealed that the relationship between evening, dream, and morning mood is not a straightforward process. In his comprehensive chapter on the biology of dreaming, Kramer elaborates that evening and morning mood are rarely linked in a predictive manner, whereas pre-sleep mood does indeed seem to influence dream mood, which in turn may influence morning mood (Kramer, 2005). This indirect relationship has been supported by research on specific characteristics that appear to influence both dream content and morning mood. As an example, it has been hypothesized that frequent nightmare sufferers experiencing a negative mood before going to bed may be predisposed to negative mood within dreams, which in turn creates negative and stressful states upon waking (Antunes-Alves & De Koninck, 2012). Studies on menstrual stress and aggressiveness have found that pre-sleep menstrual stress is correlated with in-dream anxiety and fear (Sirois-Berliss & De Koninck, 1982), whereas those same emotions are not represented in morning mood (Schultz & Koulack, 1980). Since impactful dreams usually have strong emotional content, they are a promising contender for the study of such a layered relationship.

Particularly relevant to this project is the general observation that dream content and emotions tend to be negative (Dale, Lortie-Lussier, Wong, & De Koninck, 2016), especially in comparison with waking experience (e.g. Sirois-Berliss, 1982; reviewed by De Koninck, 2012). It would be of interest to further document the transition between pre-sleep and post-sleep mood by considering the varying emotional levels in dreams.

Theoretical Implications

This current study examines the relationship between dreams and the pre-sleep to post-sleep emotional state. In doing so, this study draws from the continuity theory, which states that dreams are a reflection of waking life. According to this theory of dream formation, objects, individuals, feelings, and situations experienced in real life find themselves creatively incorporated into dream fabric. In the theory's broadest form, it is presumed that dreams and waking life have an influence on each other that may manifest itself through dream content, themes, and emotionality. However, it has also been proposed that continuity is principally manifested through cognitive experiences and concerns (e.g. Domhoff, 2011). This being said, the continuity theory has been supported by numerous studies (e.g. Nielsen & Levin, 2007; Stewart & Koulack, 1993), and is compatible with a number of dream function theories exploring the possible role of dreaming. One such theory, known as the mastery hypothesis, stipulates that the goal of dreaming is to increase mastery in real life (Adler, 1931; Breger, 1967). This mastery process is accomplished through the representation of problematic events within dream narratives. These events are typically disguised in appearance. This may occur in order to avoid triggering the dreamer into feeling the full weft of the disturbing situation's negative emotional charge (Hall & Norby, 1972). This contextual difference allows the dreamer to experiment with various techniques aimed at resolving a problem, without the real-life

consequences of a clumsy waking attempt. The mastery hypothesis may in turn be understood through one of its specific variants, the Threat Simulation theory. This theory states that, throughout evolution, dreams may have provided a stage onto which it became possible to safely rehearse threats to one's survival (Revonsuo, 2000). According to the Threat Simulation theory, dreamers who actively integrated possible waking-life threats within oneiric content were more likely to react appropriately when faced with such threats upon waking, and as a result, were also more likely to survive. While this theory does not propose that the incorporation of threats in dream serves a contemporary function, it remains of related interest to observe mood variations linked to dreams that are considered negative. More closely related to the emotional dimension of dreams, Malinovski and Horton (2014; 2015) recently proposed that dreaming reflects the processes of emotional assimilation attributed to sleep, and that dreams are correspondingly linked to waking emotionality, especially in the case of highly emotional waking events. While the authors do not claim that dreaming contributes directly to emotional assimilation, examining the relationship between emotional levels in dreams and during the following morning through this perspective may provide a relevant conceptual context.

Purpose

The aim of this study is to use the context of impactful dreams, narrowed down to its emotional content or valence, to further examine the relationship between evening mood, dream mood, and morning mood. According to the continuity theory, mood from evening, dream, and morning should all be correlated. However, in the case of impactful dreams, this may not be the case. Specifically, impactful dreams may not necessarily find their source from immediate pre-sleep mood but perhaps from a distant past, thus perhaps explaining their emotional resonance. But in order to have an impact on the dreamers, there should still be a relationship between dream and

morning mood. This study will consequently explore negative and positive impactful dreams, compared with each other and with non-impactful dreams. Self-rated emotional patterns surrounding the dream will also be examined across time from evening to morning.

Hypotheses

The global hypothesis is that evening, dream, and morning mood will follow differing patterns depending on whether they are associated with a non-impactful dream, positive impactful dream, or negative impactful dream.

Giving rise to more specific predictions, and assuming that dreams tend to be generally more negative than positive:

1) The main effect of dream type will be significantly different if the dream is impactful, as compared to non-impactful; it will also differ between positively impactful and negatively impactful dreams.

2) There will be a significant main effect of time across evening, dream, and morning mood for positive impactful dreams and negative impactful dreams, in contrast to mundane dreams.

More specifically when correlations are calculated,

3) In the case of positive impactful dreams, positive evening and dream mood will be significantly positively correlated with positive morning mood, and negatively correlated with negative morning mood.

4) In the case of negative impactful dreams, negative evening and dream mood will be significantly positively correlated with negative morning mood, and negatively correlated with positive morning mood.

Methodology

Participants

The population from which the sample was drawn comes from a normative dream study led through the University of Ottawa's Sleep laboratory. The sample was drawn uniquely from the survey's young adult and adult categories, which includes 566 individuals between 18 and 39 years of age. Participants meeting the inclusion criteria were those who had experienced both an impactful dream and a non-impactful dream on different nights. The sample included all participants meeting inclusion criteria and was composed of 32 participants, including 21 females, for a total of 64 separate dreams.

Measures

Dream Questionnaire This involved the detailed description of one's dream. The questionnaire was specifically adapted from that proposed by Kuiken's Post-Dream Questionnaire or PDQ (2006). The first PDQ-adapted statement, "My mood in the dream affected my mood in the morning", was used to identify emotionally impactful dreams. A similar version of this statement is still used in recent research (such as Lee & Kuiken, 2015). Participants would rate how true they believed the statement was on a four-point scale, from "not at all" to "extremely".

In the present study, the dreamer was not directly asked whether the dream was "impactful", as has been done in previous studies on the topic (Kuiken & Sikora, 1993; Kuiken, Lee, Eng, & Singh, 2006). Instead, a dream would be classified as impactful if the dreamer judged that the dream had had an impact on their morning mood through a rating of either "a lot" or "extremely". This dichotomous approach to categorizing impactful dreams was utilized with the goal of ensuring only highly emotionally charged dreams would be selected, especially

considering the limited presence of impactful dreams in general. A non-impactful dream was judged as such if the participant rated the dream as "not at all" influencing morning mood.

Mood Checklists Every evening before going to sleep, and again every morning upon waking, participants filled out a four-point mood checklist. For each proposed emotion, they would rate the degree of its saliency from "not at all" to "extremely". A very similar mood checklist was also used in the main questionnaire for self-reporting emotions during the dream. Those emotions were happy/happiness, afraid/fear, sad/sadness, and angry/anger. For statistical purposes, the score for the three negative emotions were averaged, whereas for happiness, the actual score was used. The emotion of confusion, found in both the HVDC scale and the mood checklist, was not included in these analyses due to its ambiguous tone.

Procedure

Every time participants experienced a dream at home, they would describe the dream and complete the dream questionnaire, as well as three mood checklists. The first mood checklist was in regards to evening mood; this was completed in the evening before falling asleep. The other two checklists, which were completed in the morning after a dream, measured in-dream and morning mood. The study lasted until two dreams were experienced by the participant, or until three weeks had passed.

Once a dream was identified as impactful, it was analyzed in order to determine whether it was a positive or negative dream. This process involved a variant of the HVDC scoring system. Impactful dreams were scored according to standard criteria, and were selected as negative if they contained more stated negative emotions than positive ones, and vice versa. If no emotion was mentioned, dreams would be scored as negative if they contained more failures and misfortunes than successes and good fortunes, and vice versa. Representative examples of

positive and negative impactful dreams, in addition to a representative example of a mundane dream, have been included in Appendix A. The final sample included 22 negative impactful dreams (*M* = 202 words), 10 positive impactful dreams (*M* = 133 words) and 32 mundane dreams (*M* = 161 words).

This study's approach to categorizing the main emotional valence of an impactful dream may straighforwardly classify dreams with elements of mixed emotionality, thus possibly obscuring emotional elements of interest. However, additional classification methods were used in order to ensure the chosen valence category would best represent the dream's emotional content.

The HVDC scoring method for emotions was validated by assessing all impactful dreams individally with three different additional approaches. The first approach compared the summation of both successes and good fortunes (positive) to the total number of failures and misfortunes (negative); dreams with more negative elements were coded as negative, and vice versa. After determining the tone of each impactful dream, all but one dream corresponded to the original HVDC emotion coding score. The second validation approach used the pleasantness self-rating scores from the dream diary. If the dream had been rated as more pleasant than unpleasant, it was considered a positively toned dream, and vice versa. Using this method, all dreams except three were scored with the same tone as the HVDC emotion coding score. Finally, the third validation method compared the self-rated dream emotion score from the post-sleep dream diary to the HVDC emotion score. Only two self-rated dream emotion scores were found to differ with the HVDC dream emotion score. Overall, one individual dream was found to be an exception across two validation methods; all other exceptions differed from method to method. Therefore, since all classifications based on HVDC were validated by at least one other criterion, all dreams were kept for the analysis.

Table 1 displays the mean stated emotion frequency scored through the HVDC method for negative and positive impactful dreams. For comparison purposes, it also displays the mean self-rated pleasantness and unpleasantness ratings of those same dreams. With the same aim, Table 2 shows the raw count of elements implying valence in emotionally impactful dreams. Finally, Table 3 provides the mean self-rated in-dream emotion intensity for anger, fear, sadness, and happiness, as provided by the dreamer upon waking.

Table 1

Mean Stated Emotion Frequency and Self-Rated Pleasantness/Unpleasantness Scores for Impactful Dreams

	Mean Negative Emotions Frequency	Mean Positive Emotion Frequency	Mean Pleasantness Score (out of 4)	Mean Unpleasantness Score (out of 4)
Negative Impactful Dreams	1.18	0.08	1.47	3.47
Positive Impactful Dreams	0.27	0.45	3.18	1.3

Table 2

Raw Count Frequency of Dream Content Elements Implying Valence for Impactful Dreams

	Misfortunes	Good Fortunes	Failures	Successes
Negative Impactful Dreams	14	2	12	0
Positive Impactful Dreams	1	0	1	2

Table 3

Mean Self-Rated Emotion Intensity in Dreams for Impactful and Mundane Dreams

Emotion	Negative Impactful Dreams	Positive Impactful Dreams	Mundane Dreams
Joy	1.38	2.6	1.74
Anger	2.5	1.9	1.45
Sadness	3.19	0.48	1.51
Fear	2.85	1.3	1.84

The self-rated scores of the four emotions used in this study (happiness, fear, sadness, and anger) were collected before, during, and after sleep, for both the impactful dream and the non-impactful dream of each participant.

Statistics

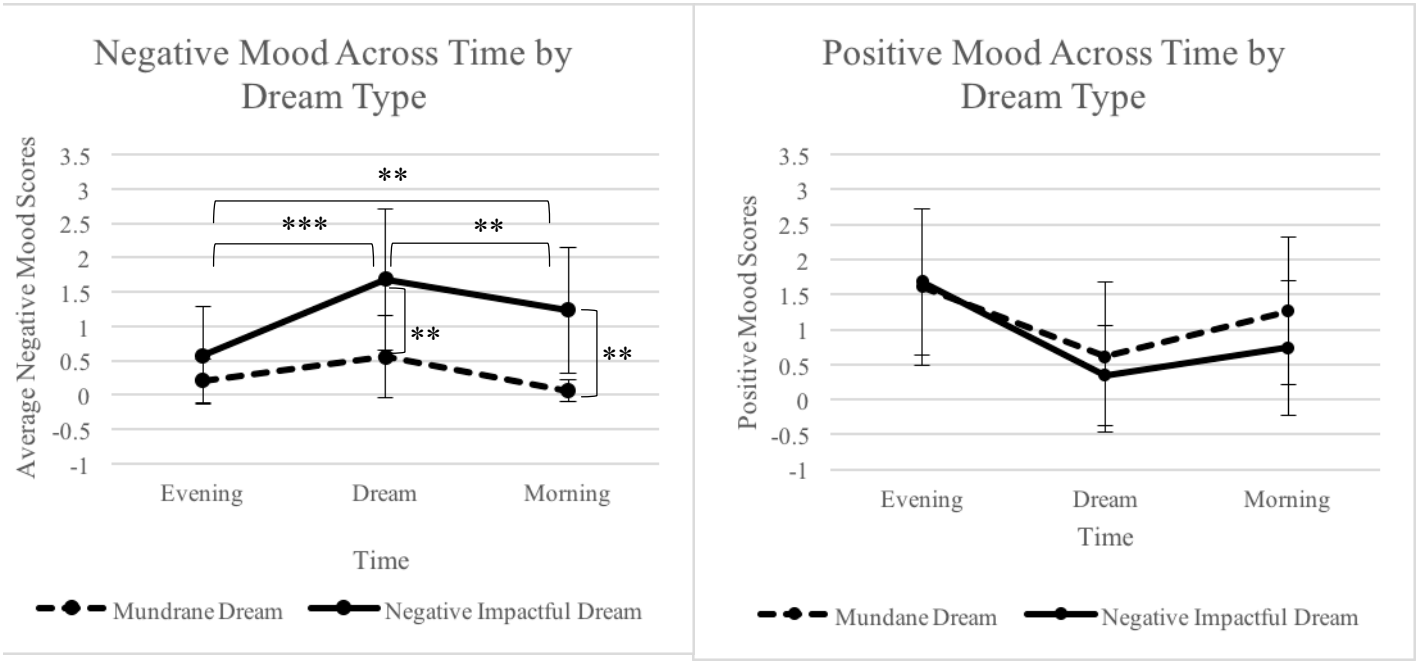
Statistical analyses were accomplished using SPSS (version 23). Four 2 x 3 repeated ANOVAs were conducted to compare the effects of dream type (mundane and impactful) across time (evening, dream and morning) for both negative and positive impactful dreams. This was completed on both negative (fear, anger, and sadness average) and positive mood (happiness score). Trend analyses were also performed for all four tests. Correlational analyses were

executed to further explore the relationships between evening, dream, and morning mood. Post-hoc t-tests explored differences detected by the ANOVAs; Bonferroni corrections were applied to account for multiple comparison.

Results

Negative Impactful Dreams Compared to Mundane Dreams

The left panel of Figure 1 illustrates the 2 x 3 repeated ANOVA between mundane dreams and negative impactful dreams, specifically regarding average negative mood scores across time. There was a significant main effect for dream type, $F(1, 21) = 34.935$, $p < .0001$, and time, $F(2, 42) = 15.999$, $p < .0001$. The interaction between dream type and time was also significant, $F(2, 42) = 12.078$, $p < .0001$. Specifically, negative mood in impactful dreams can be observed to be much higher compared to mundane dreams, particularly during the dream and at post-sleep. Additionally, negative mood increases at dream time and relatively decreases at post-sleep for both groups, as indicated by a significant quadratic trend, $F(1, 21) = 23.991$, $p < .0001$. Thus, mood changes across time and differs between dream types. In the right panel of Figure 1, a 2 x 3 repeated ANOVA between mundane dreams and negative impactful dreams, specifically regarding positive mood scores across time, is illustrated. Only the main effect of time was found to be significantly different, $F(2, 42) = 12.696$, $p < .0001$. In other words, high positive evening mood decreases during the dream and increases again in the morning, as shown by a significant quadratic trend, $F(1, 21) = 16.487$, $p = .001$. It can be observed that positive mood in the morning, after a negative impactful dream, is lower than after a mundane dream.



Post-hoc t-tests: *p ≤ .05. **p ≤ .01. ***p ≤ .001

Figure 1: ***Mood Across Time by Dream Type (Negative Impactful Dreams)***

In the left panel, mundane and negative impactful dreams have a main effect of time, $F(2, 42) = 15.999$, $p < .0001$, dream type, $F(1, 21) = 34.935$, $p < .0001$, as well as a significant interaction, $F(2, 42) = 12.078$, $p < .0001$, when average negative mood scores (anger, sadness, fear) are compared across time (evening, dream, morning). In the right panel, mundane and negative impactful dreams have a main effect of time, $F(2, 42) = 12.696$, $p < .0001$, when positive mood (happiness) is compared across time (evening, dream, morning).

N.B. In order to facilate ease of reading, post-hoc results were not shown across graphs for Figure 1. Please refer to Table 7 for all significant post-hoc results.

Table 4 demonstrates the significant correlations for negative and positive mood in negative impactful dreams across time. There was a highly significant positive correlation between dream and morning negative mood, $r = .768$, $p < .0001$, and between positive dream mood and positive morning mood in negative impactful dreams, $r = .798$, $p < .0001$. There was also a strong negative correlation between positive dream mood and negative morning mood, $r = -.641$, $p = .001$. Likewise, there was a negative correlation between negative dream mood and positive morning mood, $r = -.651$, $p = .001$. There was, however, no significant correlation between pre-sleep mood and dream mood, as well as pre-sleep and post-sleep mood for positive or negative emotions.

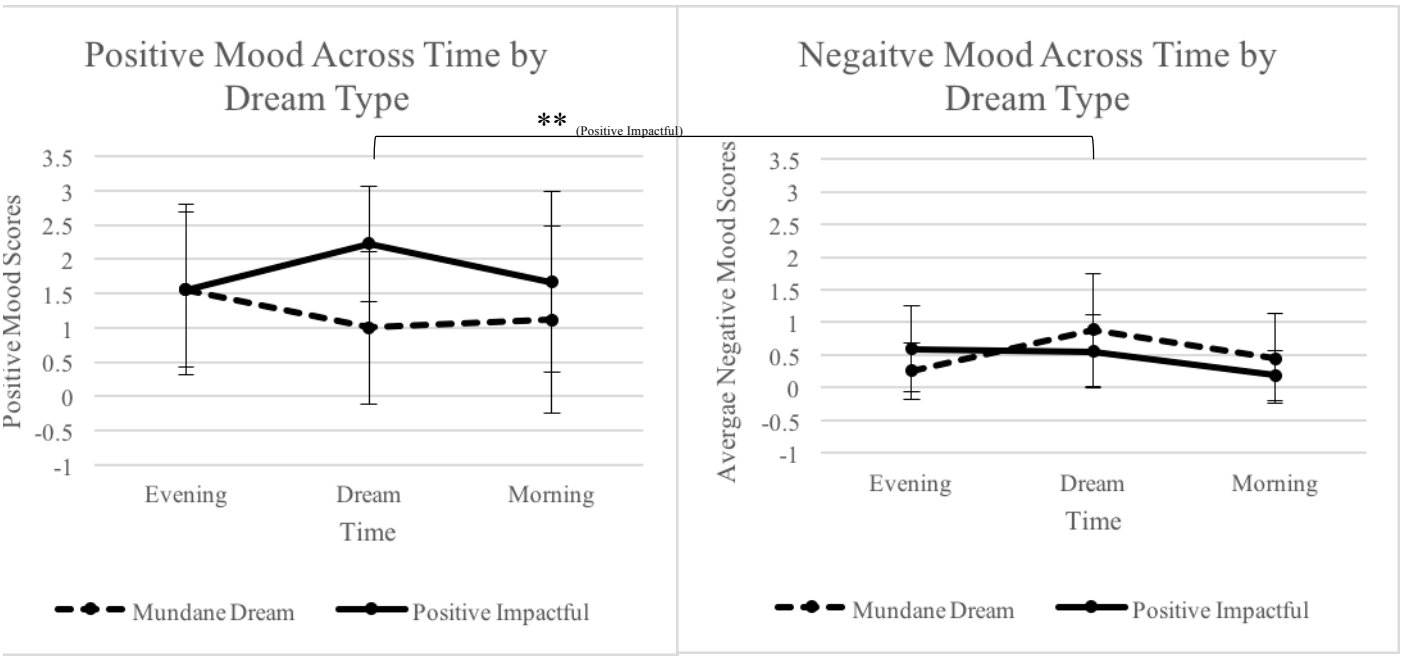
Table 4

Correlations for Negative Impactful Dreams

	r (correlation)	*P* value	*N* value
Negative Dream Emotions VS. Negative Morning Emotions	.768	<.0001	23
Positive Dream Emotions VS. Negative Morning Emotions	-.641	.001	23
Negative Dream Emotions VS. Positive Morning Emotions	-.651	.001	23
Positive Dream Emotions VS. Positive Morning Emotions	.798	<.0001	23

Positive Impactful Dreams Compared to Mundane Dreams

A 2 x 3 repeated measures ANOVA, comparing mundane dreams and positive impactful dreams across time for positive mood, is shown in the left panel of Figure 2. In this analysis, only the interaction of time and dream type was found to be significant, $F(2, 16) = 6.276$, $p = .010$. Specifically, dream types demonstrated different patterns in mood across time. An increase in positive mood during impactful dreams and a decrease in positive mood during mudane dreams can be observed. The right panel of Figure 2 represents the final 2 x 3 repeated ANOVA, which compares positive impactful dreams and mundane dreams across time for negative mood. The interaction was found to be the only significant effect, $F(2, 16) = 3.959$, $p = .040$. There was a relative stability in negative mood from evening to dream time for the positive impactful dream group; however, there was an increase in the mundane dream group. In mundane dreams, negative emotions increased during the dream and decreased at post-sleep, whereas there was no such increase in negative mood during positive impactful dreams. Interestingly, it can noted that pre-sleep mood was already positive. Based on these results, it can be concluded that both dream types present differential patterns in terms of negative mood across time.



Post-hoc t-tests: *p ≤ .05. **p ≤ .01. ***p ≤ .001.

Figure 2: ***Mood across time by dream type (positive impactful dreams)***

In the left panel, mundane and positive impactful dreams have a significant interaction, F(2, 16) = 6.276, p = .010, when positive mood (happiness) is compared across time (evening, dream, morning). In the right panel, mundane and positive impactful dreams have a significant interaction, F(2, 16) = 3.959, p = .040, when averages of negative mood (sadness, fear, anger) are compared across time (evening, dream, morning).

Table 5 lists the significant correlations between mood (positive and negative) in a positive impactful dream. In this case, positive dream emotions were significantly negatively correlated with negative morning emotions, $r = -.811$, $p = .008$, and positively correlated with positive morning emotions, $r = .756$, $p = .018$. Interestingly, positive evening emotions were also positively correlated with positive morning emotions, $r = .808$, $p = .008$, confirming the non-interference of the dream emotions in evening to morning mood.

Table 5

Mood Across Time by Dream Type (Positive Impactful Dreams)

	r (correlation)	*P* value	*N* value
Positive Dream Emotions VS. Negative Morning Emotions	-.811	.008	9
Positive Evening Emotions VS. Positive Morning Emotions	.808	.008	9
Positive Dream Emotions VS. Positive Morning Emotions	.756	.018	9

Table 6 demonstrates the significant correlations between mood (positive or negative) in mundane dreams. It can be observed that positive evening emotions were positively correlated to negative dream emotions, $r = .362$, $p = .042$, as well as positive morning emotions, $r = .627$, $p = .0001$. Additionally, negative evening mood was positively correlated with negative morning mood, $r = 488$, $p = .005$. Negative dream mood was also correlated with negative morning mood, $r = .452$, $p = .009$.

Table 6

Significant Correlations for Mundane Dreams

	Negative Evening Mood	***Positive Evening Mood***	***Negative Dream Mood***	***Positive Dream Mood***	***Negative Morning Mood***	***Positive Morning Mood***
Negative Evening Mood	-	*-.288*	*.035*	*.141*	*.488***	*-.182*
Positive Evening Mood		-	*.362**	*.114*	*-.011*	*.627****
Negative Dream Mood			-	*-.051*	*.452***	*.117*
Positive Dream Mood				-	*-.084*	*.342*
Negative Morning Mood					-	*-.241*
Positive Morning Mood						-

*p ≤ .05. **p ≤ .01. ***p ≤ .001.

Post-Hoc Tests

Paired t-tests correcting for multiple comparison were conducted as post-hoc tests. Table 7 displays t-test results that remained significant after correction. First, pairs were compared across time periods, holding dream type and valence constant (significance threshold adjusted at .008 using Bonferroni corrections). There was a significant difference between negative mood in negative impactful dreams from evening to dream, from dream to morning, and from evening to morning (respectively; t (21) = -4.84, p = < .0001; t (22) = 3.21, p = .004; t (21) = -3.206, p = .004). Additionally, dream valence was compared, holding time and dream type constant (significance threshold adjusted at .008). In this context, there was a significant difference between negative and positive mood scores in the context of a negative impactful dream, in the evening as well as during the dream (respectively; t (21) = -3.536, p = .002; t (22) = 3.886, p = .001). When positive and negative mood in a positive impactful dream were compared, only mood in dream was significantly different (t (8) = 4.423, p =.002). Furthermore, when positive and negative mood in mundane dreams were compared, a significant difference was found between these states at the evening and morning time points (respectively; t (22) = -5.321, p < .0001; t (22) = -5.202, p < .0001). Finally, when dream types were compared for the same dream valence and time (significance threshold adjusted at .004), regarding negative mood in negative impactful dreams and mundane dreams, there was a significant difference between dream mood and morning mood (respectively t (22) = -5.197, p < .0001; t (22) = -6.191, p < .0001).

Table 7

Significant Multiple Paired T-Test with Multiple Comparison Corrections

	Mean	*Df*	*t* value	*p* value
Negative Evening Mood vs. Negative Dream Mood (Negative Impactful Dream)	-1.121	21	-4.84	< .0001
Negative Dream Mood vs. Negative Morning Mood (Negative Impactful Dream)	.449	22	3.21	.004
Negative Evening Mood vs. Negative Morning Mood (Negative Impactful Dream)	-.636	21	-3.206	.004
Negative Evening Mood vs. Positive Evening Mood (Negative Impactful Dream)	-1.106	21	-3.536	.002
Negative Dream Mood vs. Positive Dream Mood (Negative Impactful Dream)	1.333	22	3.886	.001
Negative Dream Mood vs. Positive Dream Mood (Positive Impactful Dream)	1.667	8	4.423	.002
Negative Evening Mood vs. Positive Evening Mood (Mundane Dream)	-1.406	22	-5.321	< .0001
Negative Morning Mood vs. Positive Morning Mood (Mundane Dream)	-1.203	22	-5.202	< .0001
Negative Dream Mood (Negative Impactful Dream) vs. Negative Dream Mood (Mundane Dream)	-1.130	22	-5.197	< .0001
Negative Morning Mood (Negative Impactful Dream) vs. Negative Morning Mood (Mundane Dream)	-1.174	22	-6.191	< .0001

Discussion

Results from this study indicate that impactful and mundane dreams differ across time and mood. The presence of dichotomously positive and/or negative mood in impactful dreams is consistent with the notion that impactful dreams do have a measurable influence on the pre-sleep to post-sleep change in mood. This change is significantly different in the context of mundane dreams. As expected, the main effect of dream type differed depending on the impactful or non-impactful nature of the dream. This phenomenon was clearly observed when mundane dreams were compared to both negative and positive impactful dreams. The highly significant correlation between dream mood and morning mood for impactful dreams further validates this notion since it is not as consistently seen in mundane dreams. Of interest is that even in mundane dreams, mood tends to be more negative than positive. In addition, positive and negative impactful dreams seem to follow different variations in emotionality across time. Post-hoc t-tests further supported this tendency, most notably by showing highly significant distinctions between evening, dream, and morning mood in the context of negative impactful dreams; this was not observed in positive impactful dreams. The current observations consequently validate the usefulness of impactful dreams regarding everyday emotional dimensions. This facet of impactful dreams has not been extensively examined in past literature (such as Kuiken et al., 2006; Kuiken, Loverso, Dunn & Carlisle, D., 2001; Kuiken & Sikora, 1993).

From a theoretical perspective, the observation that impactful dreams appear to be relatively independent from pre-sleep mood does not support the continuity theory for emotions. However, the correlation between dream mood and morning mood indicates a continuity relationship,

bringing partial support to the theory. Furthermore, the current results do support the threat simulation theory in the case of negative dreams. Indeed, threats in negatively toned dreams do appear spontaneously. As for their effect on morning mood, they seem to be linked with a relative increase of negative mood in the morning, compared to pre-sleep. Although no causal relationship can be established with this methodology, the possibility is supported by post-hoc analysis. It is also consistent with the findings that dreams tend to be more negative, and that threats in dreams can appear even in the absence of significant threats in the pre-sleep experience (Lafrenière, Lortie-Lussier, Robidoux, Dale & De Koninck, under review). Dreams may allow one to simulate threatening events in a dream setting. Specifically, it would allow dreamers to cognitively rehearse the mechanisms needed to perceive and avoid threats (Bradshaw, De Koninck, Lafrenière, Amini, & Lortie-Lussier, 2016; Revonsuo, 2000). The increase in negative emotion from pre-sleep to post-sleep, in the case of negative impactful dreams, confirms the potential influence of threatening or negative dream mood (see the left panel of Figure 1). Interestingly, this suggests that if these dreams comprise threat simulations, their effect is not positive enough to lower post-sleep negative mood.

In addition, it should be specified that, in the absence of immediate pre-sleep threats, the dream generation system may select salient emotional mnesic traces from the distant past. This may have a stronger impact on the dreamer. In this context, a relatively low negative pre-sleep mood may not prevent the dreamer from experiencing negatively impactful dreams, since those dreams would contain threats from the distant past, which are more likely to have a strong emotional component attached to their oneiric presence.

Associating such strong negative emotions with an evolutionarily adaptive dream may further cement its impact and potential use in waking life. Indeed, negative emotions are remembered

more vividly than positive ones (Kensinger, 2007); the relative absence of dream elements implying valence in positive impactful dreams (see Tables 1-2) may be due to a lesser degree of vividness. This bias for negative elements may increase the salience of threat-resolution attempts linked to negative emotions. Moreover, both the Threat Simulation theory (Revonsuo, 2000) and the emotional assimilation theory (Malinovski & Horton, 2015) do not claim that negative dreams reduce contemporary morning stress. Rather, it may be that the benefits of this dreaming activity are realised in the long term.

Moreover, in impactful dreams overall, independently of valence, there is not necessarily a clear and direct link between pre-sleep emotions and dream mood. The pre-sleep experience does not seem to shape the impactful dream experience, or at least not unequivocally so. This finding, coupled with the sporadic and rare nature of impactful dreams, suggests that such oneiric episodes might differentially refer to waking life when compared to more frequent mundane dreams. In other words, impactful dreams might integrate incorporations differently, perhaps giving rise to heightened emotional affect as a result.

Analyses also indicate that positive impactful dreams and mundane dreams differ significantly in mood, particularly during dreams but also in the morning. Positive impactful dreams are indeed followed by a more positive morning mood than mundane dreams (see the left panel of Figure 2), although post-hoc analysis does not show this trend as significant. It still, however, suggests that morning mood is more positive in the case of positive impactful dreams, whereas pre-sleep mood in mundane dreams does not improve significantly overnight, and in fact may even become more negative. The reduction in positive mood associated with mundane dreams carries over to waking mood. This interestingly suggests that even remembering mundane dreams does seem to

reduce positive morning mood. It would be important, in future studies, to compare morning mood after a remembered mundane dream to morning mood when there is no dream recall.

In brief, specific to this study, results indicate that dream mood and morning mood are especially related. Since emotions have been proposed to be at the core of dreams (Seligman & Yellin, 1987), this relation may be especially true for impactful dreams (Kuiken & Sikora, 1993).

Limitations and Directions for Future Studies

Various strengths can be identified in this study. Since the sample was drawn from a large normative study, this confirmed that impactful dreams are a minority. In this case, out of 566 participants, only 32 having experienced one strongly emotional impactful dream were found. This study also suggests that impactful dreams can be differentiated from mundane dreams through measures of emotional valence, both self-reported and scored by external judges. This can also be confirmed using the HVDC scale.

It can be proposed that emotions in impactful dreams are especially central, since this study found significant emotional differentiations between positive and negative impactful dreams despite the possible limitations of the HVDC method. Alternately, this may be related to increased emotional intensity and centrality in impactful dreams, which possibly results in emotions being frequently mentioned in dream reports. Further studies could address these hypotheses with the help of alternate emotion scoring methods, such as using dreamers' self-reports of within-dream emotions. In that regard, involving the dreamer in the process of dream coding, among other methods, has been suggested as increasing the validity of emotional scoring (Sabourin, Robidoux, Pérusse & De Koninck, under review). This alternate technique would have the added benefit of addressing emotion intensity, which is not directly covered by the HVDC scoring system. Since impactful dreams are defined by their emotional impact, scoring

emotional intensity might allow for a deeper understanding of the nature and implications of these dreams. Additionally, different age groups could be included in the analysis, since in-dream emotions have been reported to diminish in frequency as age increases, as well as interact with both gender and age (Dale, Lortie-Lussier & De Koninck, 2015; Dale, Lafrenière & De Koninck, in press).

In addition to these considerations, it must be mentioned that temporal references in dreams were not considered in this study, although the dream diaries contained a lengthy section in which participants would rate the temporal references of incorporations. It has been suggested that waking-life incorporations with a strong emotional component tend to refer to the distant past more often than mundane incorporations, at least relating to negative valence (Lafrenière, Lortie-Lussier, Robidoux, Dale, & De Koninck, under review). This is also supported by the observation that impactful dream mood is not always linked to evening mood. Future studies could investigate this possible avenue, and explore the link between temporal references and emotional strength of oneiric elements in impactful dreams. Different waking-life experiences at different points in time may have a range of distinct oneiric impacts; still, very little is known about this connection, outside of the growing field of nightmare research. Positive emotions especially have seen limited research in the context of emotional impact.

Future studies might also address the matter of identifying emotionally impactful dreams and clarifying whether they differ from intellectually impactful dreams. The question of obtaining "pure" emotionally or intellectually impactful dreams would be an interesting avenue to explore. It would allow researchers to determine whether such dreams affect the dreamer in different ways, barring the obvious immediate variance in affect impact. Such an assumption might be tested within a normative sample using Kuiken's Post-Dream Questionnaire (Kuiken et al.,

2001), which separates morning mood changes from thought-provoking effects. Furthermore, using the Questionnaire to explore whether the dreamer has experienced subjective intellectual change, such as a new way of solving a problem, might provide additional support for the hypothesis that impactful dreams serve an adaptive purpose.

Finally, exploring impactfulness along a continuun would be a relevant future direction while investigating impactful dreams. Dream selection itself could be based on a sliding scale of emotional impact, so as to explore the fine line between impactful and mundane. In addition, classifying emotional valence along continua linked to HVDC scores (such as failures and successes, aggressions and friendliness, etc.) would allow the complexity of such ratings to be preserved. Those scores may be analyzed using modelling techniques, so as to move away from a positive-negative dichotomy in favor of a wider emotional range.

Emotions are complex, and intricately intertwined within dream fabric. As such, present results indicate some lasting emotionality through dreams and waking life. Ultimately, emotionally impactful dreams seem to leave a trace on our minds that warrants continued exploration, with potential theoretical implications for dream function theories.

References

Adler, A. (1931/1958). *What life should mean to you.* New York: Capricorn

Antunes-Alves, S. & De Koninck, J. (2012). Pre- and post-sleep stress levels and negative emotions in a sample dream among frequent and non-frequent nightmare sufferers. *Archives of Psychiatry and Psychotherapy, 2,* 11-16. URL: http://www.archivespp.pl/uploads/images/2012_14_2/11AntunesAlves_Archives2_2012.pdf

Breger, L. (1967). Function of dreams. *Journal of Abnormal Psychology, 72*(5): 1-28. URL: http://psycnet.apa.org/psycinfo/1968-00222-001

Dale, A., Lafrenière, A. & De Koninck, J. (In Press). Dream Content of Canadian Males from Adolescence to Old Age: An Exploration of Ontogenetic Patterns. *Consciousness and Cognition.*

Dale, A., Lortie-Lussier, M. & De Koninck (2015) Ontogenic patterns the dreams of women across the lifespan. *Consciousness and Cognition, 37*: 214-224. URL: http://philpapers.org/rec/DALOPI

Dale, A., Lortie-Lussier, M., Wong, C., & De Koninck, J. (2016). Dreams of Canadian Students: Norms, Gender Differences, and Comparison With American Norms. *Journal of Cross-Cultural Psychology*, *47*(7), 941-955.

Davidson, J., Lee-Archer, S., & Sanders, G. (2005). Dream imagery and emotion. *Dreaming, 15*(1), 33-47

Bradshaw, S., De Koninck, J., Lafrenière, A., Amini, R. & Lortie-Lussier, M. (2016). Threats in dreams, emotions and the severity of threatening experiences in waking. *International Journal of Dream Research, 9*(1): 102-109. URL: http://journals.ub.uni-heidelberg.de/index.php/IJoDR/article/view/27214/pdf

De Koninck, J. & Koulack (1975). Dream and adaptation to stress. *Journal of Abnormal Psychology, Vol. 84*, 3, 250-26.

Domhoff, G. W. (2000). *Moving Dream Theory Beyond Freud and Jung.* Paper presented to the symposium "Beyond Freud and Jung?", Graduate Theological Union, Berkeley, CA, 9/23/2000.

Domhoff, G.W. (2011). Dreams are embodied simulations that dramatize conceptions and concerns: The continuity hypothesis in empirical, theoretical, and historical context. *International Journal of Dream Research, 4*(2): 50-62.

Hall, C. S., & Nordby, V. (1972). *The individual and his dreams*. New York: New American Library.

Hall, C. & Van de Castle (1966). *The content analysis of dreams.* Meredith: Appleton-Century-Crofts

Kensinger, E. (2007). Negative emotion enhances memory accuracy: Behavioral and neuroimaging evidence. *Current Directions in Psychological Science,* 16(4), 213-218. URL: https://www.researchgate.net/profile/Elizabeth_Kensinger/publication/258128185_Negative_Emotion_Enhances_Memory_Accuracy/links/55ed95e308ae3e12184816e8.pdf

Kuiken, D.; Lee, M.-N.; Eng, T.; Singh, T. (2006). The influence of impactful dreams on self-perceptual depth and spiritual transformation. *Dreaming, 16*(4), 258-279.

Kuiken, D., Loverso, T., Dunn, S., & Carlisle, D. (2001). The immediate effects of expressively writing about dreams following loss or trauma. *Sleep, 24*, A85

Kuiken, D. & Sikora, S. (1993). The impact of dreams on waking thoughts and feelings.

In A. Moffit, M. Kramer, & R. Hoffmann (Ed.), *The functions of dreaming* (pp. 419-476). Albany, NY; State University of New York Press
Kramer, M. (2005). Biology of dreaming. Lee-Chiong, (Eds.). Hoboken, NJ: John Wiley & Sons, Inc
Kramer, M., & Glucksman, M. (2006). Changes in manifest dream affect during psychoanalytic treatment. *The Journal of the American Association of Psychoanalysis and Dynamic Psychiatry, 34*(2), 249-260
Lafrenière, A., Lortie-Lussier, M., Robidoux, R., Dale, A., & De Koninck, J. (in review). Autobiographical Memory Sources of Threats in Dreams. Consciousness and Cognition.
Lee, M.N, & Kuiken, D. (2015). Continuity of reflective awareness across waking and dreaming states. *Dreaming, 25*(2), 141-159.
Malinowski, J. & Horton, L. (2014). Emotion but not stress modulates the incorporation of waking experiences into dreams. *Dreaming, 24*, 18–31.
Malinowski, J..& Horton, L. (2015). Metaphor and hyperassociativity: the imagination mechanisms behind emotion assimilation in sleep and dreaming. *Frontiers in Psychology, 6,* 1132.
Merritt, J., Stickgold, R., Pace-Scholl, E., Williams, J., & Hobson, J.(1994). Emotion profiles in the dreams of men and women. *Consciousness and Cognition, 3*(1), 46-60
Nielsen, T., Deslauriers, D., & Baylor, G. (1991). Emotions in dreams and waking event reports. *Dreaming, 1*(4), 287-300. URL: http://www.dreamscience.ca/en/documents/publications/_1991_Nielsen_Reprint_D_1_287-300_emotions_dream_and_wake.pdf
Nielsen, T., & Levin, R. (2007). Nightmares: A new neurocognitive model. *Sleep Medicine Review, 11*, 295-310.
Nir, Y. & Toroni, G. (2010). Dreaming and the brain: from phenomenology to neurophysiology. *Trends in Cognitive Science, 14*(2), 88-100. URL: http://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(09)00267-8?_returnURL=http%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS1364661309002678%3Fshowall%3Dtrue
Revonsuo, A. (2000). The reinterpretation of dreams: An evolutionary hypothesis of the function of dreaming. *Behavioral and Brain Sciences*, *23*(06), 877-901. URL: https://www.ncbi.nlm.nih.gov/pubmed/11515147
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., Robidoux, R., Pérusse, A. & De Koninck, J. (In Press). Dream content in pregnancy and post-partum: Refined exploration of continuity between waking and dreaming. *Dreaming*
Seligman, M. E. P., & Yellin, A. (1987). What is a dream? *Behavior Research and Therapy*, 25, 1–24
Schneider, A. for dreamresearch.net (last updated 2015). The quantitative study of dreams. URL: http://www2.ucsc.edu/dreams/
Shredl, M. & Doll, E. (1998). Emotions in diary dreams. *Dreaming, 7*(4), 634-646. URL: http://philpapers.org/rec/SCHEID
Schultz, K. & Koulack, D. (1980). Dream affect and the menstrual cycle. *Journal of Nervous and Mental Disease, 168*(7), 391-450

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

Stewart, D. & Koulack, D. (1993). The function of dreams in adaptation to stress over time. *Dreaming, 3*(4), 259-268. URL: http://psycnet.apa.org/journals/drm/3/4/259/

Appendix A
Sample Impactful and Mundane Dreams

Example of a Positive Impactful Dream

''I dreamt that my dad and my stepmom took me and my roommate to look at a house, and we went to this loft complex that had like four condos and they were so nice and luxurious like something that movie stars would live in, and I love it. My parents told us that that would be where we could live next year, and I was a happy camper.''

Example of a Negative Impactful Dream (adapted from French by the authors)

''In my house in Vars. Me and my friend Nadia are at the hospital- her father has had a heart attack the day before. Her father, Carl, had lots of tubes (to breathe). Many strangers were there in the room. Me and Nadia were very sad, many tears. Me and Nadia stayed in the hospital room for what seemed to be a few hours. Carl can't hear, Nadia cries a lot.''

Example of a Mundane Dream

‘’I dreamed that me and my father were having coffee with his cousin Anna, and her daughter Delilah, who is a close friend of mine. Delilah gave me an early birthday gift, a gold watch that she claimed to be designer, but it was wrapped in a cheap plastic box like you'd see batteries wrapped in at Zellers. I opened it and flipped it over and the back of the dial was smooth- no engraving or stamp from a designer company, but she was insisting it was a Coach watch. Then she said « I've never gotten you a watch before, have I » and I said yes, and pointed to the one on my wrist that her mother Anna bought me years before. I remember thinking that this was a cheap birthday gift.

*Names have been changed to maintain anonymity.

2.2 Article 2

An Exploration of Shakespeare's Dreams with Modern Scientific Tools and Theories: Normative Comparison with Canadian Dreams

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An Exploration of Shakespeare's Dreams with Modern Scientific Tools and Theories: Normative Comparison with Canadian Dreams

Abstract: It is of interest that Shakespeare used dreams in his plays for a variety of narrative and psychological reasons; those have been analyzed in previous works, typically through traditional psychoanalytic perspectives. The goal of this study was to apply scientific techniques of dream content analysis, using modern theories of dream formation and function: the continuity hypothesis, the Threat Simulation Theory, and the impactful dream construct. In accordance with the continuity theory of dreams, it was thought that Shakespearean dreams might differ in content from those experienced by modern-day Canadians, whose everyday experiences contrast with those of Shakespeare's characters. Of particular interest was the examination of whether in-play dreams had an impact on Shakespeare's plays and characters.

Twenty-nine dreams drawn from Shakespeare's plays, as well as 29 age- and gender-matched dreams of modern Canadians, were analyzed for oneiric content, using the Hall and Van de Castle coding system, the Threat Simulation Theory scale, and a scoring method for impact on character and story, developed in-house. Dream content ratios were compared using corrected t-tests. It was found that Shakespearean dreams did not show the predominance of negative content typically found in modern dreams. Furthermore, Shakespeare's dreams featured more friendly, dead, and imaginary characters; more bodily misfortunes and good fortunes; more familiar settings; and less physical aggressions overall, and aggressions with the dreamer as initiator, than modern Canadian dreams. No gender differences were found in Shakespeare's dreams, at odds with the gender-based contrasts observed in Canadian norms.

Although no significant differences were found between threats in the dreams of Shakespeare's characters and those of Canadians, the latter tended to have more minor threats, as opposed to major threats. Unsurprisingly, although impactful dreams are very rare in Canadian norms, every single dream in the Shakespearean sample had an impact on the play and/or on the character, with 48% of the dreams being both narratively and emotionally impactful. Those differences are due to the narrative constraints of plays, the need for play content to bear on further continuity, and the moral demands surrounding Shakespeare's favoured psychological motifs. The dominance of impactful dreams is also explained by the narrative demands of a play, as to be included within the script, dreams need to have a purpose. The strong influence of narratively impactful dreams is still a novel finding that suggests dreams are used as straightforward narrative devices, beyond the motive of exploring characters' psyches. Both modern-day and Shakespearean dreams, however, may be seen as manifestations of continuity between dreams and waking life for characters and Canadians alike- perhaps even to a larger degree in Shakespeare's body of work.

Introduction

Four hundred years ago, William Shakespeare died in Stratford-upon-Avon, England. His plays have since withstood the test of time, and are still a source of study and leisure. Countless common expressions, such as *to be or not to be*, originally come from Shakespeare's works, and have since been seamlessly integrated into the English language.

Shakespeare's favoured themes are often considered to be universal, and comprise, among others, family, love, betrayal, jealousy, death, and the nature of humanity (Lee, 1999). Several of those themes have found resonance in dream sequences, used by Shakespeare to indicate moral dilemmas and philosophical queries buried in the dreamer's psyche (Cumberland, 1936). It has been suggested that Shakespeare's dream sequences use what could now, somewhat anachronistically, be referred to as Freudian through dream symbolism, which would draw on disguised urges for life (sexuality) and death (violence), sometimes simultaneously (Armstrong, 2001). The dream worlds used in Shakespearean plays reflect approaching catastrophes, thus taking on a certain prophetic quality; this may be an echo of Antiquity-era use of dreams in theater (Freud, 1900). Dream sequences will sometimes be used as an opportunity to convey wisdom through the dream figure of a guide, in a format often referred to as the *Chaucerian dream vision*, as per a common pre-Renaissance dream motif favored by the poet Chaucer, among others (Lynch, 1999). This dual role of dreams, as providing information from both internal (psyche) and external (prophecy) perspectives, creates a defined, arguably paradoxical function within the context of Shakespeare's plays, where dreams reflect both inner and outer life for the characters involved.

However, it is now held for a fact that dreams experienced by our contemporaries do not fulfill prophetic functions within the real-life setting of current dream research. In fact, the very idea

that dreams might serve a purpose has been contested (Allan & Robert, 1977; Domhoff, 2003; Foulkes, 1985), and dreams' possible function is not agreed upon.

When it comes to dreaming as a whole, three main theories are most commonly held forward as global explanations of dreaming. The first theory is the continuity hypothesis, which states that dreams are an extension of waking life, repeating motifs found in one's individual life experiences and emotions (Schredl & Hofmann, 2003). This would allow for an integration of life events into dream shape (Domhoff, 1996). Conversely, the mastery hypothesis proposes that dreams are an opportunity to practice reacting to threats and challenging situations that may arise in waking life. Dreams are consequently seen as a trial run of sorts, designed to expose the dreamer to difficult experiences without risking endangerment (Stickgold, Scott, Rittenhouse & Hobson, 1999). Finally, the compensation hypothesis defends another view, according to which dreams incorporate elements that are perceived as missing in waking life, so as to provide balance to the dreamer's psyche (Cartwright, 1972).

Among those three theories, the continuity hypothesis has been supported by a range of research works (e.g., Dale, 2012; Domhoff, 1996; Hall & Nordby, 1972; Schredl & Hofmann, 2003). This theory is arguably the most forgiving to the integration of other complementary approaches, perhaps because its main tenant- that is, dreams reflect waking life in some fashion- remains extremely flexible to interpretation.

In addition, a subset of the mastery hypothesis is known as the Threat Simulation Theory, or TST. According to this theory, which is compatible with the continuity theory, humans who had dreamed of threats they might encounter in waking life were better able to prepare for the eventual apparition of such threats, through oneiric rehearsals of different survival strategies (Valli & Revonsuo, 2009). Those humans consequently had an increased likelihood of survival

in waking life, as they would be better prepared intellectually and emotionally. The ability to trigger the Threat Simulation system would have thus become a mainstay of evolutionary history, as a natural consequence of this environmental pressure.

Conversely, some dreams have also been noticed as having a particularly intense or otherwise lasting impact on the dreamer's thoughts, feelings, or both. Such dreams are defined as "impactful" dreams (Kuiken & Sikora, 1993). Impactful dreams were thought to differ from the usual everyday dream, known as a "mundane" dream, that would not affect the dreamer beyond initial recollection, if that step were even achieved. For typical dreamers, impactful dreams would be rare and clearly remembered. Impactful dreams may even change the dreamer's life by drastically altering one's beliefs, creative paradigm, or perception of one's own life (Kuiken, 1996).

Perhaps unsurprisingly, two of the three impactful dream types originally defined by Kuiken are overwhelmingly negative in tone and content (Kuiken & Sikora, 1993), and contain elements that would be defined as threatening through a TST-driven analysis. It may be, then, that negative or threatening material may be more likely to impact the dreamer than positive, non-threatening material. This is in line with the observation that humans tend to remember negative emotions and memories more than they do positive ones (Ariely, 2012). This is also the case in dreams, possibly as a function of increased activation within the amygdala, specifically with regard to REM episodes (De Koninck, 2012). Remembered dreams' tendency to contain a negative overall tone may speak to this emotional bias. This may relate to an evolutionary pressure to adapt more quickly to potential threats than to positive life circumstances, as an essential function of continued survival. Expanding energy to avoid negative events is more likely to prolong life than

spending resources on the pursuit of happiness, a relatively recent preoccupation in human history.

As part of this larger context of investigation into dream function and formation, it was consequently thought that a scientific investigation of Shakespeare's plays, and more specifically of the dream content found in those plays, might be a contrasting source of insight. Shakespeare's creativity and imagination would allow for a fresh look at what we think today we know of dreams.

This study is novel through its subject matter, which has seldom been explored within the domain of psychological study. This statement may seem surprising; after all, Shakespeare's works have been often analyzed from a Freudian perspective, and their motifs have been explored using tools from the analysis of English literature. Freud was an admirer of Shakespeare's works, although not entirely convinced that the Bard had written his body of work alone (Freud, 1940). Freud himself first applied psychoanalytic principles to Shakespearean characters. Perhaps most notably, he described Hamlet's relationship with his family in Oedipal terms. In fact, *Hamlet* might even have allowed Freud to finalize his developing conceptualization of the Oedipal complex (Holland, 1960). Following in Freud's footsteps, a vast number of scholars have attempted to apply psychoanalytic variants to Shakespeare's work (as summarized in Armstrong, 2001; and Brown, 2015), including some of Freud's contemporaries, such as his friend and colleague Ernest Jones, who penned the book-length analysis *Hamlet and Oedipus* (1949). In addition to the psychoanalytic method were employed other, less commonly used analysis tools, such as a cognitive approach to investigating Shakespeare as an embodied human (Crane, 2001), or a computer-conducted analysis of Shakespeare's sonnets focusing on imagery, popularity, and the statistical association between the two (Simonton, 1990). It is also

of interest to note that attempts have been made to aggregate Shakespeare's works, including in-play oneiric content, into accessible online databases.

Yet this study is, to our knowledge, to first to use the quantitative tools of modern psychology in a Shakespearean context, providing a different and complementary perspective to the previous studies described above. This study's main strength is, correspondingly, its methodology, which uses the widely recognized Hall and Van de Castle coding system to identify dream content in both Shakespearean and modern-day dreams. This use of long-standing methodology to examine a novel construct provides a dual advantage, allowing for thorough investigative analysis.

Although this analysis is novel, and therefore exploratory by nature, general tendencies were expected to be found in the results. Indeed, and based on the current understanding of dreams as being mostly negative in content (Roussy, Raymond & De Koninck, 2000), it was thought that dreams in Shakespeare's plays would follow this trend as well, especially given the often violent and deadly events in Shakespeare's tragedies and histories, as well as, to a lesser extent, his tragicomedies. Correspondingly, threatening and impactful material was expected to be found to a much greater degree in Shakespeare's plays, as this would allow in-play dreams to express continuity of the characters' eventful, often threatening waking life. Impactful dream material was also thought to occur in Shakespeare's plays by default, as dream narratives must have served a purpose insofar as they have been consciously included within the play, whereas the same cannot be said of our own dreams. It was also expected that gender differences would not be found in the plays, as the Bard himself was a man, and therefore would provide dream content loosely based on his own experience of dreaming life. Other possible differences in dream content would be examined without the lens of a preliminary hypothesis.

Methods

In order to begin analysis, 29 dreams were selected from the plays, using an archive search of all known works by William Shakespeare. The dreams were found through a search for the keywords "dream", "sleep", and "methought(s)", often used in Shakespeare's plays to signify "I dreamt". Results were then filtered for redundancy and relevance; only complete dreams with clear oneiric elements were included in the final tally. Shakespeare's works introduced elements such as symbolic discourse on sleep and dreams and surreal, prose-based narratives, as can be found at length in *A Midsummer's Night Dream* (McDonald, 2001); such passages were excluded for study purposes, as they could not be assumed to mimic real dream narratives. The complete final selection includes a variety of plays from both tragedies and comedies. This final selection and raw count of dreams chosen per play, along with additional notes, has been included in Annex 1. Due to the small sample, dreams were not further separated by category of play, such as tragedies, comedies, and histories, but rather were analyzed as a cohesive sample to maintain statistical power.

General age ranges for the dreamers-characters were produced through a combination of in-play cues, references to historical characters (for example, Ceasar in *Julius Ceasar* would have approximately the same age as his real-life counterpart at time of death) and, in the absence of any such clues, estimates based on the characters' occupation and life path. Characters were then matched by age range and gender to anonymous participants drawn from a Canadian database of modern-day dream content research. This database was produced by the University of Ottawa's Sleep and Dream Laboratory. All normative dreams had been collected through the home collection dream method, using the Hall and Van de Castle scales for coding. Participants in this large normative study would record the first two dreams they could recall, writing them down

immediately upon waking with as much detail as could be remembered. Dreams were then brought back to the lab and scored by two independent coders trained in the Hall and Van de Castle system. Similarly, the dreams in Shakespeare's plays were scored through the Hall and Van de Castle system, by lab-trained coders, as if they had been experienced by modern-day Canadians. In total, 29 dreams from Shakespeare were compared to 29 matched normative dreams, all through the Hall and Van de Castle method.

Developed as a means of analyzing dream content quantitatively by Hall & Van de Castle (1966), this eponymous method may be used to objectively number dream content elements. The Hall and Van de Castle system has already been successfully used to compare dreams of Canadians across ages, genders, and cultures within our laboratory (Dale, Lafrenière & De Koninck, 2017; Dale, Lortie-Lussier & De Koninck, 2015; Dale, Wong & De Koninck, 2013). Frequencies can be derived from content categories for comparison, relative to other categories or groups; it consequently becomes more straightforward to examine non-parametric differences between populations, with the added advantage of offering strong inter-rater reliability. This study draws on those advantages to compare Canadian and Shakespearean dreams. Dream content was scored using the following Hall and Van de Castle scales: Interactions, Characters, Activities, Successes and Failures, Good Fortunes and Misfortunes, Settings and Objects, and Emotions. The scales were computed through the Excel-based program DreamSAT, originally suggested by Schneider and Domhoff (1999), which generates non-parametric ratios using Hall and Van de Castle coding scores. Ratios were compared between the groups for significant differences.

In parallel to those analyses, dreams were analyzed for threatening and impactful material. First, two independent judges analyzed dream samples, using the Dream Threat Simulation Scale

adapted from Revonsuo's original depiction of the TST (Revonsuo, 2000). Produced through the University of Ottawa's Laboratory of Sleep and Dreams (used by De Koninck, Bradshaw, Lafrenière, Amini, & Lortie-Lussier, 2016; and Lafrenière, Lortie-Lussier, Dale, Robidoux & De Koninck, 2017), the Dream Threat Simulation Scale identifies threatening material according to four distinct types of threats, on a continuous intensity scale ranging from 0 (no threat) to 10 (maximal intensity of the threat). Four possible threat types may be coded: major physical threat, major psychological threat, minor physical threat, and minor overall threat. "Major" and "minor" here do not refer to intensity, but to the degree of autonomy and integrity the dreamer may stand to lose from the threat, as well as the identity of the threatened oneiric character and that character's link to the dreamer. A minor threat has the potential to cause a minimal loss of autonomy and integrity to the dreamer and characters close to the dreamer; or, conversely, affects an oneiric character that is little-known by the dreamer, regardless of the threat's nature. To the contrary, a major threat potentially creates severe loss for dreamer and loved ones. If a character unknown to the dreamer is killed, for example, this is scored as a minor physical threat of high intensity. Similarly, if the dreamer is shunned by friends, this is a major psychological threat of moderate to high intensity. The Dream Threat Simulation Scale thus allows for a quantitative, balanced, and non-dichotomous investigation of threatening material in dreams.

Then, impact in dreams was scored through an adaptation of Kuiken's original criteria for emotional impact, more precisely his Post-Sleep Questionnaire (as found in Kuiken, Loverso, Dunn & Carlisle, 2001). One question of the adapted Questionnaire states: "My mood in the dream affected my mood in the morning", to be answered by the dreamer on a four-point Likert scale, which ranges from "not at all" to "extremely". For the purposes of classification, a dream was judged as emotionally impactful if normative study participants answered this statement

with "a lot" or "extremely". This classification was indirectly dichotomous, and based on the premise that impactful dreams are defined simply by their strong intensity, and are not typically rated on a more detailed spectrum of intensity, beyond this initial threshold-like criterion.

Of course, in the Shakespearean sample, no direct introspective data was available on the characters-dreamers. Emotional impact in Shakespeare's dreams was consequently determined by two independent judges. If a character stated that morning mood had been influenced by the dream, or if that character showed a physical display of emotion, along with a clearly stated reason for such a display, upon waking, this was judged to be shown emotional impact. Such criteria were drawn from the Hall and Van de Castle system's criteria for scoring emotions (Hall and Van de Castle, 1966) and were derived from scoring criteria used in another recent study on impactful dreams (Nixon, Robidoux, Dale & De Koninck, 2017).

In addition, Shakespearean dreams were also scored for narrative impact. Indeed, because dreams were part and parcel of Shakespeare's plays, such dreams could be intuited to have a narrative interest, to help move the plot forward above and beyond providing insight into a character's future actions. Two independent judges consequently observed the storylines of every play in which there had been a dream, as well as those dreams' immediate narrative aftermath. If the text of the next two pages following a dream, and/or the summarized storyline of the play, showed a shift that could reasonably be pointed back to the dream, that dream was scored as narratively impactful. Synopses were selected by the judges before scoring began, and the exact length of two pages was fixed at a standard 50 lines (or 25 per page, corresponding to a double-spaced page written in 12 pt. *Courrier New*), beginning immediately after the dream sequence.

Results

It had been predicted that Shakespearean dreams would follow modern dreams' global tendencies of negative preponderance (Roussy, Raymond & De Koninck, 2000); yet this was not shown to be the case. As expected, Canadians dreams showed more aggressions over friendly gestures and misfortunes over good fortunes, as well as an overall negative rather than positive tone, and an increased presence of negative over positive elements. On the other hand, Shakespearean dreams showed none of these tendencies, with statistically equivalent levels of both negative and positive components, whether these be emotions, interactions, events, or global constructs such as negative tone. Those elements can be observed in Table 1.

Table 1

Positive and Negative Elements in Shakespearean Dreams Compared with Canadian Normative Dreams

	Raw Result (Canadian Sample)	T (Canadian Sample)	p (Canadian Sample)	Raw Result (Shakespeare)	T (Shakespeare)	P (Shakespeare)
Aggression vs Friendliness	NS	.935	.358	More aggresion	2.546	-.017
Failure vs Success	NS	-1.000	.326	NS	1.000	.326
Misfortune vs Good Fortune	NS	-.867	.394	More misfortunes	2.654	.013
Negative vs Positive Emotion	NS	.571	.573	NS	1.098	.281
Positive vs Negative Tone (F+S+GF vs A+FL+MF)	NS	.626	.537	More negative tone	2.830	.009
Positive vs Negative Elements (F+S+GF+P vs A+FL+MF+N)	NS	.402	.691	More negative elements	2.683	.012

As for gender differences, none were found in Shakespeare's plays; yet neither were there differences in Canadian dreams. Regarding other elements of dream content, characters in Shakespeare's plays tended to dream of familiar characters more often. They also dreamed of friends and dead or imaginary characters more frequently. Shakespeare's characters, perhaps counter-intuitively, were less often the aggressors, as opposed to the aggressed, in dreams, and aggressive interactions surrounding them were less often of a physical nature than in Canadian dreams. Absolutely all of Shakespeare's dream settings were familiar to their characters-dreamers, whereas less than half of Canadian dreams involved a familiar dream setting. Bodily misfortunes occurred more often in Shakespeare's dreams, and good fortunes were much more frequent. Those elements are summarized in Tables 2 and 3.

Table 2

Characters, Social Interactions, Settings, and Self-Concept Characteristics in Shakespearean Dreams Compared to Canadian Normative Dreams

	Canadian Norms (%)	Shakespeare (%)	*h:* Shakespeare vs. Canadian	*p:* Shakespeare vs Canadian
Male/Female	68	64	-.10	.602
Familiarity	55	76	+.45	**.007
Friends	24	51	+.57	*.001
Family	19	17	-.04	.831
Dead & Imaginary	00	25	+1.06	***.000
Animal	07	07	-.02	.921
Aggression/Friendliness	81	67	-.31	.177
Befriender	33	35	+.04	.931
Aggressor	44	14	-.68	**.010
Physical Aggression	60	33	-.54	*.020
Indoor Settings	48	17	-.70	.118
Familiar Settings	44	100	+1.68	*.012
Self-Negativity	75	59	-.33	.097
Bodily Misfortunes	12	45	+.78	*.044
Negative Emotions	70	67	-.08	.860
Dreamer-Involved Success	50	50	0	1.000
Torso/Anatomy	17	33	+.37	.190

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 3

Dreams with at Least One Content Element Present in Shakespearean Dreams Compared with Canadian Normative Dreams

	Canadian Norms (%)	Shakespeare (%)	*h:* Shakespeare vs. Canadian	*p:* Shakespeare vs Canadian
Aggression	52	38	-.28	.289
Friendliness	21	31	+.24	.366
Sexuality	03	07	+.16	.548
Misfortune	34	28	-.15	.570
Good Fortune	14	48	+.78	**.003
Success	07	03	-.16	.548
Failure	14	03	-.39	.140
Striving	17	03	-.48	.066

*$p \leq .05$. **$p \leq .01$.

In addition to ratio comparison, t-tests were conducted on the matched pairs between groups to examine secondary categories of analysis. Through those analyses, it was found that Shakespearean dreams have less unfamiliar characters, more dreamer-driven activities and physical activities specifically, as well as more movement and thinking. They also showed less dreamer-involved emotions and indoor settings, but more dreamer-involved good fortunes.

Surprisingly, when analyzing threats, no statistical difference was found between the two samples, whether by threat type or raw number of total scored threats. However, Shakespearean dreams tended to show a lesser amount of minor threats, in line with other observations made through dream content analysis. The average number of threats in both samples is shown in Table 4.

Table 4

Average Frequency of Threats in Canadian and Shakespearean Samples

	Canadian Norms	Shakespeare	*p*: Shakespeare vs Canadian
Major Physical Threats	.34	.31	.668
Major Psychological Threats	.69	.72	.797
Minor Physical Threats	.28	.24	.398
Minor Threats	.76	.41	.072
Total Amount of Threats	2.07	1.69	.574

Regarding impactful content, a slight number of the overall normative Canadian sample was shown to be emotionally impactful: 35 out of 566 dreams (or 6%) were self-rated as emotionally impactful. To the contrary, all dreams from the Shakespearean sample showed impact of some sort, whether narrative, emotional, or dually narrative and emotional ($p < .0001$ overall, compared to Canadian norms), with no exception, as originally hypothesized. Within the Shakespearean sample, 25 dreams out of 29 were at least emotionally impactful (86%; $p < .0001$, compared to Canadian norms). Eighteen dreams, which is to say over half the sample of Shakespearean dreams (62%), were at least narratively impactful. This result cannot be compared to Canadian norms, as the construct of impacting the narrative only exists within literary analysis, and does not translate to the lives of everyday Canadians.

Discussion

Although the results may seem varied in their nature and scope, they can be summarized through one overarching consideration: Shakespeare wrote plays, and each scene's objective was to inform the plot in some fashion. Canadians do tend to dream about events that occurred in their lives and as such could be considered to "continue the narrative" of their waking lives, especially within the continuity hypothesis framework. Yet they do not show the same kind of focused, goal-driven oneiric intent that Shakespeare proactively inserts into his dream sequences, thus unsurprisingly giving rise to the differences observed in the present paper.

The absence of a negative tone predominance in Shakespeare's dreams, for example, could be partly explained by the main narrative found in some of the Bard's plays. In *Hamlet, Othello, King Lear,* and *Macbeth*, Shakespeare depicts an unending struggle between good and evil forces (Bradley, 1904). The plays' characters are continually subjected to both benevolent and destructive forces, as they align with either good or evil. Shakespeare's other tragedies also frequently feature elements of a battle between "good", brave and honorable characters, and "bad" characters who will lie, cheat, and murder. Examples of this dichotomy may arguably include the *Kings* works, and, to some degree, Roman-era histories such as *Titus Andronicus*. In addition, within comedic material, Shakespeare also uses characters to provide a social commentary and a depiction of human emotion, beyond the individual life conveyed by a play's character. Real-life humans are, one might argue, less often involved in such metaphoric adventures, and typically remember negative life events most starkly (Kensinger, 2009), perhaps because those events are more likely to be threatening and would consequently be evolutionarily relevant to hold in memory (Nairne, 2010). This psycho-physiological tool may not be present in the given narrative of Shakespeare's characters, whose dreams serve storytelling purposes in

addition to basic continuity demands. This may explain the lack of negative preponderance in the Shakespearean sample, but also the lack of a statistically significant increase in threats, compared to the Canadian sample.

As for the absence of found gender differences, this may simply have to do with the small female sample. Results may point to a lack of statistical power rather than a concrete finding. Indeed, only seven female characters experienced a dream in Shakespeare's plays according to this study's criteria for inclusion, thus limiting an already small sample. This result may be consistent with Shakespearean times' lesser emphasis on women as subjects. Women were typically seen as objects of desire or piety, but not as proactive players in society. However, it was not unusual for Shakespearean female characters to possess agency and individual motivations. Some would use this power to incite and influence a man (the stark example of Lady Macbeth comes to mind). Others would cross-dress as a man (such as in *Twelfth Night*), or drive romantic entanglements (as in *Much Ado About Nothing*). To be sure, such avenues for agency remain driven by societal expectations that expect men to remain the social and political core of society. Yet an alternate explanation for the lack of female dreams is that female characters may simply have been more predisposed to action, and thus less likely to discuss their dreams, due to these characters' more pragmatic nature. Indeed, many of Shakespeare's works *do* depend upon female characters' decisions, especially but not only within the context of romantic plots.

To summarize, research-relevant reasons may include the initial rationale of Shakespeare being a man and thus reproducing male-centric dream content, an emphasis on female characters as being less drawn towards introspection, or a superimposed social need of the times to write on men's visions and priorities. The latter theory may be reinforced by the Greco-Roman roots of Shakespeare's dream-world imagery, as Antiquity theater was almost entirely focused on

masculine roles and ideals, and exclusively featured male actors, who would play both male and female roles (Foley, 2002), as in Shakespearean times.

Regarding the exploratory dream content analyses, found results may be seen in the same storytelling light. Shakespeare's dreams feature more familiar, imaginary or dead, and friendly characters; this is a logical consequence of using dreams to move the narrative forward. Shakespeare's dreams, as portent and continuation of the scenic actions, would then naturally involve powerful characters such as gods and deities, friends come to warn of lurking dangers, and individuals who have already been introduced as having a role within the play's boundaries. Characters also evolve in dream worlds that reuse existing settings, again as a way to maintain consistency within the play. Familiar, outdoors settings help maintain pacing, narration, and stage direction, whereas Canadians typically spend a significant portion of their days indoors (Canadian Parks Council, 2014) and may create their dream settings accordingly.

Shakespeare's characters are also more passive. They are less often the aggressors and produce less dreamer-directed activities. This is consistent with the thread of an epic story, *epic* being used here in its original sense of grandiose, larger than life- and perhaps larger than dreams. In an epic narrative, events typically happen *to* the main characters, as a consequence of what Bernard Paris calls their "bargains with fate", which is to say their efforts to obtain validation or favour from a supra-powerful force (Paris, 1991). Although Shakespeare's characters remain personally and internally motivated, in the manner of concrete humans (Bradley, 1904), they fall victim to gods, witches, war enemies, and fated encounters with jealous subordinates. Although an argument could certainly be made that modern Canadians are also victims of their surroundings to a certain extent, they are ultimately the masters of their fates, provided one subscribes to a

philosophical current defending free will as a tenant of being. Shakespeare himself is the master of his characters' fates, and in-play dreams may reflect that shift in power and agency.

This is also linked to the construct of Shakespearean works involving conflict, in order to provide the very rationale behind a play's existence. In this context, and especially within tragedies and histories, the characters may reflect and redirect a moral struggle. In so doing, they also redirect an overarching current of narrative action; one dares hope the same cannot be said of modern-day humans in their daily experiences of existence. A greater proportion of bodily misfortunes and good fortunes in Shakespeare's dreams may again be attributed to the recurrent conflict motif, featuring powerful forces that act on the characters in polarized ways.

From this perspective, the lesser amount of emotions expressed in Shakespeare's play becomes unexpected, considering the highly demanding circumstances in which the characters' waking lives take place. This finding might be due to the relative difficulty of conveying spoken emotions in plays' texts, since the actors' facial expressions and body languages could be conceived as incorporating, or amplifying, emotionality in the text, whether intended or perceived. Furthermore, Shakespeare's plays mined emotionality from a specific set of social customs, which may be dissimilar to that now adopted by modern Canadians. Seventeenth-century men were seen as emotionally stronger and more stable than women, exhibiting emotion in an aggressive rather than so-called hysterical fashion; although Shakespeare does feature men who weep and rage in his works, they remain typically masculine forces, and may even be seen as "expelling" their feminine traits in order to regain a virile strength (Vaught, 2008). In addition to social considerations, demonstrations of affect may only be coded in the Hall and Van de Castle system if they are directly identified (Hall and Van de Castle, 1966). Modern-day Canadians are asked to anonymously recall dreams in as much detail as they can recall, which

may give rise to descriptions of feeling states to a greater degree than Shakespeare's creativity, which evolved free of such directives. This shift might manifest itself in differing emotional dream content between Shakespeare's characters and modern-day Canadians.

It was originally hypothesized that Shakespearean dreams would contain more threats, as part of the Threat Simulation Theory's expected effect on the characters. Yet another alternative explanation may also be of use. What if Shakespeare's characters are too concerned with immediate dangers to preoccupy themselves with threats from the remote past? Those characters may come from the same ancestors as we do, but would originally-adaptive dreams not actively hamper them, by depriving them of the emotional reset they need sleep to bring them in the very short term? Their lifestyles are, one would assume, replete with more threats of physical, psychological, and even spiritual harm than those of most modern-day Canadians. In this regard, Shakespeare's characters dream of immediate dangers they hope to survive in the short term, and this may disprove the Threat Simulation Theory's aim to allow mastery over time and numerous repetitions. In addition, as already discussed, Shakespearean characters are not, strictly speaking, the captains of their fates. They live at the mercy of powerful forces which push or trick them into conflict, with the greatest and most omniscient of those forces being, of course, Shakespeare himself. To the contrary, the dream lives of Canadians may reflect a freer quality, far from the narrative demands of a short-lived play.

Similarly, there would be no use for a mundane, run-of-the-mill dream to waste valuable stage time. Dreams must either propel the story, illuminate previously-unexplained aspects of the character, or, perhaps preferably, do both at once. This unambiguously calls for dreams to be impactful, in the sense originally defined by Kuiken. As would apply to real life, impactful dreams bring unique insight and motivation: "Dreaming…sensitizes us to additional layers of

significance; it alerts us to aspects of our life-worlds that we typically ignore" (Kuiken & Sikora, 1993). Personal agency notwithstanding, Shakespeare's characters may have a particular interest in being sensitized to additional meanings. The dual function of impactful in-play dreams, then, may also be conceived as alerting the audience to aspects of Shakespeare's fabricated life-worlds, allowing for a fresh perspective, a fantasy within a fantasy of sorts, to take place. This would highlight the metaphorical and symbolic elements found within the play, which are expected to continue throughout the dream narrative. Perhaps such dreams may also even shed light on events present in the audience's own waking lives, providing additional material for insight on the daily lives of Shakespeare's contemporaries, through a fresh and yet universal perspective on life, death, and the daily business of living in an increasingly complex world.

It must also be mentioned that both threatening and impactful dream content may have been manifested differently through Shakespeare's tragedies, comedies, and histories. Shakespeare's body of work is impressively broad in its range, and his plays are consequently associated with a wide variety of goals and themes. A play which is meant to make the audience laugh, and in which dreams may contribute to the overall bizarre or amusing tone of the narrative, may not contain the same oneiric elements as a tragedy, which often features ominous portents transmitted through the protagonists' dreams. Similarly, dream narratives meant to depict a tortured character's psyche may be more threatening, and perhaps more emotionally impactful, than dreams which are simply meant to incorporate storyline elements; and the former may conceivably appear more often in plays where the characters' relation to fate and danger is a crucial waking-life concern, as would be the case in Shakespeare's great tragedies. Although separating dreams according to play types may create a further loss of statistical power, future

analyses on the topic might shed light on the question of play types' relation to lasting dream content.

This being said, this study's current results show that Shakespeare understood the suggestive, evocative power of dreams very well, and skillfully manipulated dream content to feed the machine of character and plot development, thus providing dreams with an impactful quality.

In stark contrast with Shakespearean dreams, though, the majority of Canadian dreams may contribute limited meaning to everyday life, although such a contribution may alternately be conceptualized as unconscious or disguised. Yet even mundane dreams may contain material that is useful in psychotherapy, including cognitive behavior therapy, well past the historical *engouement* for the oneiric mining of subconscious evidence for psychoanalytic purposes (Rosner, Lyddon & Freeman, 2004). Dreams still remain a window into the mind of the dreamer, especially when accompanied by the dreamer's own interpretation.

All in all, Shakespeare's plays demonstrate constraints of a narrative nature, and fundamentally present the dreamers-characters as being at the mercy of forces surrounding them. This was a popular theme for Shakespeare's time and place, consistent with Antiquity-era mythology, as revived at the Renaissance, in addition to his time period's mainstream understanding of Christian religious beliefs (Jorgensen, 1975). Differences between today's normative Canadian content and Shakespeare's plays speaks to the disconnect between reality and fiction, but it also refers to social, cultural, and temporal distinctions that have grown over the centuries. As far as dream function is concerned, however, it would seem that both studied groups follow a variant of the continuity hypothesis. Shakespeare's characters dream of their own lives; Canadians nowadays do much the same. Those lives are vastly different and do not revolve around the same objectives, if indeed they do have clear ones. Yet for all of those distinctions, dreams

nevertheless hold a mirror to waking life, and to the specificities of this experienced narrative as a result. And from a purely literary perspective, including dreams within plays may help the audience identify and empathize with the characters by introducing a very human habit onto the stage.

Future studies might also analyze Shakespearean visions, hallucinations, and parallel or play-length dream worlds, in order to investigate those settings' specificities as potential mirrors and narrative devices. Comparing Shakespeare's dream content with modern British or United Kingdom dream content norms might also reduce differences attributable to a change in culture and geography. Of course, analyzing tragedies, histories, and comedies separately, or alternately dissociating primarily comedic from primarily tragic works, might allow for clearer distinctions regarding threatening and impactful content in dreams, on par with the demarcation between different plays' purposes and valences. Comparing dream content as can be divided between types of play, such as tragedies versus comedies, or even between various stages of Shakespeare's writing career, could be a relevant way of reducing inter-group variability, although statistical power might suffer from such an initiative.

While considering those future avenues of research, it would be of import to consider this present study's limitations. Some weaknesses are almost impossible to avoid. It is known that Shakespeare drew inspiration and storylines from existing manuscripts (Blanding, 2018; Bullough, 1957). The small number of dreams and dreamers-characters in Shakespeare's works is also a limiting factor that requires careful statistical consideration. Shakespeare's elaborate writing style, which uses a large number of metaphors, may obscure a portion of dream content, especially when contrasted with modern dreamers' generally matter-of-fact recounting of events.

And finally, there is no guarantee beyond extrapolation that the Hall and Van de Castle's validity extends to the 17th century, or to dreams presented within works of literature and theater.

Through the careful consideration of those limits, results may be observed as a step towards a better understanding of Shakespeare's plays and favoured oneiric motifs. This study presents the content of modern-day dreams through an entirely novel facet of investigation and comparison; going "back to the basics" of English literature, in this case, sheds light on current dreams and their link to waking life as is experienced by dreamers today. In addition, the interpretations that can be derived from this study certainly seem to indicate that Shakespeare's works, for all of their distinctive characteristics, transcend time, place, and play to become relevant in the modern academic world. Shakespeare's literary talent and insight have provided a bridge into the study of dreaming and being, in a timeless and universal fashion. Who would have thought, least of all the Bard himself?

References

Ariely, D. (2012). *The (honest) truth about dishonesty.* New York, NY: HarperCollins

Armstrong, P. (2001). *Shakespeare in psychoanalysis.* New York, NY: Routledge.

Blanding, M. (2018, February 7). Plagiarism software unveils a new source for 11 of Shakespeare's plays. *The New York Times.* Retrieved from https://www.nytimes.com/2018/02/07/books/plagiarism-software-unveils-a-new-source-for-11-of-shakespeares-plays.html

Bullough, G. (1957). *Narrative and Dramatic Sources of Shakespeare.* New York: Columbia University Press.

Bradley, A. C. (1904). *Shakespearean tragedy*. London: McMillan Press.

Brown, C. (2015). *Shakespeare and psychoanalytic theory.* New York: Bloomsbury.

Canadian Parks Council (2014). Connecting Canadians with nature. Retrieved from http://www.parks-parcs.ca/english/ConnectingCanadians-English_web.pdf

Cartwright, R., D. (1972). Sleep fantasy in normal and schizophrenic persons. *Journal of Abnormal Psychology*, *80*, 275-279

Champion, L. S. (1980). *Perspective in Shakespeare's English histories*. Athens: The University of Georgia Press.

Crane, M. T. (2001). *Shakespeare's brain: Reading with cognitive theory.* Princeton: Princeton University Press.

Cumberland, C. (1936). *Shakespeare and psychology*. London: Williams and Norgate.

Dale, A. (2012). Examining the dreams of Canadian soldiers with content analysis and the storytelling method of dream interpretation (Master's thesis, Trent University, Peterborough, Canada).

De Koninck, J., Bradshaw, S., Lafrenière, A., Amini, R., & Lortie-Lussier, M. (2016). Threats in dreams, emotions and the severity of threatening experiences in waking. *International Journal of Dream Research, 9*(2), 102-109.

Domhoff, G. W. (1996). *Finding meaning in dreams: A quantitative approach.* New York: Plenum Press.

Foley, H. P. (2001). *Female acts in Greek tragedy*. Princeton: Princeton University Press.

Freud, S. (1940). *Gesammelte Werke: Chronologisch geordnet* (Eds. A. Freud et al; 18 vol.). London/Frankfurt : Imago/Fisher.

Freud, S. (1900). *The interpretation of dreams*. Vienna: Franz Deuticke.

Hall, C. & Nordby, V. (1972). *The individual and his dreams*. New York, United States of America: New American Library.

Hall, C. & Van de Castle (1966). *The content analysis of dreams.* Meredith, United States of America: Appleton-Century-Crofts.

Holland, N. H. (1960). Freud on Shakespeare. *Proceedings of the Modern Language Association, 75*(3), 163-173.

Jones, E. (1949). *Hamlet and Oedipus.* New York: W.W. Norton and Company.

Jorgensen, P.A. (1975). A formative shakespearean legacy: Elizabethean views of god, fortune, and war. *Proceedings of the Modern Language Association, 90*(2), 222-233.

Kensinger, E. A. (2009). Remembering the details: Effects of emotion. *Emotion Review, 1*(2), 99-113.

Kuiken, D., Loverso, T., Dunn, S., & Carlisle, D. (2001). The immediate effects of expressively writing about dreams following loss or trauma. *Sleep, 24*, A85

Kuiken, D. & Sikora, S. (1993). The impact of dreams on waking thoughts and feelings. In A. Moffit, M. Kramer, & R. Hoffmann (Ed.), *The functions of dreaming* (pp. 419-476). Albany, NY; State University of New York Press

Lafrenière, A., Lortie-Lussier, M., Robidoux, R., Dale, A., & De Koninck, J. (in press, online November 2017). Autobiographical Memory Sources of Threats in Dreams. *Consciousness and Cognition.*

Lee, M. (1999). Introduction. In Michelle Lee (Ed.), *Shakespearean criticism* (Vol. 45) Farmington Hills: Gale Engage

Lynch, K. L. (1999). Baring bottom: Shakespeare and the Chaucerian dream vision. In Brown, P. (Ed.), *Reading dreams: The interpretation of dreams from Chaucer to Shakespeare* (pp.99-124).. Oxford; Oxford University Press.

McDonald, R (2001). *Shakespeare and the arts of language*. London: Oxford University Press.

Narine, J. S. (2010). Adaptive memory: Evolutionary constraints on remembering. *Psychology of Learning and Motivation, 53*, 1-32.

Paris, T. J. (1991). *Bargains with fate: Psychological crises and conflicts in Shakespeare and his plays.* New York: Plenum Press.

Revonsuo, A. (2000). The reinterpretation of dreams: An evolutionary hypothesis of the function of dreaming. *Behavioral and Brain Sciences*, *23*(06), 877-901.

Roussy, F., Raymond, I., & De Koninck, J. (2000). Affect in REM dreams: Exploration of a time-of-night effect. *Sleep, 23*, A174-A175.

Rosner, R.I, Lyddon, W.J., Freeman, A. (2004). *Cognitive Therapy and Dreams*. New York: Springer Publishing Company.

Schredl, M., & Hofmann, F. (2003). Continuity between waking activities and dream activities. *Consciousness and Cognition*, *12*, 298-308.

Simonton, D. K. (1990). Lexical choices and aesthetic success: A computer content analysis of 154 Shakespeare sonnets. *Computers and the Humanities, 24*(4), 251-264.

Stickgold, R., Scott, L., Rittenhouse, C., & Hobson, J. A. (1999). Sleep induced changes in associative memory. *Journal of Cognitive Neuroscience*, *11*, 182-193.

Valli, K., & Revonsuo, A. (2009). The threat simulation theory in light of recent empirical evidence: A review. American Journal of Psychology, 122, 17–38.

Vaught, J. C. (2008). *Masculinity and emotion in early modern English literature*. Burlington: Ashgate.

Webster, M. (2005). Gods and men in Greek religion. [Syllabus Companion Text]. Department of English, Grand Valley State University, Allendale, ML.

Wright, J. & Koulack, D. (1987), Dreams and contemporary stress. A disruption-avoidance-adaptation model. *Sleep, 10*, 172-179

Annex 1: Source of Dreams Selected from Shakespeare's Plays

Name of the Play	Number of Told or Described Dreams	Additional Details and Theories
Henry VI	4	An ominous dream foreshadowing the Duke of Gloucester's real-life death is particularly important to the storyline
Henry VIII	1	
Richard III	4	Long, ominous dreams, announcing real-life tragedy, mayhem, and revenge
A Midsummer Night's Dream	1	The entire play might be conceived of as a dream or fevered vision
The Tempest	1	
Antony and Cleopatra	1	
Coriolanus	1	
Cymbeline	4	Fractured dreams might represent a state of psychological fragility seeking consolidation (Landry, 1982; Rubinstein, 1986)
Julius Caesar	2	Caesar's death was foretold by a dream, foreshowing the tragic storyline; might be used to convey depression to the audience (Stockholder, 1987)
Macbeth	1	Dream heralding the approach of evil spirits, creatures, and madness
Merchant of Venice	1	
Othello	1	
Pericles	1	

Romeo and Juliet	2	Romeo dreams that he dies, and is brought back to life by Juliet; a parallel version of the storyline foreshadows the lovers' intertwined fates
Sonnet 43	1	Declaration of love and lust for a woman (or man?); dreaming is used as a flattering tool for seduction
Timon of Athens	1	
Troilus and Cressida	1	Andromaque's predictions of Troy's fate are used as a catalyst for the massacre to follow; symbolic reinterpretation of Andromaque as a seer
Winter's Tale	1	Perdita's return foretold in a dream; pivotal point within the storyline

3. Summary of Results

The summary of the two articles' results are presented in this section.

In the first article, *Pre-Sleep and Post-Sleep Mood as a Complementary Evaluation of Emotionally Impactful Dreams*, dreams were found to interact differently with mood if they were mundane or impactful. They also followed a differing trend across moods if they were negative in content, as opposed to positive. Positive mood tended to be less impactful in terms of emotional carry-over, as had been originally hypothesized. In addition, although relationships were found between dream and morning mood, evening mood did not strongly relate to dream mood, suggesting that the initiation of an impactful dream may not be directly linked to an unequivocal pre-sleep emotional state, or at any rate not an immediate one. This study complements the existing literature on impactful dreams and directly addresses the emotionality of dreaming, as well as waking, life.

In the second article, *An Exploration of Shakespeare's Dreams with Modern Scientific Tools and Theories: Normative Comparison with Canadian Dreams,* it was found that the dreams in Shakespeare's plays contain oneiric elements that differ from those in modern Canadian dreams. This is consistent with the differing daily lives of Shakespearean characters, compared to those of modern, everyday Canadians. Yet, despite the sometimes tragic nature of Shakespeare's characters' waking lives, negative tone is no less present than positive tone in Shakespearean dreams. This, surprisingly, appears as a contrast to the dream content of everyday Canadians, which skews towards negative content. This may be due to monolithic forces governing characters' fates in Shakespeare's plays; but it may also be a natural consequence of dreams being written with a rational mind, instead of created through the lens of sleep.

Furthermore, dreams were indeed seen as impactful by default in Shakespeare's plays, as had originally been expected. Although the majority of impactful Shakespearean dreams were emotionally impactful, an important subset was narratively impactful, with the very concept of narrative impact representing a novel intersectionality between literature and psychology. Those findings suggest that dreams in works of fiction serve a purpose as a plot device, whereas our daily dreams may not have such a clear function. The obtained results also extend the utility of modern tools for dream analysis beyond time and place, and even into the realm of fictional dreams. The tools we use today, it would seem, are capable of detecting differences within a range of possible oneiric materials.

At the beginning of the present thesis, the main theories of dream function were described, with the continuity and mastery theories being presented as theoretical frameworks for the research undertaken in both articles. Looking back on this framework and on the results of those research efforts, the continuity theory appears to have been supported, either partially or completely. Dream material and waking life material was indeed mirrored to a varying degree, whether through mood, dream elements, or dream emotions. The mastery theory may be partially supported through the second study; however, there was not a statistically significant increase in threats within Shakespeare's plays, as compared with everyday Canadians' dreams. The presence of threatening material in both samples, however, suggests a continuity with threats faced in waking life, and a corresponding, potential need to master such threats.

4. General Discussion

This thesis explored modern dream analysis through a completely novel standpoint, marrying factual and fictional dreams to compare their main characteristics, most notably through impactful and threatening oneiric material. At the root of this thesis' definition of impactful and threatening dreams lies one core concept: that of emotionality in dreams. Impactful dreams, as defined for sample selection of modern Canadian dream reports, have an impact on the dreamer's waking feelings in the morning. Dreams experienced by Shakespeare's characters are often associated with an emotional response, if not an outright declaration of emotional impact upon waking. And if it is not directly related to such a reaction from ether Shakespearean or Canadian dreamers, oneiric content nevertheless contains elements that point to emotional tone of a given valence. Those findings suggest that, as was originally put forwards in this thesis' introduction, emotionality is a driving factor in dream content, and perhaps in dream construction itself; and furthermore proposes that emotionality is useful as a remembered construct, giving it a particular weft in consciousness.

4.1 Threats and impact in Shakespeare

Throughout this thesis, an attempt was made to better understand threatening and impactful dream content. This exploration may have found a novel paradigm through the psycho-literary analysis of Shakespeare's works, in which modern dream theories may be adapted to a unique context.

Threats and Shakespearean Dreams

Indeed, if Shakespeare's characters are being partially controlled by outside forces which are, by definition, larger than life, they may not derive any additional advantage from attempting to resolve threats within dreams, since their own agency has been subsumed by the storyline itself, which drives characters into already-defined ends. Furthermore, and from a more practical point of view, the Threat Simulation Theory has been stated to have appeared in the remote past, and to have remained as an evolutionary fragment, albeit one which may prove useful in the present as well. The presence of waking-life threats the day before a dream has been shown to trigger the TST (Lafrenière, Lortie-Lussier, Robidoux, Dale & De Koninck, in press) but the threats that do appear in the dreams tend to come from the distant past, or alternately may be linked to pressing current concerns. The threat occurring in waking life, and serving as the original trigger to the construction of a threatening dream, may be a minor annoyance as it may be a grave event.

In this context, Clarence fearing mortal family feuds in *Richard III*, or a Canadian teen grumbling about how the late-night bus was late, may experiment a parallel and similar activation of the TST as they prepare to go to bed. The threat occurring within the dream, however, may well be more minor as it relates to Canadian dreams, as modern-day study participants presumably have lived through less or less intense threatening events than Shakespeare's characters on average. This would be due to temporal and narrative constraints. Shakespeare wrote plays featuring characters that tended to be extraordinary, or at the very least atypical, and thus interesting to the audience. Such characters would often hold positions of power and prestige, and the events of a play would frequently involve attempts to manipulate or maintain this enviable position. In this context, previous threatening events would serve as the narrative background justifying present threats.

Going back to the example of *Richard III*, a backdrop of family strife and the war for power rationalized and normalized the play's multiple murders, as Richard temporarily wins a bloody quest for the crown. It is thus easier for the audience to suspend disbelief, as the play's initially surprising level of intensity now seems matched by the strength of the characters' threatening pasts. In contrast, and although some members of the normative sample may certainly have lived through traumatic events, respondents tended to be individuals who would have had personal contact with researchers located in an urban setting, or would have been exposed to knowledge dissemination activities, for example by choosing to attend a conference on sleep and dreams. As such, participants may be more likely to share some characteristics that would have made them, in turn, less likely to have been victims of precarity or criminal activity, but also less likely to have

held positions of extreme influence. The Threat Simulation System, in this context, may simply have had more minor material with which to construct dream narratives in the case of modern-day Canadians.

Impact and Shakespearean Dreams

Most notably, almost all of Shakespeare's written dreams were evaluated as emotionally impactful, in the traditional sense of modifying the dreamer's feelings, thoughts, or both. When impact on the overall story's narrative thread was also considered, all dreams, without a single exception, were judged to be impactful in some way. Some dreams were prophecies, warnings, or outright visits from otherworldly forces come to speak with the dreamer of psyche, or of the play. In a finding unique to this study, a subset of Shakespearean dreams was impactful in the psychological sense, yet only insofar as the story's narrative was concerned. Below is an example of such a narratively impactful, "symbolic" dream, as told by Balthazar in *Romeo and Juliet*:

"As I did sleep under this yew-tree here,

I dreamt my master [Romeo] and another fought,

And that my master slew him."

Although Balthazar himself does not show signs of being emotionally affected by the dream, and does not immediately display concern, this dream nevertheless comes true as Romeo later fights with, and kills, Tybalt. As such, Balthazar's dream may be seen as an omen, but also as part of a narrative push towards the fatal resolution of the conflict

between Romeo and his compatriot. The investigation of such dreams may provide us with novel insight into the function of Shakespearean dreams as literal extensions of waking life.

Emotional dreams in Shakespeare's works, in contrast, may be meant as private monologues revealing a character's inner life, using revelations that may have been too delicate to expose within the constraints of in-play waking life, and would have broken the audience's suspension of disbelief within a standard setting of discussion. An example of such a dream may be seen in this except from *Cymbeline*:

"Sleep, thou hast been a grandsire, and begot

A father to me; and thou hast created

A mother and two brothers; but, Ô scorn!

Gone! They went home as soon as they were born;

And so I am awake."

This sad narrative underscores the hidden feelings of the dreamer, Posthumus Leonatus, whose own father died before his birth. Deprived of the possibility to grow up among a family of blood relatives, this young man suffers a deep sense of loss he cannot necessarily express in conversation, especially as he often interacts with the characters who helped raise him yet do not consider him to be an equal, due to his poor origins. Faced with the risk of seeming ungrateful, Posthumus Leonatus has no choice but to express his loneliness within the dreaming world. This dream may not directly add

meaning to the plot, but it allows the audience to discover an important character's inner world in a way that does not feel forced or artificial. As a side note, it is also a prime example of the compensation theory of dream formation. All in all, although Shakespearean dreams remain firmly entrenched within the realm of the play, they show signs of an astute understanding of the dreaming world as today's researchers now conceive it.

4.2 Future Directions

The current thesis set out to investigate the different types of impact that may be observed throughout dreaming and waking life. Through the analysis of impactful dreams, this work described the emotionality of dreaming, and its overlap with moods or concerns experienced over the course of daily waking life. Ways in which dreams might inform the emotional and even narrative purposes of waking life were also explored.

The first study explicitly explored mood in dreams, whereas the second study did not have access to characters' dreams, and used emotions as a proxy to mood. In this sense, the first study may be seen as more closely linked to subjective measures of emotionality, with the dreamer judging the intensity of his or her own mood across time periods. The first study consequently directly examined the interplay between two subjective, dreamer-involved means of detecting impactful dreams; in so doing, this work empirically supported the validity of self-identification for detection of emotionally impactful dreams, although this was admittedly shown in a somewhat circular fashion. To the contrary, the second study did not involve the characters-participants, and instead relied on literary cues derived from psychological analysis to determine the presence of dream-related emotions.

In both studies, however, emotionality was conceptualized as the core construct of the dreaming experience. The concept of the impactful dream was supported by investigation of dreamer mood and emotions, but also by shifts in play narratives. The narrative thread of literary works thus became a useful tool that enriched the experience of modern dream content analysis, bridging the gap between the two vastly different disciplines of English literature and quantitative psychology. The focus was on the concept of impact, with a specific interest directed towards dreams that leave some kind of conscious mark on waking life.

Future studies could pursue this line of analysis and explore alternate ways of identifying an impactful dream. Intellectual impact, for example, was also part of Kuiken's original definition (Kuiken & Sikora, 1993), and has since been developed as an integral part of the traditional impactful profile. An impactful dream can, indeed, give rise to new creative possibilities, fresh considerations or insight into solving a problem, or even a novel way of seeing the world and oneself. This aspect could be investigated in the Canadian normative sample, using the adapted version of Kuiken's Post-Sleep Questionnaire. Even spiritual or religious shifts, following an impactful dream, could be explored through the same adaptation of the Questionnaire. Although such dreams are likely to be equally rare, if not moreso, than emotionally impactful dreams, access to the large Canadian normative sample might allow sufficient statistical power for conclusions to be drawn. Kuiken did not readily distinguish between emotionally and intellectually impactful dreams; however, such an undertaking might lead to a differentiation of dreamer characteristics, or mood, which would precipitate one over the other. In addition, the link between impactful dream elements and the dreamer's own waking-life past, in which such elements might have been preferentially found, would

provide additional insight into the dreaming psyche, and could be accomplished through the normative study sample, which included a section linking dream elements to specific, dreamer-identified frames of temporal reference. Finally, the works of Shakespeare might be further examined through the perspective of emotion, and its evolving representation in works of fiction. The history of emotionality might provide context as to the manifestation of both positive and negative valence within Shakespeare's dream sequences, and their link with the characters' waking-life emotional concerns.

Overall, and going back to the core theme of this present work, the study of impact remains to be accomplished on a larger scale, through a wider variety of samples and populations. Individuals having experienced trauma, for example, may conceivably present a greater proportion of impactful dreams, as per both Kuiken's original definition and this thesis' conceptualization of an emotionally impactful dream. Finally, a more globalized investigation of dreams in works of fiction may provide a comparative window into different narratives' distinct use of dreams as tools for introspection. There is still much to be explored when it comes to the interplay of the dreaming and waking worlds.

5. Conclusion

Throughout those two articles, an attempt was made to analyze and understand the nature of dreams, and of a specific category of dreams: those that leave a mark. This mark may be made through threatening content, through an impactful nature, or through a combination of the two. In the works of the Bard over four hundred years ago, or in the dream reports written by everyday Canadians throughout the past decade, oneiric content depicts many of the same characteristics, tone, and motifs. Regardless of their time period, place, and source of origin, dreams analyzed in this study convey positive and negative emotions, feature rich interpersonal interactions, portray a variety of trials of uncertain outcomes, and ultimately emerge as portents of waking-life elements in the past, the present, and even, sometimes, the future.

This study, of course, did not provide insight into a possible adaptive function of dreaming. It did, however, show that some dreams have an impact, and that this impact was perceived in Canadians as well as in the mind of a great thinker. Two very distinct samples, vastly different from each other, nevertheless both show that some dreams play a key role in the shaping of waking concerns, emotions, and actions. Emotions in particular may leave a lasting trace on the dreamer, just as dreams may be in particular linked to the construct of emotionality in some form or other.

Ultimately, and in all likelihood, dreams are not simple, meaningless figments of our imaginations. They have a role to play, a trace to leave on our minds, and a legacy yet to be fully unearthed.

References

Antunes-Alves, S. & De Koninck, J. (2012). Pre- and post-sleep stress levels and negative emotions in a sample dream among frequent and non-frequent nightmare sufferers. *Archives of Psychiatry and Psychotherapy, 2,* 11-16

Armstrong, P. (2001). *Shakespeare in psychoanalysis.* New York, NY: Routledge.

Bokert E., (1968). The effects of thirst and a related verbal stimulus on dream reports. *Dissertation Abstracts, 28*, 47-53.

Breger, L. (1967). Function of dreams. *Journal of Abnormal Psychology, 72*(5), 1-28.

Bogzaran, F. & Deslauriers, D. (2012). *Integral dreaming: A holistic approach to dreams.* Albany, NY: State University of New York Press.

Busink, R., & Kuiken, D. (1996). Identifying types of impactful dreams: A replication. *Dreaming, 6*(2), 97-119

Cartwright, C. (1972), Sleep fantasy in normal and schizophrenic persons. *Journal of Abnormal Psychology, 80*, 275-279

Corsi-Cabrera, M, Velasco, F, Del Rio-Portilla, Y, Armony, JL, Trejo-Martinez, D, Guevara, MA, & Velasco, AL (2016). Human amygdala activation during rapid eye movements of rapid eye movement sleep: an intracranial study. *Journal of Sleep Research, 25*(5), 576-582.

Dale, A., Lafrenière, A. & De Koninck, J. (In Press). Dream Content of Canadian Males from Adolescence to Old Age: An Exploration of Ontogenetic Patterns. *Consciousness and Cognition.*

Dale, A., Lortie-Lussier, M. & De Koninck, J. (2015) Ontogenic patterns the dreams of women across the lifespan. *Consciousness and Cognition, 37*, 214-224.

Davidson, J., Lee-Archer, S., & Sanders, G. (2005). Dream imagery and emotion. *Dreaming, 15*(1), 33-47.

De Koninck, J., Dreams and Dreaming. In C. Moring & C. Epsie (Eds.), *Handbook of Sleep and Sleep Disorders,* (150-171). Oxford: Oxford University Press.

De Koninck, J., & Koulack, D. (1975). Dream content and adaptation to a stressful situation, *Journal of Abnormal Psychology, 84*(3), 250-260.

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*, 50-62.

Domhoff, G. W. (2001). A new neurocognitive theory of dreams. *Dreaming, 11,* 13-33

Domhoff, G. W. (1999). *The "Purpose" of Dreams.* Retrieved September 1, 2017 from http://dreamresearch.net/Library/domhoff_2000c.html

Domhoff, G. W. (1996). *Finding Meaning In Dreams: A Quantitative Approach.* New York, NY: Plenum Press.

Eichenlaub, JB, Cash, SS, & Blagrove, M. (2017). Daily life experiences in dreams and sleep-dependent memory consolidation. *Cognitive Neuroscience of Memory Consolidation,* 161-172.

Frazier, J. (1922). *The golden bough*. New York, NY: Penguin Books.

Foulkes, D. (1985). *Dreaming: A cognitive-psychological analysis*. Hillsdale: Lawrence Erlbaum Associates.

Hall, C. S. (1953). The cognitive theory of dreams. *Journal of General Psychology, 49*, 273-282.

Hall, CS, & Norby, VJ (1972). *The individual and his dreams.* New York: New American Library.

Hall, CS. & Van de Castle, R (1966). *The content analysis of dreams.* Meredith: Appleton-Century-Crofts.

Hartmann, E. (1996): We do not dream of the Three R's: A Study and Implications. *Sleep Research, 25*, 136.

Hartmann, E., Rosen, R., & Rand, W. (1998). Personality and dreaming: Boundary structure and dream content. *Dreaming, 8*(1), 31-39.

Hobson, J. 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*, 3-7.

Hobson, J., Pace-Schott, E., & Stickgold, R. (2003). Sleep and dreaming: scientific advances and reconsiderations. Pace-Schott, E., Solm, M., Blagrove, M., & Harnad, S. (Eds.). New York, NY: Cambridge University Press.

Kuiken, D.; Lee, M.-N.; Eng, T.; Singh, T. (2006). The influence of impactful dreams on self-perceptual depth and spiritual transformation. *Dreaming, 16*(4), 258-279.

Kuiken, D. & Sikora, S. (1993). *The impact of dreams on waking thoughts and feelings*. Albany, NY; State University of New York Press.

Kramer, M. (1993). The selective mood regulatory function in dreaming. In: Moffitt, A., Kramer, M., Hoffman, R. (Eds.), *The Functions of Dreaming*. Suny Press, New York, 139-195.

Kramer, M., & Glucksman, M. (2006). Changes in manifest dream affect during psychoanalytic treatment. *The Journal of the American Association of Psychoanalysis and Dynamic Psychiatry, 34*(2), 249-260.

Lafrenière, A., Lortie-Lussier, M., Robidoux, R., Dale, A., & De Koninck, J. (in press, online November 2017). Autobiographical Memory Sources of Threats in Dreams. *Consciousness and Cognition.*

Lang, R., & P. O'Connor, K. (1984). Personality, dream content and dream coping style. *Personality and Individual Differences, 5*(2), 211-219.

Merritt, J., Stickgold, R., Pace-Scholl, E., Williams, J., & Hobson, J.(1994). Emotion profiles in the dreams of men and women. *Consciousness and Cognition, 3*(1), 46-60.

Nielsen, T. & Levin, R. (2007). Nightmares: A new neurocognitive model. *Sleep Medicine Review, 11*, 295-310

Nielsen, T., Deslauriers, D., & Baylor, G. (1991). Emotions in dreams and waking event reports. *Dreaming, 1*(4), 287-300.

Nir, Y. & Toroni, G. (2010). Dreaming and the brain: from phenomenology to neurophysiology. *Trends in Cognitive Science, 14*(2), 88-100.

Nixon, A., Robidoux, R., Dale, A., & De Koninck, J. (2017). Pre-sleep and post-sleep mood as a complementary evaluation of emotionally impactful dreams. *International Journal of Dream Research, 10*(2), 141-150.

Pagel, J. (2014). Dream science: Exploring the forms of consciousness. Cambridge, MA: Academic Press.

Revonsuo, A. (2000). The reinterpretation of dreams: An evolutionary hypothesis of the function of dreaming. *Behavioral and Brain Sciences*, *23*(06), 877-901.

Robert, G. & Zadra, A. (2008) Measuring nightmare and bad dream frequency: Impact of retrospective and prospective instruments. *Journal of Sleep Research,* 17:132-139

Roussy, F., Raymond, I., & De Koninck, J. (2000). Affect in REM dreams: Exploration of a time-of-night effect. *Sleep, 23*, A174-A175.

Roussy, F., Brunette, M., Mercier, P., Gonthier, I., Grenier, J., Sirois-Berliss, M., Lortie-Lussier, M., & De Koninck, J. (2000). Daily events and dream content: Unsuccessful matching attempts. *Dreaming, 10*, 77-83.

Rozin, P., & Royzman, E.B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review, 5*(4), 296-320.

Sabourin, C., Robidoux, R., Pérusse, A. & De Koninck, J. (in press). Dream content in pregnancy and post-partum: Refined exploration of continuity between waking and dreaming. *Dreaming.*

Schredl, M., & Hofmann, F. (2003). Continuity between waking activities and dream activities. *Consciousness and Cognition, 12*, 298-308.

Schredl, M., & Reinhard, I. (2011). Gender differences in nightmare frequency: A meta-analysis. *Sleep Medicine Review, 15*(2), 115-121.

Schredl, M. (2012). Continuity in studying the continuity hypothesis of dreaming is needed. *International Journal of Dream Research, 5*(1), 1-8.

Schredl, M. & Doll, E. (1998). Emotions in diary dreams. *Dreaming, 7*(4), 634-646.

Seligman, M, & Yellin, A (1987). What is a dream? *Behavior Research and Therapy, 25,* 1-24.

Stairs, P. & Blick, K. (1979). A survey of emotional content of dreams recalled by college students. *Psychological Reports, 45,* 839-842

Stewart, D. & Koulack, D. (1993). The function of dreams in adaptation to stress over time. *Dreaming, 3*(4), 259-268

Vallat, R, Chatard, B, Blagrove, M., & Ruby, P. (2017). Characteristics of the memory sources of dreams: A new version of the content-matching paradigm to take mundane and remote memories into account. *PLoS ONE 12*(10), 1-19.

Valli, K (2008). *Threat simulation – the function of dreaming?* Turku: Turun Yliopisto.

Valli, K., & Revonsuo, A. (2009). The threat simulation theory in light of recent empirical evidence: A review. *American Journal of Psychology, 122,* 17–38.

Van de Castle, R. L. (1994). *Our dreaming mind.* New York: Ballantine Books.

Van der Kolk, BA, Blitz, R, Burr, WA, Sherry, S., & Hartmann, E. (1984). Nightmares and trauma. *American Journal of Psychiatry, 141*:187-190.

Wright, J. & Koulack, D. (1987), Dreams and contemporary stress. A disruption-avoidance-adaptation model. *Sleep, 10*, 172-179.