THE HUMAN ALPHA FEMALE: SOCIAL AND BIOLOGICAL PERSPECTIVES

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
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Understanding the Human Alpha Female: Social and Biological Perspectives

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Abstract

Today, in the popular and academic literature, women in the West who exhibit dominance-seeking behaviors to attain or maintain higher positions in social and professional networks are often referred to as “alpha females” or “alpha women”. Within this context, the term “alpha female” has become synonymous with the term leadership. Much of the research on the human alpha female takes its cues predominantly from the nonhuman primate literature on the social and biological factors that may predispose an individual to be an “alpha”, in particular, an “alpha male”. What are considered traditionally masculine traits in the West, such as aggression, leadership, and dominance, are often used to describe the alpha female. More recently, traits such as collaboration, teamwork, coalition building, and affiliative behavior, considered typical “feminine” traits in the West, have also been used to describe the alpha female. To date however, whether women socially occupy and/or biologically express this identity has not been researched. The purpose of this thesis is to address the gaps in the literature and following what has been studied in the nonhuman primate literature, to investigate whether women who identify as alpha female are distinguishable from other women. For the present study, I examined the associations between alpha female status with the expression of specific alpha female related traits, hormone concentrations in hair, as well as differences in finger lengths, or the 2D:4D ratio, a prenatal biomarker of testosterone exposure. For the women in this study, the results suggest,
that though specific masculine traits were found to be predictors of alpha female status, neither the specific hormones evaluated in the present study nor the 2D:4D ratio were associated with the expression of the alpha female identity. These results challenge present assumptions about what it means to be an alpha woman, as well as challenge what is known about the alpha female nonhuman primate as being representative of the human alpha female.
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Foreword

This thesis consists of five chapters that explore the alpha female identity from social and biological perspectives.

Chapter 1 provides an introduction to the thesis and includes an explanation of the social and biological perspectives that shape the research methods and approaches used to explore the relationship between social and biological traits and characteristics related to the expression of the alpha female identity. This chapter also outlines the main themes and general goals of this thesis.

The largest of all the chapters of this thesis, Chapter 2, focuses on the social construction of the alpha female identity. Chapter 2 represents the first research study in this thesis and a majority of this chapter was recently published in PLOS ONE, a peer-reviewed open access journal, as the research article, *Masculinity, femininity, and leadership: Taking a closer look at the alpha female* (Sumra, 2019). In Chapter 2, I begin with a detailed account of the history of the alpha female identity from the early 1930s to the present in order to trace the area of study from which the term “alpha” originates. This account tells the story of how the alpha female had her beginnings in the field of animal behavior studies, moved into the realm of primatology, and was then picked up by popular fiction literature. From here, her identity continues to twist and morph into the areas of feminist discourse and popular media, and further into the realm of leadership, politics, and sexuality. Chapter 2 represents the first such historical account. This will serve as a central repository for information on the alpha female identity for those who conduct research on the alpha female, as well as other areas related to female identity such as gender and social dominance research. Chapter 2 also includes the results of in-depth textual and statistical analyses of the traits found to be related to the expression of the alpha female identity. This chapter seeks to answer the following questions: 1) what traits are associated with the alpha female identity from the perspective of women themselves, and 2) are there predictive behavioral traits associated with the alpha female identity? In this study I also employ certain methods of inquiry that ethnographers have used to collect data including participant observation, interviews, and focus groups.

Chapter 3 represents the second study of the present research. In this chapter, the relationships between specific hormones and the expression of the alpha female identity are examined.
Specifically, in this chapter, the relationships between hormonal measures and behavioral traits related to the alpha female identity, discussed in Chapter 2 are tested – the association of testosterone and cortisol, as well as 3 other hormones, estradiol, oxytocin and progesterone derived from hair samples, with the traits related to the expression of the alpha female identity. The results in this chapter are examined alongside the results from the first study presented in Chapters 1 and 2. In Chapter 3, I seek to answer the following question: 1) is the alpha female identity and/or associated attributes reflected in hormonal profiles?

Chapter 4 represents the third study of this thesis and examines the relationships between alpha female status and masculine/feminine traits identified in the first study with a prenatal biomarker for androgen exposure - left and right 2D:4D ratios (differences in the finger lengths of the ring and index fingers). The relationships between left and right 2D:4D ratios and the masculine and feminine traits related to the alpha female found in the first study (Chapters 1 and 2), as well as their associations with testosterone and estradiol concentration levels that were included in the second study (Chapter 3), are also examined. This chapter also includes an investigation into the influence of the social environment after birth and its potential influence on alpha female status later in life. The results of the third study provide an opportunity to better understand whether the 2D:4D ratio may represent a potential morphological expression of the alpha female identity. This chapter seeks to answer 2 questions: 1) does the 2D:4D ratio predict alpha female status, 2) are there any potential parental and/or mentor effects that may influence whether a woman identifies herself as an alpha female later in life?

Chapter 5 represents the final chapter and summarizes the findings and conclusions from the preceding chapters. Future directions for research and the implications of the findings are also considered and discussed in this chapter.
Chapter 1

Introduction

Among anthropologists and other social scientists, the idea that gender identities are socially constructed is not new. In most societies some form of gender-based social structuring is practiced. Notions of gender, along with ideas of femininity and masculinity, are created through cultural beliefs and practices. In turn, these gender roles - what it means to be a man or a woman, are prescribed as ideal, or “normative” behavior. Anthropologists acknowledge that variation exists within gender categories - that there are different ways to perform gender. In the West, ideas and notions about the “alpha female” or “alpha woman” identity circulating in the academic literature and the popular media, present the alpha female identity as a gender variant of the category “female”. The alpha female identity has undergone iterations of variation to where it is understood today as an accepted form of gender identity. One of the main objectives of the present research is to ascertain whether alpha females are distinct from other women. If this distinction is solely based on cultural norms about gender, using the methodological approach of social constructivism would suffice. However, in the case of the alpha female, to achieve this is more complicated. It is important to note that unlike other popularized forms of female identity such as the superwoman, slut, domestic goddess, soccer mom and others, the alpha female identity and the behaviors or traits associated with its express, originate from the animal literature, predominantly, from the nonhuman primate research. In much of the research on the human alpha, many of the behaviors and traits exhibited by nonhuman primate alpha males and alpha females are considered analogous to those expressed by human alpha males and alpha females. However, in nonhuman primate research the alpha individual is not only differentiated by behaviors and traits – they are also differentiated from their subordinate counterparts by biological factors such as circulating hormone concentrations, and morphological marker such as differences in finger lengths between the index and ring fingers, or the 2D:4D ratio. Given the evidence from nonhuman primate studies, it became necessary in the present research to also investigate whether there is, or is not, a biological contribution to the social construction of the alpha female identity. In the remaining pages of this chapter, the main themes and goals are described.
CHAPTER 1. INTRODUCTION

1.1 Gender and The Alpha Female

Identity as a male or female, matters because the differences between male and female gender roles in society matter. The idea that gender, and for that matter sex, is both a product of biology and culture is not new. Margaret Mead was one of the first anthropologists to ask the question, are masculine and feminine characteristics innate or culturally constructed? (Mead, 1935).

According to Mead, if they were innate, we should expect to see the same expression in all societies. In her seminal work of 1935, *Sex and Temperament in Three Primitive Societies*, Mead (1935) found that both men and women among the Mundugumor (a.k.a. Biwat), a tribe of Papua New Guinea, exhibited what we in the West would consider “masculine” traits of aggression and assertiveness. What she found then, and in her subsequent works was that men and women had different roles in different societies, and in some cases, characterizations of masculinity and femininity contrasted sharply with those portrayed in Western society. In anthropology today, that gender roles are largely centered on localized conceptions of masculinity and femininity and that gendered expectations vary cross-culturally is almost irrefutable. This idea of variation also applies within genders themselves. For example, Lorber (1993) has argued, that though differences exist between groups, more often than not, more significant differences exist within groups themselves (see Lorber 1993, 2007).

The initial review of the academic literature and popular media revealed two competing conceptualizations of the alpha female in Western society emerged – a more “masculine”, and a more “feminine” alpha female as reflected by 8 alpha female themes and 21 alpha female-related traits. This allowed for the development and evaluation of two alpha female themes related to the two conceptualizations-the Alpha Female Masculine (AFM) and Alpha Female Feminine (AFF) in the present research. This is discussed in more detail in Chapter 2.

In Western societies, the gender binary represents a system in which a society splits its members into one of two sets of gender roles, gender identities, and associated attributes based on the genitalia an individual is born with – “two discrete sexes and two distinguishable genders because our society is built on two classes of people, women and men” (Lorber, 1993, p. 569).
Within this context, ideas about gender become very important for the alpha female identity.

The findings of the literature review revealed that the Western gender binary forms the commonsensical basis upon which the alpha female identity relies. This rendered the examination of the alpha female identity through a gender binary lens necessary. As such, this allowed of an examination of alpha female as meaningful in particular, when women push the boundaries of this binary by succeeding in spheres normally limited to men. Thus, examining the alpha female identity through a binary lens for the purposes of this work, allowed for a deeper understanding of where categories of masculine and feminine intersect and/or become distinct – how they work in tandem and/or independently to characterize the identity. What was ultimately gleaned from this examination was insight into the variability and nuances in the meanings and practices the category “female” more generally (e.g. Lorber, 2007; Mukhopadhyay et al., 2017).

1.2 Bridging the Anthropological Divide

Although the alpha female has been extensively studied in primatology, and numerous studies have examined relationship between behaviors, hormonal correlates, and prenatal exposure to androgens in nonhuman alpha female primates (e.g. Breedlove, Cooke, and Jordan, 1998; Carter, 1998; Stanford, 1998; Bailey and Hurd, 2004; Benderlioglu and Nelson, 2004; Sapolsky, 2005; Bartz and Hollander, 2006; Kuepper and Henning, 2007; Hawley, Little and Card, 2008; Nelson et al., 2010; Howlett, Marshall, and Hughes, 2012; Howlett et al., 2014; Feng et al., 2016, Beehner and Bergman, 2017), similar studies on the human alpha female have rarely been conducted. Where there have been undertaken, such studies are predominantly undertaken in the area of leadership research, where the alpha female, based on the model of male dominance or the alpha male in humans, is depicted as a leader in society. Such research has focused on behaviors associated with leadership (e.g. Ludeman and Erlandson, 2004, 2006, 2007; Kindlon, 2006; Ward et al., 2009, 2010; Poduška 2014; Moncrief, 2015). Much of the research on dominance behaviors and associated traits have been conducted within the fields of psychology, specifically, evolutionary psychology (e.g. Pratto, Stallworth and Sidanius, 1997; Johnson, 2012; Hawley, 2014; Kleppestø et al., 2019). To date, research that examines collectively, the sociobehavioral, and biological factors such as, hormonal and prenatal indicators associated with the human alpha
female identity has not been undertaken. Perhaps this is because of the diverse nature and diverse expertise that such an examination would require. Though the complexity of the alpha female identity renders it a daunting task for a more holistic examination, the discipline of anthropology lends itself perfectly to such a form of inquiry. As anthropologists McKinnon and Silverman (2005) put forth in their work *Complexities*, a collection of essays and studies that unite scholars from the four subfields of anthropology, the discipline of anthropology is uniquely positioned for this kind of critical engagement. Understanding human diversity and complexity through multiple anthropological lenses will not challenge the range of reductionisms prevalent both in the discipline of anthropology itself as well as in the popular media, it will also help us understand the social worlds within which we live (McKinnon & Silverman, 2005, p. ix).

Examining the alpha female identity from the perspectives of the subdisciplines of anthropology including, sociocultural, primatology, and biology allows for unpacking its complexity.

Research that includes social and biological expressions of the alpha female identity renders the present research theoretically and methodologically relevant as it allows for building bridges, thus revealing that anthropology’s subdisciplines are not as distinct and siloed as is often assumed. As such, this work adds to the body of research that asks for a rethinking about what is ‘biological’ and ‘cultural’ in humans. My approach to understanding the human condition toward a more inclusive anthropology of life beyond divisions, is inspired by and articulates with the works of other anthropologists from the biological, primatology, and sociocultural subfields. Over the past decades, these divisions and how they can be overcome have been highlighted by several anthropologists from the various subfields (e.g. Latour, 1979, 1984, 1987, 1991; Ingold, 2000; Ingold and Palsson, 2013; Descola, 2013; McKinnon and Silverman, 2005; Gettler et al., 2011; Gettler, 2016; Kuzawa et al., 2009; MacKinnon and Fuentes, 2005).

For example, in “The Perception of the Environment: Essays on Livelihood, Dwelling, and Skill” (Ingold, 2000), sociocultural anthropologist Tim Ingold, is very clear on his stance when it comes to what he means by bridging the biological and social in anthropology - we are at once organisms and persons to inhabit an environment. Ingold argues that what anthropologists call cultural variation is essentially variations in skill. He further argues that these skills are not
innate, nor acquired but are “grown and incorporated into the human organism through practice and training in an environment” (Ingold, 2000). According to Ingold (2000), it is these skills that are “as much biological as they are cultural”. Ingold (2000) calls for a “breaking out” of this theoretical “impasse” and states the first step toward is to think of humans, and all creatures, in terms of “not what they are but of what they do”, thinking of ourselves not as beings but as becomings.” (Ingold, 2013. p. 8).

In his work on the relationship between hormones and human behavior with respect to the stress response in humans, biological anthropologist and primatologist Agustín Fuentes (2013) calls for researchers to see the biological and the social as intertwined rather than distinct. The hypothalamic-pituitary-adrenal axis (HPA) is a feedback loop which connects the central nervous system to hormone systems in the body and is the first line of defense when it comes to our physiological response to external stimuli or to a stressor (Sapolsky, 1985). In humans, it has been well-established that males and females physiologically and psychologically, respond differently to stress. Traditional evolutionary theorists explain this variation in stress response as some form of adaptive variation (Fuentes, 2013). Fuentes (2013) asks the researcher to consider a different approach to understanding this variation - to view the HPA system as a “dynamic part of the human system and that we can better understand the way it works if we see it not as the fixed endpoint of a developmental process, responding to external cues, but rather as part of a ‘body’ that continues to develop throughout its lifespan” (p. 54). Using this approach as Fuentes (2013) states represents an “integration of innovative perspectives in evolutionary theory with ideas from both social and biological anthropology should provide us with more effective toolkits with which to examine patterns and processes of human becoming” (Fuentes, 2013, p. 42).

The ideas and approaches put forth by McKinnon and Silverman (2005), Ingold (2000) and Fuentes (2013) apply directly to my examination of the alpha female identity, specifically in the case hormone concentrations that have been linked to the traits related to the expression of the identity. Specifically, understanding the alpha female in terms of her hormones, sex, and gender-terms which refer to areas of intense anthropological in inquiry. Hormones do not determine
behavior. Rather, because hormones and behavior have a reciprocal relationship – fluctuations in hormones may increase or decrease the probability of the expression of a given behavior (Soares et al., 2010).

For example, higher testosterone concentrations in both men and women have been linked to aggressive behavior, and higher concentrations of the peptide hormone oxytocin, have been related to affiliative behavior. Examining ideas about the alpha female with ideas from both social and biological anthropology allows the opportunity to investigate whether the alpha female is as biological as she is cultural, as well the potential to develop a model, or more holistic “toolkit” to identify alpha females.

Anthropologist Gettler and colleagues (2009, 2011) examined the relationship between social identity and hormones. They examine the relationships between fatherhood, caregiving and testosterone concentration in men who were fathers, and men who were not (Kuzawa et al. 2009; Gettler et al., 2011). Gettler and colleagues examined whether being a father is linked to lower testosterone concentrations in men. In 2009, Gettler and colleagues published their first article on testosterone and fatherhood and found that fathers in committed relationships exhibited lower testosterone levels than single non-fathers. They also found that fathers who considered themselves primary care givers for their children also exhibited lower testosterone levels particularly in the evening. According to Gettler et al. (2011), what came out of this for anthropologists and other researchers is the conclusion that fatherhood likely lowers a man’s testosterone levels which is in line with similar patterns in other animal species with respect to paternal care (Kuzawa et al., 2009). In a subsequent study of the same men, Gettler et al., (2011) found that irrespective of fatherhood, most men in the study experienced some decline in testosterone over 5 years. Though these men experienced the largest drop in testosterone levels after the birth of their child, after this initial drop testosterone levels rebounded somewhat. These findings led to the development of a more integrative model by Gettler (2016) to better understand shifts in neuroendocrine function, specifically, fluctuating testosterone levels, within the context of fatherhood. He terms this model DADS (dedication, attitude, duration, and salience) as a framework within which to examine diverse human paternal profiles. In this work,
Gettler (2016) argues that because there is variation in the neuroendocrine responses both inter, and intra-culturally, there must be more at play than just adaptive responses. Given this, the charge in the present work to examine the alpha female, as an integration of the social and biological, appears to be the right path to avoid making reductionist assumptions about the identity and its expression.

In their work Remaking Life and Death: Toward an Anthropology of the Biosciences, Franklin and Lock (2003) also call for a more integrative anthropology, specifically, a call for a reconceptualization the biological phenomena of life and death as social. Franklin and Lock (2003) show the interconnectedness of the biological and the social in two distinct ways. First, how biology and life sciences contribute to the expression of social practices, beliefs, and expectations and second, how biology itself is a product and practice embedded in cultural identities, social practices, discourses, and institutions (2003). In talking about life and death, one a starting point of life, and the other an end-point, the essays in this collection render the reader to truly rethink how we make meaning of life and death. Lock (2003) talks about brain death as a “radically new form of soul loss” (p. 167), and about the discomfort that healthcare workers and families feel when the “body” is still alive after the “person” has departed. In her piece “On making up the good-as-dead utilitarian world” (Lock, 2003), ask us to think about, when does “death” actually occur, and when does a dead and dying person become an “object” of science, an object in the utilitarian world of medicine as an organ donor. Lock (2003) highlights that a “dying” or “dead” person has parts that are “alive” that can give life to others. This combining of the meaning of life and death highlights that the biological and the social are inextricably connected – that we are biological beings that live in a social world. Given the approach by Franklin and Lock (2003), for alpha females, an examination of the potential that hormones and prenatal exposure to androgens may contribute to our understanding of how the alpha female identity is practiced appears to be justified.

As my predecessors before me, through this work, I seek to take on a holistic integrative approach to examine the alpha female identity - an approach that does not presume associations
or links with biological or social expressions but rather, investigates the possibility that such
links may or may not exist. For the alpha female, this is especially important as much of the
discourse surrounding this identity is based on alpha male non-human primates. To accomplish
this, it is necessary not to categorize alpha and non-alpha females based on pre-existing
definitions a priori. Rather, based on what has been circulated in the academic literature and
popular media beginning with the origin of the alpha female identity to current ideas, I examine
how the alpha female identity is socially constructed and how women who identify themselves as
alpha female, occupy and express the identity based on their alignment with what are considered
“alpha” behavioral and biological traits. Such an approach allows for a dismantling or
deconstruction of the alpha female identity allowing for the opportunity to ascertain whether the
alpha is a unique form of female identity or whether it may have more in common with other
forms of female identity.

1.3 The Alpha Female Journey

In addition to the novel approach to studying the alpha female identity, another key contribution
of the present work is that it is the first to present a comprehensive history of the alpha female
and how she has become a part of our everyday understanding of female identity. In Chapter 2, I
present a detailed account of the history of the alpha female identity from the early 1930’s to
present in order to trace the area of study from which the term “alpha” originates. This account
tells the story of how the alpha female had her beginnings in the field of animal behavior studies,
moved into the realm of primatology and then was picked up by popular fiction and literature.
Her identity twists and morphs into the areas of feminist discourse and popular media, and
continues deeper into the realm of leadership, politics, and sexuality. This historical account
serves as central repository for information on the alpha female identity for those who conduct or
wish to engage in similar research and is a significant contribution to discourse on the human
alpha female.
CHAPTER 1. INTRODUCTION

1.4 The Self-Identified Alpha Female

Previous studies that have explored the concept of the alpha female have done so based on predetermined attributes associated with the alpha female identity (e.g. Ward et al., 2009, 2010; Poduška 2014; Moncrief, 2015). In each of these studies, women completed a survey designed to measure specific traits related to leadership and leadership qualities and based on the how they scored, women were categorized as alpha or non-alpha. In these studies, the relationships found between alpha and non-alpha women and certain alpha-related traits are consistent with the literature on the nonhuman primate alpha male (Ward et al., 2009, 2010; Poduška 2014; Moncrief, 2015). My intent in this research is to gain a deeper understanding of traits associated beyond leadership and those associated with nonhuman alpha primates, to begin with no assumptions in order to evaluate the alpha female as a potential form of female identity. Thus, my purpose is not to presuppose the existence of the alpha female identity but rather to examine if women occupy it. As such, I employ self-identification as a method of categorizing alpha and non-alpha women. In Chapter 2, the process of self-identification is described in great detail. At this point however, I would like to emphasize that this process was not haphazard.

Women were asked to complete a survey of 96 questions designed to evaluate the degree to which women align with traits related to expression of the alpha female identity. These traits were derived from in-depth textual analyses on data collected from the academic literature, popular media including websites, blogs, and magazines, interviews, and focus groups. Although some traits that emerged were similar to those used to assess alpha female status in previous studies, there were many other that were not. Women were not asked any questions related to the alpha female identity until the end of the survey. Women were asked to self-identify as alpha female or not based upon their agreement with a definition presented to them. The purpose of this was not to colour or influence the responses in order to measure traits that may or may not be associated with the identity. Using self-identification also reduces the risk of categorizing women solely on the basis of what has been learned from research on nonhuman primate alphas, thereby allowing for the complexity of human behavior to be part of the evaluation.
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Using pre-categorization defeats the purpose of examining the alpha female as a potential variant of female identity, a potential variant of female gender. I acknowledge that some researchers may view self-categorization as being subject to significant social desirability bias and as such, may not reflect meaningful categories. However, I argue that using pre-existing categories is not a risk-free approach. Just because a woman is pre-identified as an alpha female does not mean that she thinks she is one. To date, there has been no research to support or negate the use of self-identification as means to identify alpha females or alpha males. It should be noted however, that my intent in this work is not to present a tried and true method to identify the alpha female, or to present self-identification as the most appropriate method to test the occupation and expression of the identity. My interest and purpose lay entirely in understanding whether or not this identity is accepted and occupied by women, rather than applying a label with certain presumed characteristics such as leadership, masculinity, and social dominance, that have not been examined as part of the social construction of the alpha female. Having said this however, there is a difference between believing you are an alpha female and what other people think. Yes, you can be alpha female if you choose to, but others may not view you as one. Conversely, you may not consider yourself an alpha female, but others might. Though this is not within the scope of the present research, this question does open up the possibility for future research which is expanded upon in Chapter 2.

The reader may be asking at this point, if the alpha female is largely based on presumptions why should she be a subject of anthropological inquiry? This does pose an interesting question and casts shadow on studying not only the alpha female but other female identities all together. This represents one of the central conundrums in anthropology which McKinnon and Silverman (2005) bring up. “The reductionism that we reject on analytic grounds is often employed as a strategic tool by the people we study” (McKinnon and Silverman, 2005, p.15). However, like McKinnon and Silverman (2005), I also argue that it “behooves the anthropologist to understand people’s uses of such ideologies even while criticizing the assumptions inherent in them” (McKinnon and Silverman, 2005, p.15). I argue that it precisely the ambiguity of “realness” of the alpha female identity that renders it perfect for examination and even further, an examination through the “lenses” of anthropology, with different foci, biological and social, that appropriates
it to such an examination. Put simply, my answer to the question posed previously is with another question, “Why not study the alpha female?”

My intent in this dissertation is neither to engage in biological nor cultural determinisms. Rather, in first evaluating the social construction of the alpha female identity and examining whether certain biological factors may play a role in its development and expression, I seek here to make a positive contribution to the disciplinary discussion on the alpha female identity. In tracing the history of the alpha female and critically analyzing how notions about the identity came to parallel the nonhuman alpha primate model, and in using the same biological models and methods of inquiry used in nonhuman primate research (i.e. to test for their applicability to the expression of the alpha female identity), my intention is to evaluate the appropriateness of their application to humans. Most importantly, given that leadership, more specifically leadership in the workplace, is often considered synonymous with both the terms “alpha female” and “alpha male”, through the findings presented in this dissertation, I also seek to make a positive contribution to the alpha literature in leadership studies.
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1.5 References


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Chapter 2

Masculinity, Femininity, and Leadership: Taking a Closer Look at the Alpha Female

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2.1 Introduction

Individuals considered leaders in Western society who occupy the highest positions such as heads of corporations, senior management and those that hold political office are often referred to as “alpha” (e.g. de Waal, 1982, 2005, 2007, 2013; Kelleher, 1997; Kantor, 1999; Kindlon, 2006; Ludeman and Erlandson, 2006; Cora, 2008; Ward et al., 2009; Ward, Popson, and DiPaolo, 2010; Poduška, 2014; Moncrief, 2015; Hymowitz, 2012; Rhodes and Schneider, 2014; Whoriskey, 2016). Within this context, “alphas”, or socially dominant individuals, exercise influence over others, play a lead role in goal-setting, goal achievement, the development of a group or organization, and are regarded as the leader by other members of a group (Janda, 1960). The term “alpha”, more specifically “alpha male” originates from the field of animal behavior (de Waal, 2017) in the 1940s and 1950s (McClurg, 2017), and is used as a descriptor for the highest-ranking individual of a social group (de Waal, 2007), the “leader of the pack” (Mech, 1999). Being an “alpha” female has its advantages. In the primatology literature, an alpha male or female is socially dominant and reproductively successful and often has greater access to food resources (e.g. Barton and Whiten, 1993; Buss, 2003; Furuichi, 1983; Huntingford and Turner, 1987; Manson, 1996; Marmot, Shipley, and Rose, 1984; Sapolsky, 1983; van Noordwijk and van Schaik, 1999; Samuels et al., 1984; Wroblewski et al., 2009). Due to our shared evolutionary heritage, nonhuman primate behaviors, social structures and interactions have, and continue to be compared to humans (MacKinnon & Fuentes, 2005). Popularized narratives and discourse within this context rely on analogies between human and primate behavior (e.g. de Waal, 1982, 2005, 2007, 2013; Sapolsky, 2004, 2005; Whoriskey, 2016). It is not surprising then, that men
and women in leadership positions within social contexts such as the workplace, schools, athletics, and in politics, are often referred to as “alpha males” and “alpha females” (e.g. de Waal, 1982, 2005, 2007, 2013; Kelleher, 1997; Kantor, 1999; Kindlon, 2006; Ludeman and Erlandson, 2006; Cora, 2008; Ward et al., 2009; Ward, Popson, and DiPaolo, 2010; Poduška, 2014; Moncrief, 2015; Hymowitz, 2012; Rhodes and Schneider, 2014; Rhodes, 2015; Whoriskey, 2016).

Dominance, a description of the top-ranking individual in a social group, is often associated with alpha status, and is linked to many benefits such as greater access to resources and sexual partners and even prestige in nonhuman primates and humans (see Ray, 1999; Hawley, 1999). Although there has been little research in this area focused on humans, where it has been, the term “alpha” is most often regarded as a male concept. Based on the Western gender binary, alpha personality traits such as aggression, assertiveness, academic and professional achievement, confidence, greater likelihood of obtaining a supervisory or managerial position, and exhibiting a “type A” personality are regarded as inherently “male” or “masculine” characteristics (e.g. Maslow 1940; Ludeman and Erlandson, 2006; Hawley, Little, and Card, 2008; Ward et al., 2009, 2010; Hawley and Hensley, 2008; Sidanisus, Pratto, and Bobo, 1994; Pratto et al., 1997; Cashdan, 2003; Kindlon, 2006; Cora, 2008; Grado and Whiteman, 2012; Reid, 2012; Madison et al., 2014). What this suggests is that expectations of those who strive to be in management positions in the workplace have gender, and perhaps even “sexist” norms built into them. This has implications for women, and even men, who do not display these characteristics, limiting their ability to succeed, earn a higher income, and gain higher social status, all which have social consequences.

The human alpha female has been a topic of research in leadership studies in the West. Based on the alpha as a “male” concept, the alpha female has been defined as a woman who is a leader, feels a sense of superiority or dominance over other females, has men and women seek her guidance, is extroverted, believes in male and female equality, is physically strong, and driven (Ward et al. 2009, 2010). The alpha female, however, has not just been described in
“masculine” terms. For example, research on nonhuman primate alphas female has shown that they also exhibit what are traditionally regarded as feminine qualities (e.g. Hawley, Little, and Card, 2008; de Waal, 2007). In some species, where alpha males exhibit “masculine” behaviors such as coercion (Hawley, Little, and Card, 2008), alpha females engage in more “feminine” behaviors such as grooming and choosing a more cooperative and communal approach to reaching and maintaining alpha status (de Waal, 2007). Similarly, in the popular literature in the West, alpha women are at times described in masculine terms, and at other times in feminine terms. Where the alpha woman is described as being “too competitive”, too “masculine”, and “unable to love” (Venker, 2017), she is also described as being “uninhibitedly feminine and sexy” (Williams, 2016), “having a heart” (Parker, 2015), and being a “social lubricator” (Van Edwards, 2016). For example, in the article, The Female Alpha (2016), author and human behavior researcher Vanessa Van Edwards states that although the term alpha female conjures up images of a domineering, authoritative, and attractive woman, recognizing an alpha woman is not so simple. There are other things that define her. For example, according to Van Edwards (2016), alpha females can be found “at the top of the hierarchy”, are “social conductors” with non-alphas as her orchestra, and that all females follow the alpha’s cues. She also states that when an alpha female leaves the room “a social vacuum” is created. According to Van Edwards (2016) not all alpha females are created equal – there are different “degrees of female alphaness”.

Research that examines the “alpha female” as a social construct from the perspective of women themselves, and as an accepted and expressed form of female identity is largely absent from the academic literature. The only research to date on the alpha woman considers alpha status analogous to leadership (capabilities and position) and has focused primarily on women in leadership roles (e.g. Kindlon, 2006; Ludeman and Erlandson, 2006; Ward et al., 2009; Ward, Popson, and DiPaolo, 2010; Moncrief, 2015; Poduška, 2014).

Through an in-depth textual analysis of the academic literature and popular narratives surrounding the alpha female, statistical analyses of data from an administered survey and focus groups with women, the present research seeks address this gap in the research on the alpha female identity. My purpose is to provide a holistic approach to understanding and evaluating the
alpha female in North America as a potential form of female identity which may include leadership.

2.1.1 Origins of the Alpha Female

The term “alpha” connotes top ranking status in some kind of social hierarchy (Mech, 1999), and has been studied extensively in the social behavior of animals. This concept has been observed and documented since the 1800’s in a variety of social animals including chickens, wolves, walruses, fish, gorillas, monkeys and meerkats (see Carpenter, 1940, 1942, 1965; Etkin 1964). Though alpha status and the importance of the dominance hierarchy or “pecking order” has been discussed by many scholars, it was Pierre Huber, an entomologist, who first related the concept of dominance relationships to social behavior in his work on bumblebees in 1802 (Huber, 1802; Gauthreaux, 1978), perhaps one of the first works to illustrate female social dominance. The queen bee is considered the only perfect female in the hive who is responsible for populating while the worker bees perform all functions to sustain the economy of the hive. Huber (1802) also discovered that when two queens are present there is animosity and conflict between them – they fight to the death until only one queen remains. Subsequent research revealed that these relationships were not only orderly, they were also predictable (Hoffer, 1882). In the early 1900s ethologists and comparative psychologists further developed the study of dominance as an integral part of social behavior in which they began to use the terms dominance/dominant and “alpha” interchangeably.

It was Schjelderup-Ebbe’s (1922) pioneering work on the social behavior and dominance orders in flocks of chickens, that drew the interest and attention of scholars to the concept of social dominance (Gauthreaux, 1978; Hayashi, 2014). Schjelderup-Ebbe (1922) found that chickens interacted with one another in either a dominant or subordinate manner. He termed this form of social organization as the “peck order”. His observations revealed that only dominants pecked on subordinates, males dominated females, and older chickens dominated younger ones. What is most interesting is that Schjelderup-Ebbe (1922) first described this concept in his work on hens, adult female chickens, in his PHD dissertation in 1921. He used Greek letters to denote hierarchy. The hen with the highest status or peck order, was given the first letter of the Greek alphabet, alpha (α). This appears to be one of the first academic sources in the animal literature
that uses the term “alpha” to reference an individual of the highest social status, specifically, describing the alpha female (Hayashi, 2014, p. 202). Despite this, the focus among social behaviorists has been on the alpha male, perhaps because of the underlying assumption that alpha males tend to dominate not only other males, but all females, including the alpha female. According to Schjelderup-Ebbe (1922) the pecking order of chickens and other birds, represented a social system in which some individuals had preferential access to food while others waited their turn. This idea of pecking order, within which flock members gained access to food was soon generalized to other contexts to reflect power hierarchies existing in other social species including nonhuman primates. The term “pecking order” was extended into the concept of male-dominance where the individual in the top spot has priority access to food, mates and other resources (Richards, 2009 p.74). The terms “alpha male” and “pecking order” eventually became common terminology used to describe dominant individuals in social groups (Richards, 2009, p.75).

The most well-known example of an alpha-driven group in the animal literature is the wolf pack. In 1947, animal behaviorist Rudolph Schenkel (1947), brought together captive wolves from different zoos to create and study “pack” behavior. Schenkel (1947) observed that wolves fought each other to gain dominance and establish order in the group. The male and female wolves that came out on top eventually became what he called the “alpha pair,” and claimed exclusive rights to sexual reproduction within the pack.

Social dominance as a form of achieving alpha status, has also been studied extensively by primatologists. Research has examined alpha male behavior in baboons (Wittig et al., 2008; de Waal, 2018), monkeys (Sicotte and Teichroeb, 2008), and chimpanzees (de Waal, 1982; Gilby, Eberly, and Wrangham, 2008). Across the primate literature the alpha male is described as a dominant and aggressive individual with priority access to resources and females for reproduction, is considered attractive and desirable by females, and is more sexually active and reproductively successful than his subordinates (see Barton and Whiten, 1993; Buss, 2003; de Waal, 1982; Furuichi, 1983; Huntingford and Turner, 1987; Manson, 1996; Marmot, Shipley, and Rose, 1984; Sapolsky, 1983; van Noordwijk and van Schaik, 1999; Samuels et al., 1984;
Wroblewski et al., 2009). Maslow (1936) considered male dominance in primate social groups to be analogous to the “peck order” in chickens, believing it to be at the center of all primate relationships (Maslow, 1936; Stevenson, 1991). Early research on macaques and baboons also emphasized dominance rank as integral to social cohesion (Fedigan, 1983). In 1932, Solly Zuckerman extended the concept of the alpha male and social dominance in his research on captive hamadryas baboons in the London Zoo. He observed that through sexual competition, the strongest male gained primary access to females, food and other resources. Zuckerman (1932) asserted that sex was the social “glue” and that male competition expressed through dominance was the principle that defined their social group (Fedigan and Strum, 1999). Carpenter (1942) also found a positive correlation between rank and sexual activity among communal howler monkeys. However, for this species, he noted that social cohesion was maintained not through male competition but through “cooperation, affiliation, and mutual interest” (Fedigan and Strum, 1999, p. 263). Thus, how the alpha male maintains his social status, differs from species to species.

According to de Waal (2017), the term alpha female as it is applied to women, originated from the field of animal behavior, specifically nonhuman primate literature. In the nonhuman primate literature, the alpha female has been described as behaving both similarly and differently (Hawley, Little, and Card, 2008, de Waal, 2017) than her male counterpart. For example, alpha female apes have been described as rarely showing open rivalry for the top spot. Unlike alpha males who exhibit coercive behaviors (Hawley, Little, and Card, 2008), the nonhuman primate alpha female is described as choosing a more cooperative and communal approach to reaching and maintaining her alpha status (de Waal, 2007). According to Maslow (1940), the techniques and hypotheses that have come from the study of primates, specifically social dominance and dominance rank, including the alpha male or female, can be applied to similar scientific study in humans.

A literature review revealed that reference to the terms alpha male and female used to describe top-ranking individuals in human society in popular literature began as early as the 1930s. In 1932, Aldous Huxley wrote his famous work, a popular science fiction novel, Brave New World.
He vividly described a society where people are “decanted” or born in a laboratory into predened social positions in Western society. Each person occupied a prescribed social position or rank exhibiting behaviors associated only with that rank. Like Schjelderup-Ebbe (1922), Huxley (1932) used the Greek alphabet for the purpose of denoting social rank or position in a social group. Alphas were ranked the highest followed by Betas, Gammas, Epsilons, and Morons. “Alpha” men and women were described as leaders, successful, beautiful, sexually charged, and promiscuous. According to Huxley (1932), the existence of a social hierarchy is a necessity for human society; one that is necessary for “happiness and stability” (p. 152). Similar to what has been observed with nonhuman alpha primates, Huxley (1932) described alphas as having greater access to resources including, money, sex, and recreational drugs. Huxley’s (1932) use of the term alpha as it pertains to humans is significant. Although Brave New World (1932) is a work of fiction, linking human behavior and social hierarchy to that of primates runs the risk equating alpha humans and alpha primates. Huxley’s (1932) use of the term “alpha” and associated traits to describe the “top dog” in human society is a very early example of how primate social behavior was mapped onto human social behavior.

2.1.2 Leadership, Dominance, Masculinity, and Femininity

Perhaps the concept of the alpha woman had her humble beginnings as a “dominant woman”. In his 1939 publication Dominance, Personality, and Social Behavior in Women, Maslow (1939) was specific in his description of the traits of dominant women or what he termed, “dominance-quality”. His research was based on in-depth interviews with 130 women and 15 men aged 20-28 years. The women were middle-class, went to college, 75% were married, 75% were Protestant, 20% Jewish, and 5% were Catholic. Maslow (1939, p. 26) stated that high-dominance women would make great leaders, though not every dominant woman would become one. He also described dominant women (high-dominance feeling) as rarely embarrassed, self-conscious, shy, or fearful compared to women who were not dominant (low-dominance feeling). According to Maslow (1939, p. 13) dominant women have more self-confidence, higher poise, prefer to be treated like a “person” and not like a “woman”, prefer independence and “standing on their own feet”, lack feelings of inferiority, and generally do not care for concessions that imply they are inferior, weak or that they need special attention and cannot take care of themselves. Maslow
(1939, p.13) also stated that being a dominant woman does not preclude her from behaving like a “conventional”, or traditional woman which implies that the traits he describes are inherently “unconventional”. Maslow’s (1939) work also revealed that dominant women do not behave in a dominant fashion exclusively or occupy a leadership role in all social domains. Though not explicitly stated, given current notions of the alpha woman one can easily extrapolate Maslow’s (1939) “dominant woman” to the “alpha woman”.

The alpha female has often featured prominently in the popular media as a type of female identity (for example see Kindlon, 2006; Brown, 2012; Grado and Whiteman; Reid, 2012; Rhodes and Schneider, 2014; Thomson, 2014; White, 2014; Venker, 2017). During the 1980s the concept of alpha woman began to gain momentum with feminist and activist Betty Friedan’s 1981 book, *The Second Stage*. In a follow-up edition of this book, Friedan (1998) modified the introduction to include some of her experiences in the early 1980s. She describes an “unusual” meeting she attended a week before the October 29, 1980 US election about the “crisis of leadership in the U.S. which may be less about the particular leaders we have than the style of leadership we have come to expect” (Friedan, 1998, p. 233). The solution she states is to “balance the dominant Alpha, or masculine leadership style, with the Beta, a more feminine leadership style” (Friedan, 1998, p. 233). Citing research by Peter Schwartz of the Stanford Research Institute, “alpha-style leadership in our [Western] society is considered more masculine. It is based on rational, analytical, quantitative thinking, is more aggressive and direct (Friedan, 1998, p. 233). These references present the concept of an “alpha leader” as an inherently male concept and only occupied by men. Further, these references serve to reinforce traditional Western roles of masculinity and femininity. Also, in her book, Friedan (1998) stated that Schwartz’s research also revealed that “younger women moving up in the traditionally male-dominated fields of engineering and business now test higher than males in the dominant male Alpha mode” (Friedan, 1998, p. 235). Schwartz also stated that this “reversal” would be “dangerous to society”. Some have described such women as “original” or “stereotypical” alpha females – “driven, unemotional, and not letting anyone stand in her way” (Parker, 2015). Though not explicitly stated by Friedan (1998), the inclusion of this interface with Schwartz may
suggest that the idea of alphaness, as a male concept, is critical cultural terrain for discussions around gender, nature, leadership, and power.

Perhaps one of the most influential figures to contribute to the understanding and popularization of the human alpha male and alpha female is anthropologist and primatologist, Franz de Waal who contends that the term “alpha male” was not actively used outside primatology until after the publication of his book *Chimpanzee Politics: Power and Sex Among Apes* in 1982 (see de Waal, 2017). *Chimpanzee Politics* (1982), a study of male dominance and reproductive strategies in the Arnhem Chimpanzee colony, has been widely referenced by primatologists in the study of nonhuman primate social behavior (e.g. Sugiyama, 1988; Call et al., 1999; Fawcett and Muhumuza, Williams et al., 2002; Mitani, 2009), as well as a much broader audience including politicians and business leaders for the insight it purportedly offers into the understanding of human social hierarchy and behavior (e.g. Buss, 1989; Boehm, 1992; Tomasello et al., 2005). For example, in 1995, Newt Gingrich then Republican Speaker of the House of Representatives in the United States, placed *Chimpanzee Politics* (1982) as one of the 25 books on his recommended reading list for incoming young congressional Republicans (see Carlin, 1995).

The term alpha male also received notoriety during the 2000 US election campaign. There were rumors that then presidential candidate Al Gore’s image consultant, Naomi Wolf, had told him that he is a beta male who must fight [Bill] Clinton’s alpha male for dominance (Kantor, 1999). However, though she acknowledged that she did mention alpha versus beta males, she did so only in conversation (Henneberger, 1999). Wolfe clarified her role in the Gore’s campaign in a later version of the New York Times article covering this story. She was a consultant to candidate Gore on women’s issues and outreach to young voters, and not his image consultant (Henneberger, 1999). What is interesting is how the terms “alpha” and “beta” were used to describe characterizations of leadership at the highest level of office in the United States. The term “beta male” was used in a sense, to question the leadership capability of candidate Gore. This example suggests that the blind application of primate studies to human behavior has the potential to influence various institutions, including politics. What needs to be considered is that such presumptions can impact decision-making, in this case, who one may, or may not vote for.
2.1.3 The Alpha Female in the 1990s and 2000s: Persuasive and Pervasive

During the late 1990s and early 2000s the notion of human alpha female began to gain momentum. The search terms “alpha woman” and “alpha female” in Google Ngram Viewer (a web application that displays the usage of words and phrases over time sampled from millions of books scanned by Google), show a spike in use of these terms during this period in popular articles and books and in research in the fields of psychology, the scientific study of sexuality, as well as in leadership studies. Articles and books during the early 2000s on this topic question her existence (e.g. Longrigg, 2003), confirm her existence (Reiman, 2003), and describe her as a “one-off” character, who defies “categorization”, one who is “deadlier than the [alpha] male” (see Corkindale, 2007). In research on alpha women and sexual fantasies, Hawley and Hensley (2009) suggested that the ‘alpha female’ may rival alpha men in terms of “behaviors and motivation”.

Research on the human alpha female has focused primarily on leadership (for example see Ludeman and Erlandson, 2004, 2006, 2007; Kindlon, 2006; Ward et al., 2009, 2010; Poduška 2014; Moncrief, 2015). In this research women who hold a leadership position in student and business organizations are labelled “alpha female”, a “special kind of leader” (Ward et al., 2010, p. 309). Some authors have argued that the emergence of the alpha female identity has been driven by the changing context of leadership, specifically with women taking on more leadership roles, as well as the shift in women’s social roles over the past decade. This, as some suggest, has led to a rethinking of gender-role stereotypes in the West (Kindlon, 2006, Ward et al., 2009, 2010).

In Kindlon’s (2006) study, a total of 113 girls across 15 North American schools were recruited to participate in a study of alpha girls. Girls who had the highest rank in social groups such as class presidents, captains of basketball teams, and other social group leaders, were identified as alpha. Other alpha-status inclusion criteria included a GPA of 3.8 or higher, a minimum of 10 hours per week participation in extracurricular activities in or out of school, a high achievement motivation score, and a high self-rating for dependability. According to Kindlon (2006), an alpha
girl is an assertive, decisive and a confident female cognizant of her life choices; a person ready to take risks and willing to "transcend the barriers of race and class" (p. xvii). Kindlon (2006) discusses the emergence of this alpha female identity in the context of the major gains made by women in the West such as the right to vote, to make reproductive choices and the right to participate in athletic sports previously not accessible to them. According to Kindlon (2006) what was most noteworthy in his results was that alpha and non-alpha girls were similar in many ways. Kindlon (2006) concluded that though an alpha girl is a leader, she is also a female in a “generation on the rise” (Kindlon, 2006, p. xix) and that “alpha girls”, in some sense, represent a whole generation of females.

Ludeman and Erlandson (2004, 2006, 2007) have studied the concept of the alpha male leader extensively. According to Ludeman and Erlandson (2007), men in leadership positions are alpha males described as “well-balanced human beings in full command of their strengths, are esteemed by colleagues, revered by employees, and adored by Wall Street” (p. 38). They further state that alpha men “inspire fear and resentment rather than trust and respect” (Ludeman and Erlandson, 2007. p. 38). In their comparative research on male and female leaders, the authors found that male leaders scored significantly higher than female leaders on all the attributes that they define as “alpha” (e.g. charismatic leadership, dominance, confidence, aggressive, competitive, persistent, far-sighted, and bold) (Ludeman and Erlandson, 2007. p. 40). Their analysis revealed that alpha traits are correlated with being a male who fits into one of 4 alpha groups; 1) commander, 2) visionary, 3) strategist, or 4) executor (Ludeman and Erlandson, 2007. p. 40). Though the authors did not conduct direct research on the alpha female they state that women possess the same fundamental traits as alpha males (Ludeman and Erlandson, 2007. p. 39).

In 2009, colleagues Rose Marie Ward (health psychologist), Donald DiPaolo (Professor and leadership researcher), and Halle Popson (health promotion), were the first to conduct research on the alpha female identity. Their first study was an examination of the alpha female identity as a measure of leadership among 13 undergraduate women at a midwestern university in the United States. Only women who were well-known on campus and held a leadership position in a
student organization were recruited. Data on their leadership characteristics, situations where these were displayed, whether they viewed themselves as a leader, and alignment with a specific definition of the alpha female – “a woman who reports being a leader, feeling a sense of superiority or dominance over other females, having others seek her guidance, feeling extroverted in social situations, believing that males and females are equal, feels driven, and is highly self-confident” (Ward et al., 2009, p. 102), were collected. The authors developed this definition from the leadership and dominance concepts presented in the alpha male literature and Kindlon’s (2005) work. According to Ward et al. (2010), this definition encompasses the aspects of leadership that are endorsed by alpha females (Ward et al., 2010, p. 310). The results of their study revealed that alpha females come from a nurturing family environment and had role models who taught them that being female was either a non-issue or an advantage (Ward et al., 2009, p. 113). Further, Ward et al. (2009, p. 113) also stated that it is this teaching that has facilitated the ability of alpha females to “push boundaries”.

In their second study, Defining the Alpha Female: A Female Leadership Measure, Ward et al. (2010) develop and present a 14-item measure of an alpha female personality. The development of the Alpha Female Inventory or AFI (Ward et al., 2010) was guided by the alpha female definition developed in their previous work. According to the authors, the AFI can be used to identify alpha females (Ward et al., 2010, p.318). The AFI comprises three subscales: the AFI-L (leadership), AFI-S (strength), and the AFI-LI (low introversion) (Ward et al., 2010). The AFI-L assesses a woman’s desire to be a leader, to be dominant and assertive, while the AFI-S measures a woman’s superiority and perceived strength, and the AFI-LI measures extroversion. The authors argue that low levels of introversion are synonymous with being more extroverted, social or outgoing (Ward et al., 2010, p. 317). Women who score high on each of the subscales, that is, they “agree” or “strongly agree” with the items, are categorized as alpha female, and all others as non-alpha females.

The results of Ward et al.’s (2010) study revealed that alpha females were not different from non-alphas in terms of year in school, mother’s and father’s education level, family income or age, though they did have significantly higher GPAs. Though alpha females had higher levels of
leadership characteristics and more masculine gender-role characteristics than non-alpha females, there were no differences in self-esteem and emotional intelligence (Ward et al., 2010, p. 315-316). The authors did suggest however, that additional research that examines leadership with respect to general dominance measures and determining whether there are more alpha females in college in comparison to the community at large is needed (Ward et al., 2010).

More recently, Poduška (2014) translated and performed a validation of the Ward et al.’s (2010) AFI in their study of Croatian female university students. Although the composition of the leadership components of the AFI were different than Ward et al. (2010), Poduška (2014) found that alpha females evaluate themselves significantly higher on measures of self-efficacy and self-monitoring, and they engage in more leader-like behaviors in the student environment.

Departing from previous research that focused on alpha females as student leaders in a public school or university setting, Moncrief (2015) used the AFI to gain insight into how being a “veteran” alpha female leader is influenced by minority identity (ethnicity), leadership experience (modality, display and presumption), and duration (10 years or more in a leadership role). Recruitment for their study was restricted to women who self-identified as leaders and had a minimum of 10 years of experience in a leadership role (Moncrief, 2015, p. 123). The 12 women who participated in their study had leadership experience ranging from 10 years to 40 years, held a variety of leadership positions, came from different industries and had different ethnic backgrounds (Moncrief, 2015). All 12 women were self-identified leaders and scored as alpha on Ward et al.’s (2010) Alpha Female Inventory (AFI).

Ward et al. (2010) have put forth the AFI as an appropriate measure to identify alpha. It is important to note however, that the underlying assumption of the AFI (Ward et al., 2010) is that women who are in leadership roles in different contexts are alpha women and as such, the AFI (Ward et al., 2010) does not measure the alpha female construct necessarily; it measures female leadership. Ward et al. (2010) examine the relationship between self-identified female leaders with leadership characteristics consistent with the male leadership literature. These include qualities such as emotional intelligence, masculine and feminine gender-role traits, and self-esteem (Ward et al., 2010). As a result, other forms of the alpha female leader, such as a female model of leadership, may not be easily discernable. Additionally, other characteristics or traits
related to the alpha female identity such as dominance (sexual and social), collaboration and affiliation and life-satisfaction that may also contribute to the alpha female construct are not explicitly incorporated in the AFI (Ward et al., 2010). Inclusion of such traits may also contribute to measures such as the AFI (Ward et al., 2010) in identification of alpha females. Ward et al.’s (2010) AFI inventory is invaluable in identifying alpha females in terms of leadership, strength, and low introversion. What may add greater insight is an investigation that examines whether women who identify themselves as alpha female also express the components of the AFI (Ward et al., 2010). An examination of the relationship between self-identification as an alpha female and traits related to the expression of the alpha female identity, including those presented by Ward et al. (2010) would provide additional insight into our understanding of the alpha female identity. In the present study I examine the alpha female as a potential form of female identity and ask women themselves whether they identify as alpha or not. Thus, although self-identification represents a different approach from previous research that has used the AFI (Ward et al., 2010) to identify alpha females in different populations and contexts (e.g. Ward et al., 2010; Poduška, 2014; Moncrief, 2015), this approach offers the opportunity to evaluate the alpha female as potential form of female identity which may also include the expression of traits presented by Ward et al. (2010), adding to the research in this area.

Like his earlier metaphorical comparisons of the alpha male primate to alpha men, de Waal (2007) also engaged in similar comparisons of alpha female primates to alpha women during the 2000s. In his 2007 popular article, Alpha Females I Have Known, de Waal states that ‘alpha female’ refers to women who “are in charge” – through “flirting” and “dating on their own terms” (de Waal, 2007). He also states however, that characterizations of alpha women as “loud-mouthed and controlling, with no patience with deviating opinions”, do not present an accurate picture (de Waal, 2007). According to de Waal (2007), alpha female means the same as alpha male – “the highest-ranking member of one’s sex with all the traits and advantages associated with it” (de Waal, 2007). Though he states that despite the underlying assumption that the highest rank is about “being the strongest and nastiest”, he also states that being an alpha female is about connection and relationships (de Waal, 2007). De Waal (2007) likens alpha female chimpanzee traits such as problem-solving, being “sweet, calm, and reassuring” which he
suggestions may be why we do not “notice” her status (de Waal, 2007). According to de Waal (2007), several alpha female primate attributes can be applied to alpha women. He cites age as contributing factor to alpha female status—older women in post-reproductive state such as Indira Gandhi, Angela Merkel, and Margaret Thatcher. He also states that female solidarity is the “key” to alpha female leadership and that an alpha female needs to rise above others (de Waal, 2007). He states however, that unlike alpha males, alpha females should not have sex appeal—not be “overly attractive”. De Waal has also published many articles comparing other aspects of primate social behavior to human social behavior such as empathy (e.g. de Waal, 2009b), morality (e.g. de Waal 2009a), conflict resolution (e.g. de Waal, 2000), and altruism (e.g. de Waal, 2008).

A quick google search of the term “alpha female’ today, yields all sorts of information from a description of her traits and characteristics, to how to “bring out your inner alpha”, to a plethora of diagnostic tools and surveys that profess to measure “alphaness”. Less than a second after typing in the words “alpha female” (0.87 seconds to be exact) in Google’s search bar, over 7 million search results appear. The first, is a definition with an image of a woman’s long bare legs standing in the sand on a beach. An image of a man’s head, who is in the water appears in the gap between her legs. The definition that appears under this image says, “The Alpha Female is a strong, majestic female. She can often be intimidating to those around her and isn’t afraid to ask for what she wants. She’s killing it in her career and has solid group of friends to rely on. There’s nothing quite as brilliant as a woman with confidence and ambition” (Engle, 2015).

2.1.4 Alpha Female Sexuality

Though de Waal (2007) contends that an alpha female should not be “overly attractive” and should not have “sex appeal” like the alpha male (de Waal, 2007), more recently, depictions of the alpha female have expanded to include physical appearance as well as sexuality as part of how she expresses her identity. Across the popular media, when compared to other women, the alpha female is often described as taking more pride in her appearance, considered more attractive and desirable by men compared to other women, superior in sports, having a large social network, and is not afraid to be “uninhibitedly feminine and sexy” (e.g. Kindlon, 2006;
Brown, 2012; Grado and Whiteman, 2012; Reid, 2012; Rhodes and Schneider, 2014; Thomson, 2014; White, 2014). Topics in the popular media vary from how to become an alpha female (Brown, 2012; Cora, 2008; Grado and Whiteman, 2012; Reid, 2012; Rhodes and Schneider 2014; Thomson, 2014; White 2014), to how being an alpha female makes you “sick” (Rivers, 2010; Cram et al., 2015; Williams, 2016). The alpha female has also been described as a femme fatale or vixen, a successful leader, a harlot, a high-heeled powerhouse, intelligent, sophisticated, cut-throat, aggressive, confident and collaborative (e.g. Kindlon, 2006; Brown, 2012; Grado and Whiteman, 2012; Reid, 2012; Rhodes and Schneider, 2014; Thomson, 2014; White, 2014).

While some popular narratives depict her as being “unable to love” (e.g. Venker, 2017), others say the alpha female may have a “heart” (e.g. Parker, 2015). She has also been described as a powerful woman who is an “adulteress” and sexual predator (Sunderland, 2011) who is “truly sexy” and “passionate about sex” (e.g. Wesley, 2018; Williams, 2016). What is interesting about her sexuality is that much of the discourse on the alpha female to date portrays her as heterosexual. Though some suggest that the alpha female’s sexuality is not limited to being "strait" (e.g. Williams, 2016) there appears to be minimal engagement in this particular discourse both in popular media and academia. The term alpha female also comes up in the bullying literature. Here, she is referred to as a “bully” who manipulates others through fear and threats (Littlemore, 2016). Psychologist Dr. Littlemore states that “there tends to be one main type of girl bully – a strong-willed alpha female” who gathers her pack. This alpha female according to Littlemore (2016), is desperate to establish and maintain a role at the top of the social hierarchy.

Such popularized and polarized notions of the alpha female have been rejected by some women as being an inherently “male” concept and embraced by others who regard the alpha female as a meaningful form of female identity that expresses both the masculine and the feminine. Today’s alpha women according to some, are growing “softer around the edges” both “metaphorically and literally” (Parker, 2015).

2.1.5 Social Rank and Social Dominance

Dominance, often considered a hallmark trait of the alpha individual (Maner and Case, 2016), describes a type of relationship between two individuals, and serves as a description of ranked
individuals in a social group (Mackinnon and Fuentes, 2005, p. 225, p. 94). It is achieved through the enacting of specific behaviors directed at increasing or maintaining one’s social rank in relation to others (Rivers and Josephs, 2010). In the study of social animals including humans, a dominant individual is one who consistently prevails over another in dyadic contests (Mackinnon and Fuentes, p. 225). Alpha status can be achieved by superior physical strength and aggression, or through social efforts such as building alliances and coalitions within a social group (de Waal, 1982). For example, alpha male chimpanzees use physical strength, intelligence and political alliances to maintain their rank (de Waal, 1982) and male gorillas use intimidation to both establish and maintain their alpha status (Stoinski et al., 2009). Dominance can also be established in other ways. For example, rhesus monkeys inherit alpha status (Sapolsky, 2005) as do bonobos (Furuichi, 2011) and geladas (Le Roux, Beehner and Bergman, 2011). In the case of bonobos and geladas, female rank is maternally inherited (Furuichi, 2011; Le Roux, Beehner and Bergman, 2011). Rank, however, is not fixed and may fluctuate as a function of in-group politics. Whether alpha status is achieved through competition, inherited, or conferred by the status of another alpha individual, in order to maintain alpha status, an alpha individual must continually engage in behaviors that maintain social dominance (Sapolsky, 2005). Social dominance behaviors, including competition and aggression, as well as physical signals, gestures and displays are often associated with high-ranking/alpha males (Anderson and Kilduff, 2009; Sapolsky 2005; Mehta & Josephs 2010, 2011). As mentioned previously, alpha males enjoy greater access to food, territory, and most importantly, mates (see Barton and Whiten, 1993; Buss, 2003; Furuichi, 1983; Huntingford and Turner, 1987; Manson, 1996; Marmot, Shipley, and Rose, 1984; Sapolsky, 1983; van Noordwijk and van Schaik, 1999; Samuels et al., 1984; Wroblewski et al., 2009). For many primatologists the most significant benefit of dominance rank is increased reproductive success. For example, Pusey’s (1997) research on female chimpanzees revealed that compared to subordinate females, alpha female chimpanzees lived longer, their offspring had significantly higher rates of infant survival, and the age at which their daughters reached sexual maturity was related to their rank and lived longer (Pusey, 1997).

Although there appears to be a general consensus on what behaviors constitute social dominance when it comes to the alpha male in the primate literature, the same cannot be said for the alpha
female. Like the alpha male, the alpha female also enjoys access to resources, however, she does not always exhibit the same social dominance behaviors to maintain her status. For example, where alpha males exhibit coercive behaviors (Hawley, Little, and Card, 2008), alpha females choose a more cooperative and communal approach to reaching and maintaining her alpha status (Hawley, Little, and Card, 2008). Alpha female bonobos for example, maintain cohesion through affiliation and keep males away from food, though they can also be aggressive and often attack males, even biting off their fingers and toes (Stanford, 1998). Calmness, reassurance, grooming and coalition-building skills are also behaviors associated with alpha female chimpanzees (de Waal, 2005, 2007).

Alpha males and alpha females are similar when it comes to behaviors and motivations for example, aggression and resource control (Hawley, Little, and Card 2008), however, there are other behaviors also at play. Like in non-human primates, social dominance behaviors in humans also vary. According to Hawley (1999), in humans “social dominance results when members of a social group vary in their ability to acquire resources in the presence of others (i.e. compete)” (Hawley, 1999, p. 97). Hawley (1999) examined social dominance in humans from a developmental perspective. Her work revealed that human social dominance patterns are similar to those of nonhuman primates. She argues that social dominance is not simply about being a dominant person. According to Hawley (1999), socially dominant humans engage in both coercive and prosocial behaviors to achieve or maintain their rank. Prosocial behavior involves voluntary actions that benefit others such as helping, sharing and cooperating while coercive behaviors include competition, aggression, and hostility. The primate and human literature on social dominance suggest that as a trait, social dominance is more complicated. Aggression and competitiveness are not the only ways to move up in a dominance hierarchy – coalition and consensus building also play a role.

2.1.6 Social Dominance Theory (SDT)

Social Dominance Theory (SDT), is a theory of intergroup relations focused on the maintenance and stability of group-based social hierarchies (Sidianius and Pratto, 1999). Social Dominance Orientation (SDO) is a belief system that represents a preference for a hierarchical society in
which some groups are more deserving of higher status than others (Sidanius, 1993). The Social Dominance Orientation Scale (SDOS), a concept introduced by Pratto et al. (1994), reflects one’s approval of hierarchical and dominance relationships between social groups regardless of whether or not one’s ingroup is in a dominant position (see Sidanius et al., 2001). The SDOS has been used as a validated measure of social dominance in humans (see Sidanius 1993; Pratto et al., 1994, 1997; Sidanius, Pratto, and Bobo, 1994; Sidanius and Pratto, 1999; Sidanius et al., 2001). Though the SDOS has been predominantly used in research to evaluate discrimination, inequality, and political affiliations (e.g. Sidanius 1993; Pratto et al., 1994, 1997; Sidanius, Pratto, and Bobo, 1994; Sidanius and Pratto, 1999; Sidanius et al., 2001; Meadows et al., 2017), it serves as a viable instrument to measure the degree to which women in the present study group, may or may not feel that alpha females as a group, are superior to non-alpha females – whether the alpha female identity is indeed, a value laden-identity. This could offer partial insight on what may or may not be at stake for women who do not identify as alpha. The SDOS is used as an index of social dominance in the present research.

2.1.7 The Alpha Female – A Social Construction

Female identity is a form of social identity that refers to the meaning women attach to their membership in the category “female” (Ray and Miller, 1994; Sumra and Schillaci, 2015). Prevailing narratives and the discourses surrounding the alpha female as an archetype of female identity present her as enigmatic. Is she a “masculine” female or a “feminine” female? To gain insight into this question however, it is necessary to understand how ideas about gender become part of our everyday lived experiences, and this begins with some background on how female identity is socially constructed.

Social constructionism theory proposes that everything people come to know or see as reality is partly, if not entirely, socially situated. A social construct is ontologically subjective in that the construction and continued existence of social constructs depend upon the collective agreement, imposition, and acceptance of such constructions (Searle, 1995). Perhaps the best example is the concept of race. “Race” is not biological but rather is “real” only as a social construct. It does not
exist in any ontologically objective way; however, it still “exists” and is “real” in society. “Race” is a social construction with real consequences and real effects (Porton, 2014). Social constructs shape the way we see ourselves and others (Searle, 1995). Like race, the alpha female as a social construct can be regarded as “real” if there is collective agreement and acceptance of the identity. The idea that the notion of the alpha female as a socially constructed identity, therefore, does not diminish its sense of reality. A social constructivist approach, therefore, lends itself to examination of the alpha female identity. When it comes to the alpha female and gender however, it gets a little more complicated.

2.1.8 The Alpha Female and Gender

Earlier theorists have presented the category of “women” as singular and homogenous however, as women have entered the workforce such categories have become varied resulting in the emergence of different archetypes of female identity (Cheng, 2007), one such archetype is the “alpha female” or “alpha woman”. Both these terms are used interchangeably in popular and academic courses and predominantly refer to women who are born biologically female and exclusively heterosexual. Academic and popular discourses surrounding the alpha female identity largely reference characteristics or traits that are based on traditional gender roles of males and females in Western society. However, previous research has predominantly focused on gender differences between men and women and alpha male/masculine traits. As such, ideas, and by extension, research that focuses on a human alpha identity tends to be about alpha males rather than alpha females. Perhaps this stems from research that evaluates gender differences in behaviors.

For example, previous work has shown that collaboration in the workplace has a gendered component. Senior males are said to create highly competitive working conditions, argue about individuals that are junior to them, and have difficulties accepting challenges from them (Gaughan and Bozeman, 2016). When it comes to risk-taking behavior, a behavior regarded as “an attribute of the masculine psychology” (Wilson and Daly, 1985, p. 61), previous work has shown that women are more risk-averse than men. For example, males are more likely to take risks than females (e.g. Byrnes et al., 1999). Risk-taking behavior is considered an outcome of
competition - competition forces dominant individuals to engage in risk-taking in order to attain their positions of power (Byrnes et al., 1999). Similarly, women have been shown to shy away from competition while men embrace it (Niederle and Vesterlund, 2007) and also exit situations of conflict when the cost of this exit is small (Capraro, 2015, p. 2). When it comes to the trait of altruism, previous research suggests than women are more altruistic than men (Rand et al., 2016; Branas-Garza et al, 2018). This is important as it suggests that irrespective of whether women identify more with masculine or feminine traits, by virtue of being female, the expectation in Western society is that she will still engage in altruistic behaviors (Rand et al, 2016). As women disproportionately occupy social roles that require cooperative, communal, and sacrificing behavior, failure to engage in such behaviors can result in negative consequences for them (Rand et al., 2016). Less altruism is considered a “male” attribute because it is disfavored by both masculine gender roles which involve power, dominance, and independent self-interest, and the general tendency to make people consider strategic self-interest (Rand et al. 2016, p. 391). Women have also been found to be more harm-averse (Capraro and Sippel, 2017) and more honest (Capraro, 2018) than men. A recent study revealed that women tend to embrace deontological ethics more than men when faced with personal dilemmas— that is women are more likely to be concerned with what people do rather than with the consequences of their actions (Capraro and Sippel, 2017). Similarly, when it comes to lying, another recent study revealed that men are more likely to tell “black” lies which, come with benefits for the liar and someone else, while women are more likely to tell altruistic “white” lies, which benefit another person at their expense (Capraro, 2018, p. 345). The reluctance and/or lack of women in traditionally “masculine” jobs may also influence our assumptions that human alphas are more likely to be male than female. For example, research that examines women’s experiences in “masculine” jobs, such as in the military has shown that negative consequences can occur for such women for example, less perceived family support. As such, women are less likely to pursue masculine occupations because they perceive that these jobs are not open or “available” to them, or that there is an expectation that such jobs are “men only” jobs (Huffmen and Olsen, 2016). Research has also shown that women’s disadvantage is greater at higher organizational levels in corporate law firms, limiting the possibility of internal promotions, though this was not
shown to be the case for women who are hired outside an organization (Gorman and Kmec, 2019). These examples suggest that gender differences in the expression of alpha related traits may partially explain why research has predominantly focused on alpha males rather than alpha females. However, given that in recent decades women’s social roles in the West have changed significantly and that today, more women are employed, educated and have taken on senior leadership roles in their vocations, quashing earlier stereotypes of women being passive, non-competitive and non-progressive (Ward et al. 2010), a deeper understanding of the alpha female’s gender is warranted.

In the West, this gender binary, in which men are masculine and women are feminine, is predicated on the assumption that men are of the male sex and women are of the female sex. However, according to Lorber (1993) the gender binary model is limited. She argues that neither gender nor sex are “pure” categories (Lorber, 1993). For example, some women do not have ovaries or a uterus, some women menstruate while other do not. Though these are considered experiences of “womanhood” they are not necessarily determinants of the social category of “woman” or “female” for that matter (Lorber, 1993, p. 570). Similarly, Lorber (1993) states that some men lactate, and some men do not produce sperm (Lorber 1993). Fausto-Sterling (2000) rejects the idea of gender binary as it does not take into consideration intersexed individuals – people who possess both male and female biological sexual characteristics. The existence of such individuals questions the idea of constructing gender based on two distinct categories.

Other societies have complicated and diverse gender systems which may have multiple sexes, multiple genders, and multiple gender roles. For example, aside from the traditional man and woman, the Hijra and Sadhin considered “neither man nor woman”, are part of a diverse gender system in India (Nanda, 1999, 2000). Hijras are born male but identify as woman. Sadhins are born female but adopt different aspects of a man’s life such as donning what would be considered male hairstyles and men’s clothing in Indian society (Nanda, 2000). Where Hijras have sex with men, Sadhins must stay virgins and remain celibate for life (Nanda 2000). In Brazil, Travestis are males (born with male genitalia) who from ages as young as 10, take on female names, dress and do their hair like women and refer to themselves in female pronouns.
Kulick, 1998). They consider themselves part of the “woman” category and even modify their bodies to look more like women - by injecting silicone and ingesting large amounts of estrogens (Kulick, 1998). Kulick (1998) suggests a reconfiguration of the man/woman dichotomy, as it appears among the *travesti* – the dichotomy of ‘man/not-man’. The Berdache, or “two-spirit people”, refers to individuals among some aboriginal tribes that manifest both masculine and feminine spiritual qualities (Faiman-Silva, 2011). Even in Western society, gender operates beyond anatomy and no longer has just “two boxes” to choose from. Gender exists on a spectrum. For example, transgendered individuals regard their gender opposite to their biological sex. It is an umbrella term used for people whose gender identity, gender expression or behavior, does not conform with the sex they were assigned with at birth (Moleiro and Pinto, 2015).

Although it is recognized that gender and identity do not necessarily fit neatly into one particular “box”, that is gender is not necessarily easily discernable based on biological traits, there is still value in examining the alpha female identity through a gender binary lens. Such an examination allows for a deeper understanding of variability in the meanings and practices of being female (see Lorber, 2007; Mukhopadhyay et al., 2017). More importantly, this will provide insight into how the expression of the alpha female identity, for the sample of women in this study, aligns, challenges, and/or blurs academic portrayals of the alpha female as inherently masculine.

Examining this variability within the category woman, may yield to the emergence of a different gender, one that is perhaps at once both masculine and feminine or neither. Thus, it can be said that gender, and variations on how to be a woman, specifically, are socially constructed and attached to sexed bodies and is nonetheless interesting and necessary to understanding the variation within gender categories. As Lorber (1993) argues, though differences exist between groups, more often than not, more significant differences exist within groups themselves (see Lorber 1993, 2007). A social constructivist approach to identity allows for an examination of gender identity that extends beyond categories of masculine and feminine, problematizes them, and provides the framework within which to examine the variation within gender categories themselves, as well as where they intersect, overlap, or become blurred. A social construction perspective thus, provides an optimal framework within which to examine the alpha female construct as there is the potential to understand it as a variation of the category “woman”. A
social construction perspective also suggests that it might be more useful to group patterns of possible masculine and feminine behaviors and examine these among women who are most likely to exhibit them. Thus, the approach taken in this study was to ask women whether or not they identified themselves as alpha female, based on a definition that was provided to them at the end their participation. Rather than categorize women as alpha and non-alpha based on how they scored for the expression of a particular behavior or trait, I wanted to examine to what degree do women who self-identify as alpha express these traits. The purpose of this was to determine what traits related to the expression of the alpha female identity are expressed, or not expressed by women who identity as alpha female. Such research has not been undertaken to date.

2.1.9 The Alpha Female and the Bem Sex Role Inventory (BSRI)

In 1974, Sandra Bem developed the Bem Sex Role Inventory (BSRI) challenging the biological innateness of masculine and feminine traits and argued that such conceptualizations are culturally prescriptive – how men and women “should” act (see Bem, 1974). The scale reflects what Americans in the 1970s considered were masculine traits such as aggression and independence, feminine traits such as being affectionate and sympathetic, and gender-neutral traits such as happy and tactful (see Bem 1974). According to Bem (1974), the Western sex-role dichotomy does not consider two very important things. First, depending upon the context, individuals may be both masculine and feminine in the expression of their gender, and second, that “strongly sex-typed individuals might be limited in the range of behaviors available to them” (Bem, 1974). For example, a person with a highly masculine self-concept might inhibit behaviors that are considered feminine, and a person with a highly feminine self-concept might inhibit masculine behaviors (Bem, 1974, p. 155). According to Bem (1981), sex typing refers to “the process by which society transmutes “male” and “female” into “masculine” and “feminine” (Bem, 1981, p. 354). The BSRI (Bem, 1974) allows researchers to assess a third expression of gender, androgyny, a person who is scores high in both masculine and feminine traits (Bem, 1974). An androgynous individual is comfortable engaging in both masculine and feminine behaviors (Bem, 1974), allowing for a more fluid and flexible expression of their gender.
unrestricted by traditional Western gender role expectations (Bem and Lenney, 1976). Since the 1970s, the original 60-item BSRI (Bem, 1974) and shorter versions have been, and continue to be used in many studies as a reliable measure of gender identity across various countries, cultures, ages, and transsexual groups (see Gomez-gil et al. 2012; Vafaei et al., 2014). For example, Gomez-gil et al. (2012), used the femininity scale of the BSRI to evaluate differences in the sex-role identification of Spanish transsexuals and non-transsexuals. They also found that male-female and female-male transsexuals score as a function of their gender identity instead of their anatomical sex (Gomez-gil et al., 2014, p. 304).

Despite criticisms of the scale citing changes in Western perceptions of masculinity and femininity (see Holt, 1998), and development of similar scales (e.g. Carver et al., 2013), the BSRI (Bem, 1974) is still extensively used in psychometric studies and other research (Colley et al., 2009; Rammsayer & Troche, 2007) to measure self-attributed gender-stereotyped personality traits in the West (Carver et al., 2013; Hottenstein, 2014; Tsirigot, 2017). The BSRI (Bem, 1974) has also been used in previous research on the alpha female (e.g. Ward et al., 2010). As such, the BSRI (Bem, 1974) presents itself as an integral tool in the examination of the expression of the alpha female identity. For the purposes of the present research, shortened versions of the BSRI-M, BSRI-F, and BSRI-N were developed based on traits that aligned with the current narratives, discourse and research on the alpha female.

2.1.10 Self-Identification and Social Identity Theory

In addition to taking a social constructivist approach to examining the alpha female identity, the present research is also informed by identity, self-categorization theory, and social identity theories. The definition of identity put forth by Weldes et al. (1999) states “identity is established in relation to a series of differences that have become socially recognized. These differences are essential to its being. If they did not exist as differences, it [identity] would not exist in its distinctness and solidity” (Weldes et al., 1999). Identity discourse is concerned with how membership in a group influences one’s knowledge, interpretations, beliefs, preferences and strategies that underlie our individual and collective behavior (Abdelal et al., 2009). Identity is the result of the use of particular adjectives to describe the self and others. Such descriptions are
often touted as the motivations for specific behaviors (Abdelal et al., 2009). When it comes to the alpha female, using identity discourse provides the opportunity to examine not only specific traits and behaviors of the alpha female identity, but also what may motivate them.

The concept of “recognition” in social identity theory, specifically the degree to which a group accepts a social identity, and the degree to which non-group members recognize it (Abdelal et al., 2009), provides the framework within which to identify the alpha female as a distinct category. According to Tajfel and Turner (2004), one aspect of self-categorization theory is that it represents the degree to which a person feels committed or attached to a specific group. This allows for a deeper examination of the extent to which a woman is attached to the category “alpha” as well as the degree to which she feels committed or attached to the associated traits themselves (see Tajfel and Turner, 2004). Thus, asking whether women themselves accept and identify with the alpha female provides the opportunity to develop the alpha female as an accepted form of female identity by women themselves.

2.1.11 The Alpha Female-Feminine (AFF) & Alpha Female-Masculine (AFM) Hypotheses

An extensive review and textual analysis of the academic and popular literature, as well as information collected during focus groups revealed two competing conceptualizations of the alpha female in Western society– a more “masculine”, and a more “feminine” alpha female. To examine the two competing conceptualizations, two hypotheses were developed and tested- the Alpha Female-Masculine (AFM) and Alpha Female-Feminine (AFF). These hypotheses allowed for the examination of the relationships between two often presumed and culturally endorsed gender categories (masculine and feminine) of the alpha female. For the purposes of the present research a shorter version of the masculine, feminine and neutral traits consistent with current discourse, narratives and academic research on the alpha female were developed. These are represented as the BSRI-M (masculine traits), BSRI-F (feminine traits), and the BSRI-N (neutral traits). It is predicted that if the Alpha Female-Feminine Hypothesis (AFF) holds true, feminine traits as indexed in the BSRI-F predict alpha female status, and that compared to non-alpha females, alpha females will report having larger and more diverse social networks and being
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more collaborative. If the Alpha Female-Masculine Hypothesis (AFM) holds true, masculine traits as indexed in the BSRI-M will predict alpha female status, and that compared to non-alpha females, alpha females would report, higher social dominance orientation, higher life satisfaction, being stronger, being less introverted, being a leader, be more sexually experienced, have sex more frequently, initiate sex, play a dominant role in sexual encounters, and enjoy sex more.

2.2 Methods

2.2.1 Textual and Content Analyses

The present study which was carried out from June to December 2015, began with an initial examination of the results of the search terms “alpha woman” and “alpha female” in Google Ngram Viewer (for results see Figures 2-1 and 2-2), a web application that displays the usage of words and phrases over time sampled from millions of books scanned by Google. This was followed by an in-depth literature review. Data collected from this review were used to conduct textual analyses to gain insight into the social construction of the alpha female identity. The purpose was not only to analyze the discourse and narratives but also to assess what the alpha female identity produces for women in terms of traits, behaviors, beliefs, and practices. Qualitative data collected from popular media such as blogs, men’s and women’s magazines, books, and webpages, as well from academic sources including the leadership and biobehavioral literature (animal, nonhuman primate, and human), and from focus groups and interviews were analyzed using QSR-NVIVO v10.2 (QSR International Pty Ltd., 2014) software. NVivo (QSR International Pty Ltd., 2014) is used to gain insights and facilitate the interpretation of unstructured and qualitative data such as interviews, open-ended survey questions, articles, social media and web content (Welsh, 2002). The coding strategy developed for data analysis included mention and similarity in meaning were run which yielded key words and themes. The key words and themes were subsequently used to analyze the data (Appendix 1).

In addition to using NVivo (QSR International Pty Ltd., 2014), other manual methods including content analysis to identify, enumerate and analyze occurrences of specific alpha-related themes, and interactional analyses. Interactional analysis was used to identify and describe the
identification of themes within the data collected from participants. Queries on frequency of interactions between focus-group participants to gain insight into alpha woman identity related topics, themes, associated words and phrases (see Frey, Botan, and Kreps 1999). The textual analysis allowed for a broad understanding of the social construction of the alpha female identity which facilitated identifying common, and recurring alpha female themes needed to develop a working description that would guide the research. The analysis revealed 8 themes and 21 potential alpha female traits from which, a working definition of the alpha female was developed. To develop a measure of these traits a study of pre-existing survey instruments was conducted. Some variables were assessed using pre-existing validated instruments. Components of the Bem Sex Role Inventory (BSRI) (Bem, 1974) were used to measure masculine traits (BSRI-M) feminine traits (BSRI-F), and neutral traits (BSRI-N). Ward et al.’s (2010) Alpha Female Inventory (AFI) was used to measure leadership, strength and low introversion. Pratto et al. (1994) Social Dominance Orientation Scale (SDOS) was used to measure social dominance. Rosenberg’s (1965) Self-Esteem Scale (RSES) was used to measure self-esteem. Cohen’s (1997) Social Network Index (SNI) was used to measure network size and network diversity. In addition to the 21 variables, management position, as an index of leadership role in the workplace was also used as a potential predictor of alpha female status.

2.2.2 Participants, recruitment, and exclusion

A survey of 96 questions (Appendix 2) designed to collect data on all variables was developed and made available to women aged 18 years of age and older on the website surveymonkey.com. The link to this survey was posted on LinkedIn, Facebook and Twitter, as well as on the websites of various women’s organizations in Canada. Women who were recruited from malls and universities were given a paper version of the survey to complete.

Of the 512 surveys obtained, 114 participants were excluded from the dataset leaving a total of 398 women as the study population. Participants were excluded if surveys were incomplete or had missing information. The survey results of all 398 participants, a small cross-section of North American society, included career women, housewives, single women, grandmothers, stay at home moms and others. The working description developed from the textual analysis, along
with questions designed to assess women’s perceptions of the expression of the alpha female identity in North American/Canadian society were presented to participants at the end of the survey. The inclusion at the end was intentional so as not to influence the responses to questions representing traits that may or may not be associated with the alpha female identity. Women were subsequently asked to indicate whether they identified as alpha female or not. Respondents were given the options of “yes, maybe, or no”. Women who responded “yes” were categorized as alpha (N=94). Women who responded “maybe” or “no”, were categorized as non-alpha (N=304). For both the alpha and non-alpha female groups, the average age was between 35-37 years, average education level was a bachelor’s degree, and those women who were employed earned an average income of approximately $58,000 annually.

2.2.3 Measures Used in the Study

2.2.3.1 Bem Sex Role Inventory (BSRI)

The original BSRI (Bem, 1974), includes 60 dichotomous items divided into 3 subscales - masculinity, femininity, and neutral. Each subscale includes 20 adjectives for subscale that represent typical masculine, feminine, and 20 neutral traits in Western society. For the purposes of this study, a condensed version of 10 (5 masculine and 5 feminine) items was derived from the original BSRI 60-item scale. These items are representative of the alpha female masculine and feminine themes consistent with the results from the textual analysis. These are represented as BSRI-M and BSRI-F. Five (5) neutral items were also included (see Appendix 3). Respondents were asked to score each item on a 5-point Likert Scale (modified from the original 7-point Likert Scale) from never (1) to always (5). Means for masculine and feminine categories were calculated to derive corresponding masculinity and femininity scores. Neutral items served as distractors or filler items. Higher masculinity scores indicate higher affiliation with masculine traits, higher feminine scores indicate higher affiliation with feminine traits, equal scores in both masculine and feminine traits indicate androgyny, and low scores in both masculinity and femininity indicate an undifferentiated gender. Though primarily used to compare masculine and feminine traits in research that includes both men and women (e.g. Carver et al., 2013; Hottenstein 2015; Tsirgotis, 2017), in the present research, the BSRI is used to examine the
expression of masculine and feminine traits in alpha females as well as any difference in these traits between alphas and non-alphas.

2.2.3.2 Collaboration Inventory (CI)

The textual analysis revealed persuasiveness, consensus-building, coalition-building, and networking abilities as traits associated with the alpha female. For the purposes of the present research, the Collaboration Inventory (CI) survey instrument was developed and is introduced (See Appendix 4). Higher scores represent higher self-reported collaboration. All items were answered using a 5-point Likert Scale from strongly disagree (1) to strongly agree (5). The collaboration mean scores were used as an index of collaboration.

2.2.3.4 Alpha Female Inventory (AFI)

The subscales of the Alpha Female Inventory (AFI) developed by Ward et al. (2010), was used to measure leadership (AFI-L), strength (AFI-S), and extroversion (AFI-LI). The AFI is a 14-item measure of alpha female personality (See Appendix 5). Items are scored on a 5-point Likert scale from strongly disagree-1 to strongly agree-5 and summed with higher scores indicating greater levels of leadership, strength, and low introversion (a measure of extroversion). Defined by Ward et al. (2010) as “being quiet and withdrawn from social situations” (p. 317), low introversion is considered a proxy measure of extroversion. AFI-LI items are reverse coded where higher scores indicate lower levels of being quiet and withdrawn.

2.2.3.5 Rosenberg Self-Esteem Scale (RSES)

The Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965) is a validated measure of self-esteem. Composed of 10 items that assess both positive and negative feelings about the self or “self-worth”, it is the most widely used self-report instrument of confidence and self-esteem (Blascovich & Tomaka, 1991). The RSES is unidimensional and items are scored on a 4-point Likert-type scale ranging from strongly disagree (0) to strongly agree (3) (Blascovich & Tomaka, 1991). For the purposes of the present research, the RSES was modified to include an additional category of choice “neutral” (3). Given that research suggests that because negatively worded items may be interpreted differently by different groups, using the RSES without the category of “neutral” may consequently have limited value. Thus, inclusion of a choice of
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“neutral” avoids responses at the extreme ends of the RSES. Some questions were also reworded for simplicity and clarity (see Appendix 6). Items were summed, and higher scores indicated greater self-esteem.

2.2.3.6 Sexuality

Questions were designed and included in the survey to assess 5 aspects of alpha female sexuality - dominance which included sex frequency, sexual dominance, taking initiative in sexual encounters, enjoyment during sex, and sexual experience (See Appendix 7). Data on alpha and non-alpha sexual preferences (men, women, or both) were also collected and examined.

2.2.3.7 Social Dominance Orientation Scale (SDOS)

The Social Dominance Orientation Scale (SDOS) (Pratto et al., 1994) was used to assess preference for group-based hierarchy. The Social Dominance Orientation Scale (SDOS) was used as an index of social dominance with higher SDO scores reflecting higher levels of agreement with the concept of social dominance. The 16-item SDOS (Cronbach’s $\alpha=0.88$) uses a 7-point Likert scale of agreement from very negative (1) to very positive (7). A modified version of the SDOS was developed and included in the survey instrument (See Appendix 8). The result was a 12-item instrument scored on a 5-point Likert scale of agreement from strongly disagree (1) indicating low SDO, to strongly agree (5) indicating high SDO. The purpose was to simplify the measure of the alpha female personality as reflected in the data collected on current definitions and descriptions. A person with low SDO prefers relationships between social groups to be equal and not hierarchical.

2.2.3.8 Life Satisfaction and Social Capital

This study also included an assessment of life satisfaction. A single question was asked, “Describe the level of satisfaction and fulfillment you feel in your life”. Responses were scored on a 5-point Likert scale (0-none, 1-low, 2-moderate, 3-high, and 4-extremely high). Cohen’s Social Network Index (SNI) (Cohen, 1997) was used as a measure social capital. Cohen et al.’s
(1997) work on social ties and susceptibility to the common cold revealed that individuals with more diverse social networks had greater resistance to upper respiratory illness, even without considering the nature of those social relationships. Network diversity is defined as the number of social roles in which the respondent has regular contact with others. The maximum number of high-contacts is 12 and includes: spouse, parent, child, in-law, close relative, close friend, religious group member, student, employee, neighbor, volunteer, and another group member. Network size is defined as the total number of people with whom the respondent is in regular contact. Both network diversity and network size are based upon having contact at least once every two weeks. Many women in the focus groups indicated that adult grandchildren were very important to their social network. In order to capture the specific value that this may bring to their social networks, a single question, “If you have adult grandchildren how many of them do you see or communicate with (including phone, texting and email) at least once every 2 weeks?”, was added to the original 12-item instrument increasing the maximum number of possible contacts from 12 to 13.

2.3 Statistical Analyses

Descriptive statistics including the mean, median and standard deviation were run for all variables. The differences in the average (median) values between the alpha and non-alpha groups for the traits or variables included in the analysis were assessed using nonparametric Mann-Whitney U-tests. The Mann-Whitney comparisons were used to identify potential predictor variables of alpha female status. Logistic regression was used to predict which variables, if any, were significant predictors of alpha female identity. Logistic regression was conducted using ten potential predictor variables that were identified by the Mann-Whitney U comparisons, 1) BSRI-M, 2) Leadership, 3) Strength, 4) Low Introversion, 5) RSES, 6) Life Satisfaction, 7) Sexual Experience, 8) Initiates Sex, 9) Enjoys Sex, and 10) DomRole_Sex. Odds ratio analyses were conducted to examine both the alpha female as a valid form of female identity in Western society, and the likelihood of an alpha female holding a management position. Data on sexual preference were also analyzed to provide insight into the alpha female’s sexuality profile. All statistical tests were conducted using the Number Cruncher Statistical Systems (NCSS) statistical software package (Hintz, 2004).
Results

2.4.1 Textual and Content Analyses

The following 8 themes were revealed by the textual analysis using NVivo (QSR International Pty Ltd., 2014). In comparison to non-alpha females, alpha females are described as, 1) more socially dominant, 2) leaders 3) having higher self-esteem, 4) displaying more masculine than feminine personality traits, 5) using collaboration and affiliation strategies to achieve their goals, 6) physically stronger, 7) more extroverted, and 8) more sexually dominant (i.e. more sexually active, play a dominant role in sexual encounters, initiate sex more often, and enjoy sexual intercourse more), than non-alpha women (see Huxley, 1932; Zuckerman, 1932; Maslow, 1936, 1939, 1940; Carpenter (1940, 1942, 1965); Schenkel, 1947; Gauthreaux, 1978; Gouzoules, 1980; Fedigan, 1983; Furuichi, 1983; Pratto et al., 1994, 1997; Cashdan, 1995, 2003; Harris et al., 1996; de Waal, 1998; Hawley, 1999; Mazur and Booth, 1998; Sidanius and Pratto, 1999; Levin et al., 2002; Ludeman and Erlandson, 2004, 2006; Cora, 2008; Kindlon, 2006; Gilby, Eberly, and Wrangham, 2008; Hawley, Little, and Card, 2008; Hawley and Hensley, 2009; Ward et al., 2009, 2010; Mehta and Josephs, 2010, 2011; Rivers and Josephs, 2010; Sunderland, 2011; Brown, 2012; Grado, 2012; Howlett, Marshall, and Hughes, 2012; Reid, 2012; Reiman, 2012; Madison et al. 2014; Schneider, 2014; Thomson, 2014; White, 2014; Hogen, 2017; Holden, 2017). The results of the textual analysis also revealed 21 potential traits related to the expression of the alpha female identity. These are represented as 21 potential predictor variables of alpha female status and include, 1) masculine traits (aggressiveness, ambition, assertiveness, competitiveness, and independence); 2) feminine traits (affectionate, gentle, loyal, sensitive to the needs of others, understanding); 3) neutral traits (conscientious, adaptable, reliable, likeable, tactful); 4) age; 5) education; 6) employment; 7) income; 8) leadership; 9) strength; 10) low introversion; 11) collaboration (persuasiveness, consensus-building, coalition-building, and networking abilities); 12) social dominance; 13) self-esteem; 14) network size; 15) network diversity; 16) life satisfaction; 17) sex frequency; 18) sexual experience; 19) initiates sex; 20) enjoys sex; and 21) plays a dominant role in sexual encounters. These themes and traits found to be related to the expression of the alpha female identity allowed for the development of the following working definition:
“The alpha female is a confident leader who is socially and sexually dominant over others. She is physically strong, more sexually active, and extroverted, and her personality is more masculine than feminine. She believes that men and women are equal and uses collaboration and affiliation strategies to achieve her goals.”

2.4.2 The Social Construction of the Alpha Female

To assess social construction of the alpha female identity, levels of association for 3 specific questions were calculated (see Table 2-1). To test whether women occupy the alpha female identity, odds ratio analyses were conducted (see Table 2-2). The odds ratio tests examine the association between self-identified alpha and non-alpha females and knowledge and acceptance of the alpha female identity, occupation, and holding a management position. Self-identified alpha females were 2.4 times more likely to have heard of the term alpha female/woman than non-alpha females. Of all 398 women, 91% of alpha females and 82% of non-alpha females had heard of the term. Combined, 84% off all women had heard of the terms “alpha female” or “alpha woman”. Alpha females were 8.6 times more likely to agree that the alpha female is more than just a construct of popular media and exists as a true identity in Canadian society than non-alpha females. Of all 398 women, 94% of alpha and 63% of non-alpha women agreed with this statement. Alpha females were 7.5 times more likely to agree that the alpha female is a positive form of female identity than non-alpha females. Of all 398 women, 85% of alpha and 43% of non-alpha women agreed that the alpha female is positive form of female identity. Odds ratio analysis was also used to test the association between alpha status and leadership position in the workplace as measured by management level (Table 2-2). Interestingly, alpha and non-alpha females were equally likely to occupy management positions and of the 59 alpha women who were employed, 81% did not. None of these associations as determined by 95% CI were statistically significant.

2.4.3 Expression of the Alpha Female Identity

To test the expression of the alpha female identity univariate analyses to find patterns in the data were conducted (Table 2-3). Correlation (Table 2-4) and multinomial logistic regression analyses (Table 2-5) were also conducted to assess the relationships among variables. Positive and highly
significant differences in mean scores between alpha (N=94) and non-alpha (N=304) females were found for 10 variables (Table 2-3) including, BSRI-M, Leadership, Strength, Low Introversion, RSES, Life Satisfaction, Sexual Experience, Initiates Sex, Enjoys Sex. Alpha females exhibited a higher average score for playing a dominant role in sexual encounters (Dom_Role_Sex), though this difference did not quite reach significance. Small but non-significant differences in Age, BSRI-N, Employment, Income, Collaboration, SDO, and Network Size were found with alpha females scoring slightly higher than non-alphas. Alpha females scored slightly lower in Education than non-alphas though this difference was also non-significant. There was no difference in BSRI-F, Network Diversity, and Sex Frequency.

The results from the nonparametric correlation analysis revealed several positive and highly significant relationships (Table 2-4). Self-esteem was correlated with life satisfaction, income, social dominance, BSRI-M, leadership and low introversion. Social dominance was highly and positively correlated with income, BSRI-M, leadership and low introversion. Leadership, strength and low introversion were positively correlated with BSRI-M (masculine traits). Leadership and low introversion were positively correlated with income. Other positive and highly significant correlations included BSRI-N (neutral traits) with RSES (self-esteem) and life satisfaction as well as age and employment status. Life satisfaction was correlated with strength. Sex frequency was positively and highly correlated with initiating and enjoying sex, as taking a lead or dominant role in sexual encounters was with initiating sex. Social capital (network diversity and network size) were not correlated with any other variables.

BSRI-M was the only significant predictor of alpha female identity as identified by the multiple logistic regression model (Table 2-5), with sexual experience and life satisfaction approaching statistical significance. For both the alpha female and non-alpha female groups, mean BSRI-F scores were higher than mean BSRI-M scores (Table 2-3). The model correctly classified only 23% of alpha females (Table 2-6). There was little difference between alpha and non-alpha females with respect to sexual preference (see Table 2-7).
2.5 Discussion

The present study investigated the alpha female as a form of social identity in a small non-random sample of women in North America (N=398). The association between self-identified alpha females and measures of sexuality, and management, as an index of leadership position in the workplace were also examined. Based on the textual analysis it was expected that the alpha female would be considered a widely recognized and positive social construct of female identity that privileges masculine traits akin to the alpha male. Two hypotheses were developed to test the two competing conceptualizations of the alpha female identity in Western society, 1) The Alpha Female–Masculine (AFM) Hypothesis, and 2) The Alpha Female-Feminine Hypothesis (AFF). Under the Alpha Female-Masculine Hypothesis, it was predicted that alpha females would be more socially and sexually dominant, more likely to occupy a management position in the workplace, be a leader, be stronger, have higher self-esteem, be less introverted than non-alpha females, and possess more masculine than feminine traits. Under the Alpha Female-Feminine Hypothesis (AFF) it was predicted that compared to non-alpha females, alpha females would be more collaborative and possess more feminine than masculine traits.

The results of this study revealed that for the present sample of North American women, the measure for masculine traits (BSRI-M) was the only statistically significant predictor of alpha status. This measure of masculine traits was followed closely by life satisfaction and sexual experience as predictors of alpha status. That is, given all other variables, male personality traits (aggressive, ambitious, assertive, competitive and independent), are the only significant predictors of the alpha female identity. However, this result did not negate identification with feminine traits. Interestingly, both alpha and non-alpha women scored equally with the feminine traits (BSRI-F) of being affectionate, gentle, loyal, understanding, and sensitive to the needs of others, and both groups identified more with feminine traits than masculine traits. According to Bem (1981), individuals who score higher on feminine characteristics than masculine ones, are categorized “feminine”. Based on this, both alpha females and non-alpha females can be classified as “feminine” which, on the surface, may appear counterintuitive. Most women, regardless of self-identified alpha status, reported the “alpha female” as a positive, and valid or true construct of female identity.
Collaboration, as reflected in coalition and consensus building, networking and persuasiveness, were also equally possessed by both alpha and non-alpha females. Both alpha and non-alpha women had low Social Dominance Orientation (SDO) indicating that, regardless of alpha self-identification, women in the present study preferred relations between social groups to be more equal rather than hierarchical. Alpha females also reported being physically and mentally stronger, having higher self-esteem, greater life satisfaction, and being less introverted than non-alpha women. Though alpha woman reported leadership as being an important aspect of their identity, they did not necessarily hold a leadership position in the workplace. Sexual dominance, though higher in alpha women, were not predictors of alpha status. The results support the Alpha Female-Masculine (AFM) hypothesis however not at the expense of feminine traits. Being more “male” does not mean being less “female”.

The results of the present study are consistent with previous research that has demonstrated that alpha females possess masculine traits (Ludeman and Erlandson, 2004; Hawley, Little, and Card, 2008; Ward et al., 2009, 2010; Moncrief, 2015; Poduška, 2014). It is also consistent with research that links these traits with leadership, strength and extroversion (see Ward et al., 2010). However, the results also challenge previous research that identifies social dominance and sexual dominance as key traits of the alpha female (e.g. Hawley, Little, and Card, 2008). For example, there was no statistically significant difference in Social Dominance Orientation (SDO) between alphas and non-alphas. Additionally, although there were statistically significant differences for specific aspects of alpha female sexuality (sex frequency, enjoys sex, initiates sex, and playing a dominant role in sexual encounters) with alpha females scoring higher than non-alphas, neither social dominance orientation nor any of these aspects were found to be predictors of the alpha female identity in the logistic regression model. Furthermore, sexual dominance and social dominance were not correlated. Given the academic and popular literature that state otherwise, these results in particular were not expected. What could explain why alpha females do not exhibit greater social dominance despite research that has demonstrated it to be one of the hallmark traits of an alpha individual?
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With respect to sexual behavior, the results revealed that although alpha and non-alpha females do not differ in terms of the frequency of sex, they are different when it comes to sexual experience (number of partners), initiating and enjoying sexual intercourse with alpha females reporting higher levels in all. Both alpha and non-alphas however, reported that between “sometimes” and “half the time”, they initiate and play a dominant role in sexual encounters. Both alpha and non-alpha females exhibit a mean score for sexual experience that suggest fewer than what they would consider to be an average number of partners. These results challenge common assumptions about the alpha female as promiscuous and more sexually dominant than non-alpha females. Recent research that supports this has shown that alpha males and females prefer to submit rather than dominate in the bedroom; that they prefer a role reversal (Hawley and Hensley, 2009). Thus, the alpha female, sometimes dominant in one social domain, may prefer not so to be in another. These discrepancies in relating the concept of social dominance in primates and other animals to humans and how hierarchies are subsequently formed and maintained, render as questionable, the trait of social dominance, and by extension sexual dominance, as predictors of alpha female status. Thus, contrary to academic and popular discourses in the animal, primate and human research on the alpha personality, for the human alpha female, perhaps social and sexual dominance are understood and perceived differently, or do not factor at all.

The results also add to recent research on leadership which demonstrates that it is advantageous for both male and female leaders to have masculine and feminine attributes (see Hans-Joachim and Gratton, 2013). They also challenge the often-assumed inextricable link, and interchangeable use, of the concepts of leadership and the alpha female, and that for self-identified alpha females, adopting or not adopting the definition does not seem to matter much. The analysis revealed that although there was a highly significant difference in mean leadership scores between alpha and non-alpha females, with alpha females scoring higher, alpha and non-alpha females were equally likely to hold a leadership/management position at work. These results, therefore, not only challenge the common assumption that alpha females are leaders, they also challenge previous leadership research that present the alpha female as a “special kind of leader” (e.g. Ward et al., 2009).
2.6 Conclusion

The present research contributes to and has direct implications for future leadership and alpha-leadership research. In the leadership literature, although the term “alpha” has become synonymous with the term “leader” (see Ward et al., 2009, 2010; Ludeman and Erlandson, 2004, 2006; Hymowitz, 2012) there is confusion as to what “alpha leadership” actually means. Those at “the top” of the business hierarchy or organizational chart are considered the leaders. “Alpha leadership” is a term often used to describe a leadership style for those holding top positions in organizations such as CEOs and senior management (Deering, Diltz, and Russell, 2002). While some claim leadership for these individuals is social dominance (Hawley, Little, and Card, 2008), others contend that such leadership has little to do with it (Deering, Diltz, and Russell, 2002). Similarly, when it comes to identifying alpha males and females there seems to be confusion. According to Ludeman and Erlandson (2004), it is easy to spot an alpha male in the workplace, but spotting an alpha female is more challenging. The authors contend that this is because people are more “confused” about the alpha female when it comes to her traits (Ludeman and Erlandson, 2004, p. 3). They argue that this is because different alpha females may possess some but not all of the traits possessed by alpha males (Ludeman and Erlandson, 2004, p. 1). Irrespective of this confusion, leaders in organizations and other leaders such as politicians, exercise influence over others; play a lead role in goal-setting, goal achievement, and the development of a group or organization; and are regarded as the leader by other members of the group (Janda, 1960). The present research therefore also serves as a framework within which to also evaluate the alpha male within this context. Further, a comparison of the alpha male and female within this framework will provide invaluable and quantifiable insight into the notion of alpha leadership. The results of such a study would have a significant impact on how leadership is viewed in the workplace and what traits/characteristics employers should look for when hiring for specific leadership positions.

Though previous research on the alpha female was used to explain the influence of the shift in women’s roles, it is largely based on unsubstantiated assumptions regarding the relationship between leadership and the alpha female and the validity of the alpha female as a universal identity/category in society. It is argued that in an effort to engage in the gender-equality
discourse, such assumptions have contributed to the notion that the alpha female is the female representation of her male counterpart, the alpha male. This in turn has added to the discourse that leadership and being alpha female are inextricably linked. Whether women identify as alpha female or not, or whether women consider the alpha female as a valid identity at all, has not been considered previously. The present research is thus significant as it is the first to use self-identification to identify alpha females as opposed to identification through predetermined and assumed alpha female behavior traits, including leadership. Additionally, in asking women themselves what they think about the alpha female what has come to light is that some descriptions of the alpha female hold true while others do not. In particular, the absence of social dominance as a predictor of alpha female status in the study sample a major finding, warrants a refocus of current depictions of the human alpha female as a socially dominant individual in society. It should be noted however, that more recently in nonhuman primate research, the oversimplification of the term “social dominance” has come under fire. In their recent investigation of social context-dependent dominance in captive chimpanzee, Funkhouser and colleagues (2018) suggest that primatologists and other scientists are oversimplifying the term “social dominance” when using to describe the behavioral characteristics and social status of nonhuman primates (Funkhouser et al., 2018). The authors of that study reveal that there is a lack of reliability and predictability of what constitutes social dominance when comparing nonhuman primate social groups due to the variation in techniques and statistical analysis methods used by scientists (Funkhouser et al., 2018). Additionally, among many primatologists, dominance is considered a social construct and is context specific - some individuals who possess alpha traits may never become alpha while other individuals who do not possess alpha traits may become alpha (Jack and Fedigan, 2018). Thus, though the lack of association between social dominance and alpha female status in the present study may appear counterintuitive to what has been traditionally been associated with the alpha individual in nonhuman primate research, this result does align with more recent research in this area.

The findings also add to the leadership research, namely that female leaders in the workplace (i.e. women in management and senior management positions) do not necessarily identify as alpha. For those that do, there are other traits including non-masculine traits to consider. This has
implications for organizations who rely on masculine gender stereotype alpha traits as indicators of leadership/management quality and potentiality. Contrary to popular narratives, for the study population, women who self-identify as alpha female do not necessarily have sex more frequently than other women though she may be more experienced and enjoy sex more. Alpha females do not necessarily make more money or are more educated than other women, and they do not necessarily hold a senior position in her workplace. In comparison to non-alpha women, alpha women reported being stronger and more extroverted, as well as more aggressive, ambitious, assertive, competitive, and independent however, not at the expense of being affectionate, gentle, loyal, sensitive to the needs of others, and understanding. It is important to mention here again, that women were asked whether they considered themselves to be alpha female or not at the end of the survey to avoid influencing the answers to the questions for the various validated instruments that were used to evaluate the expression of alpha-female related traits. The purpose to avoid reporting what they think would be in line with expectations for the alpha female identity.

The results of this study revealed that the human alpha female is far more complex when its social construction and measurable expression of the identity are included in the discourse. This suggests that current understandings, popularized notions, and academic research on the alpha female are incomplete, and as such, have ramifications for research that seek to identify or categorize women to a specific female identity.
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2.7 Figures

Figure 2-1 Google Ngram Viewer for the search term “alpha woman”

Figure 2-2 Google Ngram Viewer for the search term “alpha female”
### 2.8 Tables

#### Table 2-1 Alpha female identity occupation

<table>
<thead>
<tr>
<th>Question</th>
<th>Alpha</th>
<th>Non-Alpha</th>
<th>Odds Ratio</th>
<th>CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you heard of the alpha woman? (N=398)</td>
<td>86</td>
<td>8</td>
<td>2.37</td>
<td>1.09-5.19</td>
</tr>
<tr>
<td>2. The alpha female is a true form of female identity in Canadian/Western Society (N=398)</td>
<td>88</td>
<td>6</td>
<td>8.56</td>
<td>3.62-20.20</td>
</tr>
<tr>
<td>3. The alpha woman is a positive female identity (N=398)</td>
<td>80</td>
<td>14</td>
<td>7.55</td>
<td>4.09-13.91</td>
</tr>
<tr>
<td>4. Management</td>
<td>131</td>
<td>173</td>
<td>0.99</td>
<td>0.47-2.08</td>
</tr>
</tbody>
</table>

#### Table 2-2 Associations between self-identified alpha and non-alpha females for identity occupation and management position

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Odds Ratio</th>
<th>CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have heard of the alpha female/woman</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alpha</td>
<td>86</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Alpha</td>
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<td>2. The alpha female is a true form of female identity in Canadian/Western society</td>
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</table>
CHAPTER 2. MASCULINITY, FEMININITY, AND LEADERSHIP: TAKING A CLOSER LOOK AT THE ALPHA FEMALE

Table 2-3 Results from univariate analyses for the self-identified alpha and self-identified non-alpha female groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Alpha</th>
<th>Non-Alpha</th>
<th>P</th>
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<tbody>
<tr>
<td>1. Masculine Traits (BSRI-M)</td>
<td>N: 94, Mean: 3.938, SD: 0.438</td>
<td>N: 304, Mean: 3.536, SD: 0.514</td>
<td>&lt;0.0001</td>
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<td>2. Feminine Traits (BSRI-F)</td>
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<td>N: 304, Mean: 4.105, SD: 0.507</td>
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<tr>
<td>3. Neutral Traits (BSRI-N)</td>
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<td>N: 304, Mean: 4.166, SD: 0.463</td>
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<td>4. Age Category</td>
<td>N: 94, Mean: 3.745, SD: 1.182</td>
<td>N: 304, Mean: 3.572, SD: 1.149</td>
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<tr>
<td>5. Education</td>
<td>N: 94, Mean: 3.213, SD: 0.761</td>
<td>N: 304, Mean: 3.046, SD: 0.739</td>
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<tr>
<td>6. Employment</td>
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<td>N: 304, Mean: 3.579, SD: 1.702</td>
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<td>8. Leadership</td>
<td>N: 94, Mean: 20.011, SD: 3.416</td>
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<td>9. Strength</td>
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<td>10. Low Introversion</td>
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<td>N: 304, Mean: 12.707, SD: 3.335</td>
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<td>16. Life Satisfaction</td>
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<td>17. Sex Frequency</td>
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<td>N: 288, Mean: 1.226, SD: 1.049</td>
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<td>18. Sexual Experience</td>
<td>N: 90, Mean: 2.455, SD: 0.85</td>
<td>N: 290, Mean: 2.283, SD: 0.81</td>
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<tr>
<td>19. Initiates Sex</td>
<td>N: 90, Mean: 2.8, SD: 0.902</td>
<td>N: 290, Mean: 2.541, SD: 0.836</td>
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<tr>
<td>20. Enjoys Sex</td>
<td>N: 89, Mean: 4.36, SD: 0.843</td>
<td>N: 291, Mean: 4.041, SD: 1.082</td>
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## Table 2-4 Nonparametric Spearman correlations among variables used in the study (N=398) ***P<0.0001

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<th>Strength</th>
<th>Low Introversion</th>
<th>Collab</th>
<th>Social Dominance (SDO)</th>
<th>Self-Esteem (RSES)</th>
<th>Network Size (SNI)</th>
<th>Network Diversity (SNI)</th>
<th>Emp</th>
<th>Inc</th>
<th>Sex Freq</th>
<th>Sexual Exp.</th>
<th>Masc. Traits (BSRI-M)</th>
<th>Fem. Traits (BSRI-F)</th>
<th>Neut. Traits (BSRI-N)</th>
<th>Initiates Sex</th>
<th>Dom Role, sex</th>
<th>Life Sat.</th>
<th>Enjoys Sex</th>
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<td><strong>0.573</strong>*</td>
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<td>-0.060</td>
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<td><strong>0.517</strong>*</td>
<td><strong>0.531</strong>*</td>
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<td><strong>0.210</strong>*</td>
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<td><strong>0.247</strong>*</td>
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<td><strong>0.359</strong>*</td>
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<td>-0.056</td>
<td>0.093</td>
<td><strong>0.248</strong>*</td>
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<td>0.119</td>
<td>0.022</td>
<td>0.182</td>
<td>0.093</td>
<td>0.014</td>
<td>0.056</td>
<td>0.043</td>
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<td>0.171</td>
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<td>0.216</td>
<td><strong>0.439</strong>*</td>
<td><strong>0.320</strong>*</td>
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CHAPTER 2. MASCULINITY, FEMININITY, AND LEADERSHIP: TAKING A CLOSER LOOK AT THE ALPHA FEMALE

Table 2-5 Results from the logistic regression analysis (N=380)

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<th>Predictor</th>
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<th>Standard Error</th>
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<th>P-value</th>
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Table 2-6 Classification Table

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<th>Estimated</th>
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<th>Total</th>
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Table 2-7 Sexual Preference alpha and non-alpha females

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<th>Alpha</th>
<th>%</th>
<th>Total</th>
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<td>249</td>
<td>86%</td>
<td>80</td>
<td>88%</td>
<td>329</td>
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<td>Women</td>
<td>24</td>
<td>8%</td>
<td>7</td>
<td>8%</td>
<td>31</td>
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<tr>
<td>Both</td>
<td>18</td>
<td>6%</td>
<td>4</td>
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</table>
2.9 References


CHAPTER 2. MASCULINITY, FEMININITY, AND LEADERSHIP: TAKING A CLOSER LOOK AT THE ALPHA FEMALE


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CHAPTER 2. MASCULINITY, FEMININITY, AND LEADERSHIP: TAKING A CLOSER LOOK AT THE ALPHA FEMALE


CHAPTER 2. MASCULINITY, FEMININITY, AND LEADERSHIP: TAKING A CLOSER LOOK AT THE ALPHA FEMALE


Chapter 3

The Alpha Female and Hormones

3.1 Introduction

Researchers including anthropologists have studied the interaction between hormones and behaviors in humans (see Zak et al., 2004, 2005; Zak, 2006; Bos, 2010; Stanton et al., 2009a; Stanton et al., 2009b; Anderson and Kilduff, 2010; Mehta and Josephs, 2010; Feldman et al., 2011; Gettler, 2014; Weisman et al., 2014; Jaeggi et al., 2015; Sherman et al., 2012, 2016, 2017). The influence of hormones includes “intrinsic feedbacks of social context and social behavior on hormones” (Soares et al., 2010, p. 2738). Behavior is driven by internal and external (environmental) stimuli which act on neural systems (Soares et al., 2010). The reciprocal relationship between hormones and social behavior demonstrates that hormones do not determine behavior however, they may increase or decrease the probability of the expression of a given behavior (Soares et al., 2010). Given that dominance as a behavioral strategy can be used to gain or maintain high status in society, it is not surprising that a large body of literature has focused on understanding how biological factors, specifically hormones, may influence dominance behaviors (Mehta and Josephs, 2011).

The cross-disciplinary interest in the relationship between alpha status and hormones is not a new one. Much of the research in animal and nonhuman primate literature examines the traits of aggression and dominance and associations with cortisol and testosterone concentrations within the context of stress (e.g. Mazur and Booth, 1998; Sapolsky, 1982, 1983, 1989, 1991, 2004, 2005; Cashdan, 1995; Carré and Olmstead, 2015; Feng et al., 2016; Sherman et al., 2016; Denson et al., 2018). It should be noted, that while some research has found social rank to be associated with stress in primates as measured by elevated cortisol levels (Sapolsky, 2005; Feng et al., 2016, Beehner and Bergman, 2017), some research has found the opposite (Reding, 2012), and others found no such association (Feng et al., 2016).

Though limited, there is some research in the animal and nonhuman primate literature that examines the influence of progesterone, oxytocin, and estrogen on the expression alpha male and
CHAPTER 3. THE ALPHA FEMALE AND HORMONES

alpha female behaviours. For example, there is evidence to support an association between the peptide hormone oxytocin as well as progesterone, with alpha female related behaviors in nonhuman primates. For example, increases in oxytocin and progesterone levels increase engagement in affiliative behaviors (Stanford, 1998; Bartz and Hollander, 2006, Brown et al., 2009). Estradiol has also been implicated in the expression of alpha female behaviours. For example, a previous study on rhesus monkeys revealed that while higher levels of estradiol can increase sexual motivation and male-affiliation for alpha females and also reduce contact aggression with others, higher levels of estradiol in subordinate females show no such effects (Reding et al., 2012). Research has also shown that when treated with progesterone, female hamsters become dominant over males (Payne and Swanson, 1971).

In humans, research has demonstrated that specific hormones correlate with a variety of traits deemed as “alpha” in women (see Baucom, Besch, and Callahan, 1985; Grant and France, 2001; Booth, Granger, Mazur, and Kivlighan, 2006; Mehta and Josephs, 2010, 2011; Madison et al., 2014, Stanton and Schultheiss, 2007; McCarthy et al., 1996; Ziegler, 2007; van Anders et al., 2015; Denson et al., 2018). Similar to animal and nonhuman primate research, in humans, studies have predominantly focused on the influence of testosterone and cortisol, on aggression and other dominance-seeking behaviors. For example, while self-assertion, confidence, conceit, forcefulness, control, and willfulness, are associated with higher circulating testosterone levels in women, absence of these traits are associated with lower testosterone concentrations (Grant and France, 2001). Cashdan (2003), examined hormones and competitive aggression in 30 women and found that women with low levels of testosterone were less likely to express their competitive feelings through verbal aggression than women with higher levels of testosterone. Aggression has been associated with high testosterone and low cortisol levels in women (Denson et al., 2018), as well as negatively associated with estradiol (Stanton and Schultheiss, 2007). There is also evidence to support that high levels of estradiol and high levels of progesterone are associated with low levels of aggression and that estradiol may influence behaviors in women other than aggression. These include dominance, assertiveness, and risk-taking behaviors (Denson et al., 2018).
More recently, there has been a focus on understanding how hormone levels may jointly influence dominance and other status-seeking behaviors in humans with respect to leadership. Mehta and Josephs (2010), examined hormone regulation of dominance in women leaders. They contend that leadership is one of the most important domains within which to study status and social dominance. For their study men and women were randomly assigned to the position of a leader or follower and then asked to complete a leadership task in a simulated competition (how to move blocks to make a specific design). These interactions were video-taped, observations recorded, and each identified leader was rated in terms of dominance. Mehta and Josephs (2011) developed a 12-item scale that indexed dominance in leaders. These items assessed dominance as characterized by behaviors linked to motivation to gain high status including assertiveness, confidence, being energetic, enthusiastic, extraverted, and verbally fluent, display leader-like and directive behavior, being decisive, displaying masculinity and an expansive posture. Using salivary samples, their results revealed that testosterone interacted with cortisol to predict dominance in leaders – that is, “dominance in leaders can be predicted by the joint regulation of testosterone and cortisol, where low cortisol and higher testosterone together, are related to increased dominance” (Mehta and Josephs, 2011, p. 901). In their study on leadership position and circulating testosterone and cortisol levels in male executives, Sherman et al. (2016) evaluated the relationship between salivary cortisol and testosterone levels and a measure of attained status – the number of subordinates over which the executive had authority. They found that executive males who exhibited high testosterone and low cortisol levels were more likely to occupy high-status positions whereas low-testosterone, low-cortisol executives were more likely to occupy lower status positions (Sherman et al., 2016). Testosterone has also been implicated in sexual behavior of women (Booth, Granger, Mazur, and Kivlighan, 2006). For example, Udry (1988) found that though testosterone was positively related to interest in sexual behavior for both males and females, for females specifically, this interest is only expressed in the absence of a father and low participation in team sports (Udry, 1988). It should be noted however, though testosterone is required for the expression of masculine traits such as aggression in most vertebrates, including mice and humans, estrogen also plays a role (Wu et al., 2009). The enzyme aromatase converts testosterone into estrogen and thus increased levels of testosterone lead to increased levels of estrogen (Wu et al., 2009). Despite the dual requirement of estrogen
and testosterone for the expression of masculine behaviors how these dual hormonal pathways are expressed by alpha females has not been examined.

Unlike testosterone and cortisol, research that examines relationships between behavioural traits related to the human alpha female, or for that matter, the alpha male, with estradiol, progesterone, as well as the peptide hormone oxytocin, is limited. This underrepresented area of research, however, has shown links between these hormones and behavioural traits in humans.

When it comes to estradiol, in one-on-one dominance contests, women who expressed higher power motivation also expressed higher circulating estradiol levels both, before and after the contest, when compared to women who had lower power motivation (Stanton and Schultheiss, 2007). In contrast, in a study conducted by Gladue (1991), estradiol (and testosterone), positively correlated with aggression for men, and negatively for women (Gladue, 1991). Similarly, Cashdan (2003) found, that increased levels of estradiol in women reduced engagement in competitive behaviours - women with high estradiol levels reported fewer competitive interactions in athletics than did other women.

Increased oxytocin concentrations in women are associated with behaviors that promote affiliation, cooperation and prosociality (i.e. performing acts that benefit or help others) with other females (Carter, 1998; Bartz and Hollander, 2006). Oxytocin has also been found to potentially increase aggression in women by lowering perceptions of danger that would normally inhibit women from retaliating. It is also important to note that oxytocin has a special relevance to female behavior because its effects are strongly modulated by estrogen (Campbell, 2008). Low levels of aggression have also been associated with elevated levels of estradiol and progesterone (Denson et al., 2018).

Previous research suggests that progesterone concentrations can be used to index a person’s motivation to bond with others (Brown et al., 2009). For example, “higher levels of progesterone in humans are associated with greater affiliation motivation – deriving satisfaction from positive
relationships with others” (Brown et al., 2009, p. 108). For women in particular, as progesterone levels rise during the course of the menstrual cycle, higher concentrations of progesterone are considered predictive of greater affiliation motivation (Brown et al., 2009). Additionally, previous research suggests that fluctuating progesterone levels may influence centrally-released oxytocin levels (Brown et al., 2009).

Despite the limited research that has examined potential links between progesterone, estradiol, and oxytocin, and how they may relate to traits associated with the expression of the alpha female identity, there is still value in examining these hormones for the present research. Previous research has demonstrated that communal/affiliative behavior has been shown to be a trait related to the expression of the alpha female identity (Hawley, Little, and Card, 2008; Sumra, 2019). As the main objective of the present research is to ascertain whether self-identified alpha females are distinguishable from other women, it is warranted that assessments of estradiol, progesterone, and oxytocin concentrations for all the women in the study are included. This will allow for a deeper understanding into whether there is a hormonal profile unique to the alpha female.

Although it has been established that hormones respond to social context and vice versa (van Anders et al., 2015), what is not clear is how these responses are shaped by social norms related to gender, in this case, a specific archetype of female identity, the alpha female. What is absent from the literature is whether variability in the expression of female identity, specifically between alpha and non-alpha women, may, or may not be connected to neuroendocrine expression. The present research examines the relationships between hormonal and behavioral traits of the alpha female to gain greater insight into our understanding of the alpha female identity from a biosocial perspective. The results of the present study provide an opportunity to better understand whether hormones may represent a biological expression of the alpha female identity. Specifically, the present research seeks to understand the associations between cortisol, testosterone, and alpha female attributes as well as how other hormones, estradiol, progesterone, and oxytocin, may also play a role in the expression of this female identity.
3.2 Methods

3.2.1 Participants, Recruitment, and Exclusion, and Behavioral Variables

A total of 126 women, 32 alpha and 94 non-alpha women were recruited from the previous study presented in chapter 2. As chemical birth control or hormonal therapy may influence hormone levels, women who indicated either were excluded. This study evaluated the potential associations between 5 specific hormones (cortisol, estradiol, progesterone, oxytocin, and testosterone), and the 10 alpha female-related traits or behavioral variables which were found to be associated with the expression of the alpha female identity in the previous study presented in chapter 2. These included masculine traits (BSRI-M), leadership, strength, low introversion, self-esteem (RSES), life satisfaction, sexual experience, initiates sex, enjoys sex, and sexual dominance (Dom_Role_Sex). Relationships between the 5 hormones and the BSRI-F were also examined. The average age category for the sample of women across all women 35-37 years, and the average education level was a bachelor’s degree. For those women who were employed the average income was approximately $58,000.00 annually.

3.2.2 Hair Hormone Analysis

Previous research has validated hair to be a reliable substrate for measuring hormone concentrations in animals and humans (e.g. Gleixner, Meyer, and Fresenius, 1997, Yang et al., 1998; Sauvé et al., 2007; Gow, 2010; Stalder and Kirschbaum, 2012; van Holland et al., 2012; Cattet, 2017) and when compared to other methods of sampling such as blood, urine, and saliva, hair sampling offers a more non-invasive approach. Samples can also be collected by non-health care professionals (Sauvé et al., 2007), as well as by study participants themselves (e.g. Sumra and Schillaci, 2015). In the field of hair hormone analysis, research has focused primarily on the assessment of chronic stress as a function of cortisol concentration in hair (Slezak, Ström, and Theodorsson, 2017). In the case of saliva, blood, and urine, cortisol concentrations are typically measured over a 24-hour period usually starting with a first morning sample, with subsequent samples taken at specified intervals throughout the day (Genuth, 1993). Only urine collected throughout the day captures cortisol secretion over a 24-hour period (Van Uum, 2008). While
urine samples can provide hormonal profiles for a 24-hour period, saliva and serum provide “point estimates” for cortisol secreted prior to collection (~20 minutes for saliva and <3 minutes for serum) (Manenschijn et al., 2013). Hormone concentrations in hair, however, are expressed over a longer period of time rather than at a given point in time (Van Uum, 2008). Cortisol concentration in hair, on the other hand, has been described as a novel biological marker for measuring stress over a longer period of time, with reliable and validated tests to measure cortisol levels in hair becoming available in recent years (Manenschijn et al., 2013). Uptake of cortisol in scalp hair occurs primarily through blood circulation when the hair shaft is formed (Cone, 1996). It is argued that because of the balance between serum levels and hair cortisol concentration, and because hair grows on the scalp at an average rate of 1cm per month (Wennig, 2000), measurements of endogenously produced cortisol in the hair may reflect average hormone levels over a period of weeks or months (Sauvé et al., 2007; van Holland et al., 2012). Research on multiple stressors and physiological stress has revealed that the level of the stress hormone cortisol in hair is a predictive biomarker for cumulative or chronic stress in men (Pereg et al., 2011) and both chronic and perceived stress in pregnant women (Kalra et al., 2007). Hair samples have also been used to measure hormone concentrations in hair in animal and nonhuman primate studies. For example, progesterone, testosterone, estrogen, and cortisol concentrations have been measured in hair extracts for black bears (Cattet et al., 2017, 2018) and female domestic cats and lynx (Terwissen, Mastromonaco, and Murray, 2014). Hair cortisol and progesterone concentrations have also been measured in rhesus monkeys (Dettmer et al., 2015)

For the present study, each participant was asked to provide a sample of at least 25 strands of hair with an approximate length of 3 to 6 centimeters. Hair samples were sent to a commercial lab (Viagaurd Accu-Metrics, Toronto, Canada) for measurement of cortisol, estradiol, testosterone, progesterone, and oxytocin concentrations. Use of a special collection kit ensured the root ends faced the same direction. Participants were asked to cut hair as close to the scalp as possible and to ensure that the sample was collected between periods of dying hair, if hair was dyed on a regular basis. All kits were sealed and stored in individual envelopes. Samples were prepared using the first 3 centimeters of hair closest to the scalp which were washed in isopropyl alcohol by soaking for 5 minutes followed by a rinse. Any hair follicles that were present were cut to ensure that only hormones from the hair shaft were extracted. Hair shaft samples were cut
into small pieces with surgical scissors then weighed in a 1.5mL tube. The weight of the samples ranged between 0.69 and 3.67 mg. The samples were then ground to a fine powder prior to an overnight extraction in methanol. The supernatant from each of the extractions was then removed and evaporated until completely dry. Once the methanol had been removed, each sample was re-suspended in 250μL of phosphate-buffered saline (PBS) at pH 8.0. The samples were vortexed for 1 min until the extract was dissolved. The cortisol, estradiol, testosterone, progesterone, and oxytocin extracted from the hair were measured with standards for each of these hormones as reference. The dissolved supernatant for each hormone was compared with the standard and normalized with the weight of the hair to give pg/mg values. The respective analytical errors were assessed by replicate measures of cortisol, estradiol, testosterone, progesterone, and oxytocin standards and determined to be ±7 pg/mg.

3.3 Statistical Analyses

Univariate analyses were conducted which included the means, medians, and standard deviations for all variables. These included 5 hormone variables CORT (cortisol), EST (estradiol), PROG (progesterone), OXY (oxytocin,) and TEST (testosterone), and the 10 alpha female behavioral variables identified in Sumra’s (2019) study. Although Sumra (2019) did not find a difference between alpha and non-alpha groupings in a measure of feminine traits (BSRI-F), this was included in the present study. Based on the definition provided women were asked whether they identified as an alpha female or not. Based on their response, each participant was placed in one of two groups - alpha or non-alpha. Differences between the alpha and non-alpha females for the average (mean) of behavioral variables including, masculine traits (BSRI-M), feminine traits (BSRI-F), leadership, strength, low introversion, self-esteem (RSES), life satisfaction, sexual experience, initiate sex, enjoy sex, and dominant role in sexual encounters, and hormone variables including, cortisol, estrogen, progesterone, oxytocin, and testosterone, were assessed using nonparametric Mann-Whitney U-tests. Pair-wise comparisons were used to determine where differences might occur. P-values were not adjusted using the Bonferroni correction as the purpose was not to test for an overall difference between alpha and non-alpha females. The values were considered to reflect individual comparisons and not multiple comparisons. All statistical tests were conducted using the Number Cruncher Statistical Systems (NCSS) statistical software package (Hintz, 2004).
CHAPTER 3. THE ALPHA FEMALE AND HORMONES

3.4 Results

The results from the univariate analyses and the Mann-Whitney U comparisons (Table 3-1) revealed that when compared to non-alpha females, alpha females (N=32) had significantly higher mean scores for masculine traits (BSRI-M), leadership, low introversion, and self-esteem (RSES), and exhibited lower cortisol (CORT) levels than non-alpha females (N=94) (Table 3-1). Small but non-significant differences in strength, BSRI-F, life satisfaction, initiates sex and enjoys sex were also found. Alpha females exhibited slightly lower levels of estradiol (EST) and oxytocin (OXY) than non-alphas, and although they scored higher in sexual experience, playing a dominant role in sexual encounters (Dom_Role_Sex), testosterone (TEST), and progesterone (PROG) than non-alpha women, these differences were not significant statistically.

The results from the nonparametric correlation analysis revealed a number of significant relationships (Table 3-2). Cortisol was positively correlated with leadership and negatively correlated with strength, and feminine traits (BSRI-F). Progesterone and oxytocin were positively correlated with sexual enjoyment (Enjoys Sex) as was testosterone. Oxytocin was also positively correlated with playing a dominant role in sexual encounters (Dom_Role_Sex), and negatively correlated with masculine traits (BSRI-M). Estradiol (EST) was not correlated with any of the variables. Leadership position in the workplace as measured by management level is included in (Table 3-3) and reveal that 44% of alpha females held a mid to upper management position versus 35% of non-alpha females.

3.5 Discussion

The present study examined the relationship between 5 hormones (cortisol, estradiol, progesterone, oxytocin, and testosterone) and 11 alpha female variables in a small non-random sample of women in North America (N=126). As predicted, alpha women exhibited higher testosterone and lower cortisol levels than non-alpha women. Only the difference in cortisol levels between alpha and non-alphas, however, was statistically significant. Within this context, these results are consistent with similar research in humans (Sherman et al., 2012, 2016), and non-human primates (Sapolsky, 1989). For example, Sapolsky (1989), found that in stable dominance hierarchies of wild olive baboons, subordinate males exhibited higher cortisol levels
than alpha males. In Sherman et al.’s (2016) study, high testosterone and low cortisol predicted the number of subordinates among male business executives. Other research on the association between cortisol levels and alpha status, however, have revealed mixed results (Sapolsky 1982, Sapolsky and Ray, 1989).

Alpha individuals are found both to have higher (Sapolsky 1982, Sapolsky and Ray, 1989) and lower cortisol levels than non-alphas (Sapolsky 1989, 1992; Sherman et al., 2012, 2016). According to Sapolsky and Ray (1989), when it comes to nonhuman primates, dominance style problematizes the validity of low cortisol level as a marker for alpha status. For example, Sapolsky and Ray (1999) found that low cortisol levels are not necessarily a feature of all dominant male baboons in stable hierarchies. Low cortisol levels are exhibited by alpha males who engage in a particular style of dominance such as in dominant males who displayed a high degree of social skillfulness, control, and predictability over social hazards, such as, the ability to distinguish between winning or losing a fight (Sapolsky and Ray, 1989). In contrast, alpha males without this skill set were found to have cortisol concentrations as high as subordinate males (Sapolsky and Ray, 1989). Further Sapolsky and Ray (1989) found that male baboons who held longer alpha tenure had exhibited lower cortisol levels (Sapolsky and Ray, 1989). This suggests that perhaps cortisol levels in alpha individuals may fluctuate over time. Perhaps the longer a woman identifies as an alpha female, the lower her cortisol levels may be. The results of the present study revealed a positive association between cortisol levels and leadership scores across all women. This result is significant for future research that examines the relationship between cortisol levels in women and leadership position in the workplace.

The finding that testosterone is not correlated with masculine traits in the present group of women is significant and adds to current research in this area. At first glance, this finding appears to be inconsistent with previous research that positively correlates masculine traits with testosterone concentration in women. For example, Baucom, Besch, and Callahan’s (1985) study of 84 undergraduate students who completed Baucom’s Masculinity and Femininity Scales (Baucom, 1980), as well as the BSRI and an Adjective Check List, found that women with higher masculinity scores exhibited higher testosterone levels than women with higher
femininity scores. They also found that women with higher testosterone levels perceived themselves as self-directed, action-oriented, and resourceful (Baucom, Besch, & Callahan, 1985). However, Baucom, Besch, and Callahan (1985 p. 1218) also stated that masculine-sex-typed females (women who scored higher for masculine traits than feminine traits) exhibited “somewhat” higher testosterone levels than more feminine-sex-typed females (women who scored higher for feminine traits than masculine traits), suggesting that the difference in testosterone levels may not be significant. Given this, it appears that the finding in the present study that testosterone is not correlated with masculine traits may not be inconsistent with previous findings. It is important to note that Baucom, Besch, and Callahan (1985) used saliva as the substrate to measure testosterone in women. The present study is the first to use hair testosterone to evaluate associations with masculine traits. Future studies in this area will allow for more similar comparisons.

### 3.6 Conclusion

The present research contributes to and has direct implications for research on dominance and status-seeking behaviors in humans, specifically research on the human alpha female. First, that masculine traits were not associated with testosterone in this second study, offers insight into the major finding of the first study – masculine traits are predictive of alpha female status. If testosterone is not implicated in this then what is? Why are masculine traits predictive of alpha female status? Are there other potential biological contributors? Though answering these questions is beyond the scope of the present research, these questions provide food for thought for future research on the human alpha female. With respect to research social dominance research in humans the finding that testosterone is not associated with the self-reported masculine traits also brings up another question. How does the dual-hormone hypothesis fit into this? The dual hormone hypothesis posits that “testosterone’s role in status-relevant behavior should depend on concentrations of cortisol” (Mehta and Prasad, 2015, p.163) – higher status is a function of higher testosterone and lower cortisol. The dual-hormone hypothesis has been used to assess measures of dominance, aggression, social status, risk-taking, and economic decision-making (Mehta and Prasad, 2015). The results of my study present the opportunity to utilize the dual-hormone hypothesis in order to assess the alpha female behavioral domains related within the context of the pursuit and maintenance of social status. This provides and
opportunity for future research that considers the interplay between testosterone and cortisol in the present group of women and in other potential study populations contributing to the growing research on dual-hormone patterns (Sherman et al., 2016; Carré and Archer, 2018). Such research has further implications for future leadership and alpha leadership research, and for the study of social hierarchy in organizational research, including research that examines associations between hormones and the attainment of social status (e.g. Sherman, 2012, 2016). For example, are women in leadership positions in the workplace, who consider themselves alpha female, less stressed than other women? Do such women have higher testosterone levels relative to cortisol? If so, what behaviors do the engage in, or not engage in, that allow them to achieve higher social status/leadership position in the workplace?

Consideration of these findings alongside those of the first study (Chapter 2) offers a more holistic evaluation of the social and biological, in this case, hormonal, aspects reflected in the alpha female identity. In this second study, alpha females exhibit leadership, self-esteem, and less low introversion as part of their identity than non-alpha women. Alpha women exhibited lower cortisol levels than non-alpha women and as a result, may be less stressed. Thus, the answer to the question “are hormone levels associated with being an alpha female”, for this group of women, is yes, however, only in the case of cortisol.
### 3.7 Tables

Table 3-1 Results from univariate analyses for alpha and non-alpha female groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Alpha</th>
<th>Non-Alpha</th>
<th>P-value (Mann-Whitney U Test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>Masculine Traits (BSRI-M)</td>
<td>32</td>
<td>3.806</td>
<td>0.395</td>
</tr>
<tr>
<td>Feminine Traits (BSRI-F)</td>
<td>32</td>
<td>4.187</td>
<td>0.451</td>
</tr>
<tr>
<td>Leadership</td>
<td>32</td>
<td>20.219</td>
<td>3.338</td>
</tr>
<tr>
<td>Strength</td>
<td>32</td>
<td>16.75</td>
<td>2.639</td>
</tr>
<tr>
<td>Low Introversion</td>
<td>32</td>
<td>13.75</td>
<td>2.747</td>
</tr>
<tr>
<td>Self-Esteem (RSES)</td>
<td>32</td>
<td>39.719</td>
<td>6.624</td>
</tr>
<tr>
<td>Life Satisfaction</td>
<td>32</td>
<td>2.5</td>
<td>0.824</td>
</tr>
<tr>
<td>Sexual Experience</td>
<td>32</td>
<td>1.875</td>
<td>1.039</td>
</tr>
<tr>
<td>Initiate Sex</td>
<td>32</td>
<td>2.688</td>
<td>1.029</td>
</tr>
<tr>
<td>Enjoy Sex</td>
<td>31</td>
<td>4.194</td>
<td>1.138</td>
</tr>
<tr>
<td>Dom Role_Sex</td>
<td>32</td>
<td>2.406</td>
<td>0.797</td>
</tr>
<tr>
<td>CORT</td>
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<tr>
<td>EST</td>
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<td>PROG</td>
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<td>Employment</td>
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<td>0.761</td>
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<tr>
<td>Income</td>
<td>32</td>
<td>3.638</td>
<td>1.789</td>
</tr>
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### Table 3-2 Nonparametric Spearman correlations among variables used in the study (N=126) *P<0.05, **P<0.01, ***P<0.0001

<table>
<thead>
<tr>
<th></th>
<th>Leadership</th>
<th>Strength</th>
<th>Low Int.</th>
<th>Self-Esteem RSES</th>
<th>Masc. Traits BSRI-M</th>
<th>Fem. Traits BSRI-F</th>
<th>Life Sat.</th>
<th>Enjoys Sex</th>
<th>Init.Sex</th>
<th>Dom_Role_Sex</th>
<th>Sex Exp</th>
<th>CORT</th>
<th>EST</th>
<th>PROG</th>
<th>OXY</th>
<th>TEST</th>
</tr>
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<tbody>
<tr>
<td>Leadership</td>
<td>1</td>
<td></td>
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<tr>
<td>Strength</td>
<td>0.270**</td>
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<tr>
<td>Low Int.</td>
<td>0.473***</td>
<td>0.393***</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>Self-Esteem RSES</td>
<td>0.485***</td>
<td>0.381***</td>
<td>0.474***</td>
<td>1</td>
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<tr>
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<td>0.542***</td>
<td>0.322***</td>
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<td>-0.023</td>
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<td>Enjoys Sex</td>
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<td>0.019</td>
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Table 3-3 Management position and alpha status

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<th>Position</th>
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<th>non-alphas</th>
<th>%</th>
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<td>Non to low mgmt</td>
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<td>0.56</td>
<td>N=61</td>
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<td>Mid to upper mgmt</td>
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<td>N=33</td>
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3.8 References


CHAPTER 3. THE ALPHA FEMALE AND HORMONES


Chapter 4
Second to Fourth Digit Finger Ratio (2D:4D), Parental Alpha Status, Positive Mentor Influence, and the Alpha Woman

4.1 Introduction

In many animal species including humans, prenatal androgens, a group of hormones that influence the expression of male traits are responsible for behavioral and morphological differences (Manning, 2002) which contribute to changes in neural structure and function that persist through the life course (Howlett et al., 2014). Digit ratio, or the 2D:4D ratio, is the ratio of the lengths of the index finger (second digit) to the ring finger (fourth digit) from either the left or right hand and reflects prenatal exposure to androgens (Manning, 2002). In females, androgens are converted into female hormones or estrogens and are produced in ovaries, fat cells, and the adrenal glands. Prenatal estradiol, an estrogen steroid hormone, comes from the placenta through the aromatase conversion of testosterone as well as the adrenal glands (Csathó et al., 2002). Prenatal testosterone comes from fetal testes and adrenal glands. In human and nonhuman primates, the 2D:4D ratio is typically smaller for males than females. That is, the difference between the length of ring and index fingers is greater for males than females. There is both direct and indirect evidence that 2D:4D ratio is negatively related to prenatal exposure to androgens, specifically, testosterone, and positively with prenatal estradiol (e.g. Brown et al., 2002; Manning, 2002; Csathó et al., 2003 Lutchmaya et al., 2004; Hönekopp et al., 2007; Kuepper and Hennig, 2007; Berenbaum, 2009; Yang, Gray, Zhang, and Pope, 2009).

Evaluation of the potential associations between the 2D:4D ratio and the alpha female identity has not been conducted to date. Such an evaluation provides the opportunity to determine whether 2D:4D may be a biological differentiator for alpha and non-alpha women. To understand the rationale for this however, requires a reminder of the specific findings of the first study. In Chapter 2, the results of the first study found that the measure for masculine traits, the BSRI-M (aggressive, ambitious, assertive, competitive, and independent), was the strongest predictor of alpha female status. In the previous chapter, exploratory analyses examining
circulating hormones and the alpha female identity were conducted. These analyses were focused on examining the biological link between a biological substrate that reflects a 3-month physiological state. Conducting an analysis of 2D:4D ratio offers the opportunity to gain insight into how early development in-utero may or may not play a biological role in the development of the alpha female identity. More specifically, such an analysis allows for an understanding of whether a low 2D:4D (masculinized) ratio predicts alpha female status, and whether it is associated with masculine traits. This is especially relevant given that many behavior studies have shown the 2D:4D ratio to be implicated in the maintenance of dominance rank and alpha related behaviors in nonhuman primates and humans (e.g. Wilson, 1983; Breedlove, Cooke & Jordan, 1998; Brown et al., 2002; Lippa, 2003; Bailey and Hurd, 2004; Benderlioglu and Nelson, 2004; Bailey and Hurd, 2005; Coyne et al., 2007; Kuepper and Hennig, 2007; Nelson et al., 2010; Howlett, Marshall and Hughes, 2012; Howlett et al., 2014; Turanovic, Pratt and Piquero, 2017; Horn et al., 2018).

For example, Nelson et al. (2010) were the first to show a relationship between 2D:4D ratio and dominance rank in female rhesus macaques suggesting that prenatal androgen effects, may influence the maintenance of dominance rank. Their study showed that low 2D:4D ratios were associated with alpha females and higher 2D:4D ratios were associated with lower ranking females (Nelson et al., 2010). Howlett et al. (2014) found that 2D:4D ratios were strongly correlated with dominance rank among female baboons – with low 2D:4D ratios associated with the alpha female rank, lower submission rates, and higher rates of non-physical contact and physical contact aggression. These results suggest that exposure to higher levels of testosterone in-utero may be involved in the maintenance of dominance rank in female non-human primate social groups that have matrilineal dominance structures, where high dominance rank confers reproductive, fitness, and resource benefits throughout the individual’s lifetime (Nelson et al., 2010; Howlett et al., 2014). In the case of both baboons and rhesus macaques, this is especially significant as alpha female status is inherited. As such, these benefits are highly likely to span across generations. Interestingly, Howlett et al. (2014) also found no correlation between 2D:4D ratios and interest in infants or engaging in affiliative and other prosocial behavior. It is important to note however, that there are limited studies that examine the relationship between
higher 2D:4D ratios (feminized) and the alpha nonhuman primate. Though similar research in humans is also scant, a recent study conducted by Horn et al. (2018) revealed that children with high 2D:4D ratios acted more prosocially (defined as voluntary behavior intended to benefit others), than those children with low 2D:4D ratios. Horn et al. (2018) also found that children of higher social status, or popular children (those who had more people they interacted with), chose to behave prosocially less than those children who were not.

When it comes to the association between low 2D:4D and masculine traits in humans, the results are mixed. For example, in Bailey and Hurd’s (2005) study examining the relationship between the 2D:4D ratio and physical aggression, men with lower, more masculine finger length ratios scored higher aggression than other men, however, in the case of women, no correlation between 2D:4D and any form of aggression was found. Kuepper and Hennig (2007) also found a that a lower 2D:4D was correlated with aggression in men but not for women. In examining females only, Wilson (1983) found, that women with a lower, more masculinized 2D:4D ratio were more likely to describe themselves as assertive and competitive than women with a higher 2D:4D. Benderlioglu and Nelson (2004) found that low right 2D:4D predicts reactive aggression in women but not in men. Research conducted by Coyne et al. (2007) also found that, although 2D:4D was not linked to direct aggression in women, it did predict indirect aggression. However, Turanovic, Pratt, and Piquero’s (2017) meta-analysis of exposure to fetal testosterone, aggression and violent behavior, revealed that although the overall mean effect of the 2D:4D ratio to different measures of aggression and violent behaviors was found to be statistically significant, these associations were weak and as such, the authors ask for caution when using the 2D:4D ratio as a predictive measure for aggression and violent behavior (Turanovic, Pratt, and Piquero (2017).

The relationship between sexual orientation and 2D:4D in women has also been examined (i.e. Brown et al., 2002; Lippa, 2003), though the results have been mixed. Research by Brown et al. (2002) examining the relationship between the 2D:4D ratio and self-identified “butch” and “femme” lesbians in females revealed that lesbians who identified themselves as “butch” had
significantly smaller 2D:4D than those that identified themselves as “femme”. They also found that “femme” lesbians were unlikely to have been influenced by early androgens (Brown et al., 2002). However, Lippa (2003) found that heterosexual and lesbian women showed no significant differences in 2D:4D ratios though they did find a link between 2D:4D and men’s sexual orientation.

Relationships between circulating hormone concentrations in adulthood, particularly testosterone and estrogen with 2D:4D, has also been examined in humans. For example, Manning et al. (1998) reported significant correlations between circulating sex hormones, including testosterone and estrogen, in a sample of men (N=69) and women (N=62) attending an infertility clinic. In that study (Manning et al., 1998), estrogen was positively correlated to 2D:4D in women and testosterone was negatively correlated to 2D:4D in men. In a subsequent study, Manning et al. (2004) found that men attending a fertility clinic had a smaller right 2D:4D and higher testosterone levels while men from the general population showed no significant associations. Richards et al. (2018) found that low exposure to androgens and/or high exposure to estrogen during gestation may predict high estradiol levels in naturally cycling females of reproductive age. However, Muller et al. (2011) found no associations between 2D:4D measures and either testosterone or estrogen in men and women, and more recently, a study examining the relationship between testosterone concentrations in hair and 2D:4D as well as risk-taking behavior, Ronay et al. (2018) found no relationship in men’s hair testosterone concentrations and 2D:4D.

Previous research on both nonhuman primates and humans has shown associations between 2D:4D and alpha female status, as well as with alpha female related masculine and feminine traits. Research has also demonstrated that 2D:4D may be associated with circulating testosterone concentrations in adulthood (Manning et al., 1998). In the first study of the present research (Chapter 2), masculine traits were found to be the only predictor of alpha female status, and that in the second study (Chapter 3), testosterone was higher for alpha females than for non-alpha females (though this result was not statistically significant). Given these previous results, for the third study of this research potential associations between 2D:4D and alpha status, feminine traits, as well as masculine traits are investigated. The potential association between
2D:4D and hair testosterone concentrations is also assessed.

4.1.1 A Brief Examination of Early Social environment and Alpha Female Status Later in Life: Alpha Parents and Mentors

A brief, and introductory analysis of the potential link between having an alpha parent (mother and/or father), or a positive mentor (non-parent) early and life, and the likelihood of self-identifying as alpha female later in life is also included in this chapter. The purpose of this was to balance the examination of potential in-utero influence on alpha female status later in life, an example of a biological environment, with potential early childhood influences, an example of a social environment. According to identity theory, social identities are constructed through interactions with people that are significant in our lives and are influenced by the social contexts within which people are embedded (Stryker and Serpe, 1994). During childhood and adolescence, parents are very important to the context of socialization (Elder, 1968). Although there has been research that links parental influence on adult identity formation the mechanisms through which such influence occurs have not yet been identified (Benson and Kirkpatrick Johnson, 2009). Much of this research has focused on parental resources, more specifically, economic resources though there has also been a call to understand the nature and types of relationships in different contexts (Benson and Kirkpatrick Johnson, 2009). Parental effects occur when the phenotype or the environment experienced by a biological parent influences the phenotype of their offspring independently of genetic transmission (Marshall and Uller, 2007). This approach has been used to examine parental conference of sexual orientation. For example, Schumm (2010) examined 10 narrative studies involving family histories of 262 children of gay fathers and lesbian mothers. Their results showed that intergenerational transfer of sexual orientation can occur at statistically significant and substantial rates especially in the case for female parents and female children (Schumm, 2010). This area of research in the case of the alpha female may provide greater insight another potential source of influence that may confer alpha female identity later in life.
CHAPTER 4. SECOND TO FOURTH DIGIT FINGER RATIO (2D:4D), PARENTAL ALPHA STATUS, POSITIVE MENTOR INFLUENCE, AND THE ALPHA WOMAN

Having a non-familial mentor such as a teacher, coach, religious leader, or family friend has been shown to have a positive influence in the lives of their mentees (Hurd et al., 2014). Mentoring involves a caring and supportive relationship between a child or youth and a non-parent (Rhodes et al., 2006). According to Rhodes and colleagues (2006), mentoring affects youths in three ways, 1) enhancing social relationships and well-being, 2) improving cognitive skill through instruction and conversation, and 3) promoting positive identity development by serving as role models, and advocates for those they mentor (p. 692). Natural mentors provide instruction and guidance and influence a youth’s transition into adulthood (Schwartz, Lowe & Rhodes, 2010). The intensity, duration, and quality of the mentor/youth relationship can have a great influence on the development of identity in adulthood (Schwartz, Lowe, and Rhodes, 2010). Mentor effects are often examined in research that focuses on behaviors of young adults, aged 18-25 years. For example, in their study, *The Importance of Natural Mentors for Emerging Adults*, Hurd et al. (2014) found that having non-familial mentor predicted less cigarette use. In another study, an examination of the association between having a mentor and mental health, Hurd and Zimmerman (2014) found that high levels of relational closeness and either extended relationship duration or frequent contact may improve psychological well-being of mentees later in life. To date research that examines the relationship between having a mentor and alpha female status has not been conducted.

The present research examines the associations between left and right 2D:4D ratios and self-identified alpha female status, as well as with previously established masculine and feminine traits associated with the alpha female identity (see Sumra, 2019). Associations between 2D:4D ratios and testosterone and estradiol levels in hair are also examined. The results of the present study seek to provide an opportunity to better understand whether the 2D:4D ratio may represent a morphological expression of the alpha female identity. To examine a component of the social environment, the present research tests the relationships between parental alpha status and mentors, with alpha female status. An examination of such relationships provides insight into a potential connection to the expression of the alpha female identity later in life. The present research seeks to answer 2 questions: 1) does 2D:4D predict alpha female status, and 2) does having an alpha mother, father, and/or positive mentor in early life influence whether a woman...
self-identifies as alpha female later in life? A separate analysis is also presented to contribute to the growing literature on associations of the 2D:4D ratio with circulating hormones in adulthood specifically, concentrations of testosterone and estradiol in hair.

4.2 Methods

4.2.1 Participants and Behavior Variables

All participants (N=126) from the previous study in chapter 3 were recruited for this study. The relationships of left and right 2D:4D with the variables BSRI-M and the BSRI-F from the first study presented in Chapter 2 (Sumra, 2019) as well as with the testosterone and estradiol concentrations measured in the second study in presented in Chapter 3, were examined. To examine potential parental effects, the associations of alpha status with parental alpha status and mentor status were also examined.

4.2.2 2D:4D Finger Measurements – Direct Method

Various methods have been used to measure the 2D:4D ratio. These include direct measurement which involves measuring finger lengths directly with a ruler or calipers, and indirect methods such as taking finger measurements from photocopies or scans (Kemper and Schwerdtfeger, 2009). The present study used the direct method as it is considered an appropriate method to measure finger lengths for smaller sample sizes when there is adequate time to take measurements (Jain, Dhal, Pandey, and Jain, 2012; Ribeiro, Neave, Morais, and Manning, 2016). A single researcher took all the measurements and each finger was measured twice. Those samples with more than a 10% difference between the first and the second measurement were excluded from. Measurements of the palmer surfaces of the second and fourth fingers from a mid-point on the ventral crease distal to the palm, to the tip of the finger pad were taken with a ruler. This method is similar to the methodology used by Bonte, Procher, Urbig, and Voracek (2017).
4.3 Statistical Analyses

Descriptive statistics including the mean, median and standard deviation were run for all variables. These included testosterone, estradiol, BSRI-M and BSRI-F. Differences between the alpha and non-alpha groups were assessed using nonparametric Mann-Whitney U-tests and the Fisher’s Exact Test. Nonparametric Spearman correlations between left and right 2D:4D ratios, and the BSRI-M and BSRI-F, as well as hair testosterone and estradiol concentrations were calculated. All statistical tests were conducted using the Number Cruncher Statistical Systems (NCSS) statistical software package (Hintz, 2004).

4.4 Results

Digit ratios for the right and left hand correlated positively (R=0.489, p-value=<0.001). The results from the Mann-Whitney comparisons revealed no significant difference in the right 2D:4D ratio between alpha (N=32) and non-alpha (N=94) groups (Table 4-1). A small but non-significant difference in the mean score in the left 2D:4D ratio was found, with alpha females having a smaller mean. The results of the nonparametric correlation analysis for the sample of women in this study revealed non-significant associations for both left and right 2D:4D with masculine and feminine traits, as well as with testosterone and estradiol concentrations (Table 4-2).

Odds Ratio and Fisher’s Exact tests revealed that alpha females were about 1.7 times more likely to identify their mothers as an alpha (P=0.218), and 3.4 times more likely to identify their fathers as alpha (P=0.004). There was no difference in the odds of reporting a mentor as positively influencing them as a child (Table 4-3). Half of the alpha females identified their mothers as alpha compared to 37% of non-alphas, and 74% of alpha females reported that a mentor had a significant positive influence in their childhood compared to 70% of non-alpha female. Additionally, 56% of alpha females identified their fathers as alpha compared to only 26% of non-alphas (Table 4-3).
4.5 Discussion

The present study examined the associations of the left and right 2D:4D ratios with alpha female status, as well as with measures of masculine and feminine traits related to the expression of the alpha female identity in a non-random sample of self-identified alpha and non-alpha women in North America. Associations of 2D:4D ratios with testosterone and estradiol concentrations were also examined. To evaluate potential parental effects, the associations of alpha female status with parental alpha status, and having a positive mentor during childhood, were examined.

Several findings are consistent with previous research. The finding of a positive correlation between 2D:4D ratios in left and right hands is supported by previous research in this area (i.e. Hampson et al., 2008; Manning and Fink, 2008; Richards et al., 2018). Also consistent with previous research, is the finding that 2D:4D is not associated with adult testosterone and estradiol levels (e.g. Manning et al., 2004; Hönekopp et al., 2007; Muller et al., 2011). The finding that 2D:4D is not associated with the BSRI-M (masculine traits) or the BSRI-F (feminine traits) is significant given previous research (Sumra, 2019) which has shown the BSRI-M to be a predictor of alpha female identity, though not at the expense of feminine traits. These results are supported by evidence revealed from a previous large and extensive meta-analysis of the pertinent literature in this area (see Voracek et al. 2011). Many of the studies included in Voracek et al’s (2011) work used the original 60-item version of the BSRI in addition to shorter versions, to assess masculine and feminine associations with 2D:4D in men and women (Voracek et al. (2011) found that the cumulative evidence in this area of research did not support systematic, robust, noteworthy within-sex correlations between 2D:4D and masculinity/femininity personality dimensions. The findings of the present research add to the growing area of research that examines the association between 2D:4D and masculine and feminine personality traits.

With respect to the first question posed in the present study, “Does 2D:4D predict alpha female status?”, the answer is no. As noted earlier, there was not a significant difference in 2D:4D ratios between alpha and non-alpha groupings. This finding is in contrast to other research that examines the association of 2D:4D with other representations of female identity. For example,
CHAPTER 4. SECOND TO FOURTH DIGIT FINGER RATIO (2D:4D), PARENTAL ALPHA STATUS, POSITIVE MENTOR INFLUENCE, AND THE ALPHA WOMAN

Madison et al. (2014) found women who were classified as feminist activists exhibited significantly higher 2D:4D. Brown et al. (2002) surveyed individuals from a gay pride street fair and found that lesbians who identified themselves as “butch” had a significantly smaller 2D:4D than did those who identified themselves as “femme”. They further concluded that increased early androgen exposure played a role in only a minority of cases of female homosexuality, and that the sexual orientation of “femme” lesbians was unlikely to have been influenced by early androgens (Brown et al., 2002).

With respect to the second question, “Does having an alpha mother, father, and/or positive mentor in early life influence whether a woman self-identifies as alpha female later in life?”, the answer here is, potentially ‘yes’, however, only in the case of alpha fathers. This result is similar to what Kindlon (2006) found in his study of alpha girls - that a strong positive relationship between a father and his daughter was one of the key factors that separated alpha girls from other girls. This result also infers that perhaps, having an alpha male father may be linked the previous research that links social and parental influence with offspring identity expression and behavior (Rando, 2012; Schumm, 2010). This result is also similar to research that shown that fathers have significant influence over their daughters’ identity later in life (Allgood and Beckert, 2012). It is also important to note that daughters’ perceptions of parental alpha male status and positive mentor influences were included in the present study. Future studies that collect multigenerational information could provide greater insight.

4.6 Conclusion

The present research is the first to examine the association of 2D:4D ratio with the alpha female identity and the findings have particular relevance to a question often asked in the popular media, “are some women born to be alpha female?” More often than not, this implies that she was born with the masculine traits that are often depicted as part of the identity. The lack of association between the 2D:4D and alpha female status challenges this assumption. This implies that women can become alpha by way of their social environment during childhood. The implications of this are far-reaching. Opportunities to capitalize on this can fuel the development and production of
self-help or “how to be an alpha female” books, workshops, and other training programmes, and even products marketed for the purpose of helping women become alpha women. The results also provide an opportunity to expand current conceptual understandings of the father-daughter relationship dynamic. The present study provides the opportunity to further develop and refine quantitative and qualitative measures of a father’s influence and impact on a woman’s identity in adulthood.
CHAPTER 4. SECOND TO FOURTH DIGIT FINGER RATIO (2D:4D), PARENTAL ALPHA STATUS, POSITIVE MENTOR INFLUENCE, AND THE ALPHA WOMAN

4.7 Tables

Table 4-1 Results from univariate analyses for 2D:4D and alpha status

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<th>Non-Alpha</th>
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<th>P-Value associated with Mann-Whitney U test</th>
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<td>SD</td>
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<td>SD</td>
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</tbody>
</table>

Table 4-2 Nonparametric Spearman correlations among variables used in the study (N=122)

<table>
<thead>
<tr>
<th>Left 2D:4D</th>
<th>P-value</th>
<th>Right 2D:4D</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masculine Traits (BSRI-M)</td>
<td>0.071</td>
<td>0.434</td>
<td>0.164</td>
</tr>
<tr>
<td>Feminine Traits (BSRI-F)</td>
<td>-0.049</td>
<td>0.587</td>
<td>-0.094</td>
</tr>
<tr>
<td>Estradiol</td>
<td>-0.004</td>
<td>0.960</td>
<td>-0.054</td>
</tr>
<tr>
<td>Testosterone</td>
<td>-0.089</td>
<td>0.325</td>
<td>0.034</td>
</tr>
</tbody>
</table>

Table 4-3 Fisher's Exact Test - alpha status and association with parents and mentors

<table>
<thead>
<tr>
<th></th>
<th>alphas</th>
<th>%</th>
<th>non-alphas</th>
<th>%</th>
<th>Odds Ratio</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>mother (yes)</td>
<td>N=16</td>
<td>0.5</td>
<td>N=35</td>
<td>0.37</td>
<td>1.686</td>
<td>0.218</td>
</tr>
<tr>
<td>mother (no)</td>
<td>N=16</td>
<td>0.5</td>
<td>N=59</td>
<td>0.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>father (yes)</td>
<td>N=17</td>
<td>0.53</td>
<td>N=23</td>
<td>0.24</td>
<td>3.440</td>
<td>0.004</td>
</tr>
<tr>
<td>father (no)</td>
<td>N=15</td>
<td>0.47</td>
<td>N=71</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mentor (yes)</td>
<td>N=23</td>
<td>0.74</td>
<td>N=66</td>
<td>0.7</td>
<td>1.220</td>
<td>0.671</td>
</tr>
<tr>
<td>mentor (no)</td>
<td>N=8</td>
<td>0.26</td>
<td>N=28</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 4. SECOND TO FOURTH DIGIT FINGER RATIO (2D:4D), PARENTAL ALPHA STATUS, POSITIVE MENTOR INFLUENCE, AND THE ALPHA WOMAN

4.8 References


CHAPTER 4. SECOND TO FOURTH DIGIT FINGER RATIO (2D:4D), PARENTAL ALPHA STATUS, POSITIVE MENTOR INFLUENCE, AND THE ALPHA WOMAN


CHAPTER 4. SECOND TO FOURTH DIGIT FINGER RATIO (2D:4D), PARENTAL ALPHA STATUS, POSITIVE MENTOR INFLUENCE, AND THE ALPHA WOMAN


Chapter 5

Conclusion

5.1 Summary of Findings

The in-depth evaluations of the academic literature, existing research, and the popular media for the first study as presented in Chapter 2, revealed that depictions of the alpha female identity have changed over time in very interesting ways. To summarize, her journey began in the field of animal behavior as the queen bee in Huber’s (1802) work on the sociality of bees. Here, the queen bee was presented to the masses as the most socially dominant individual in the hive, ruling over her subordinates, and who has special access to resources. Throughout the 1800’s the idea of a top-ranking individual in society took hold in animal behavior studies which also drew the attention to those in the field of comparative psychology. If for no other reason, in the early 1900s, the term alpha, denoted by the Greek letter for “first” began to be used in animal behavior studies to denote the most socially dominant individual in a social group. The use of the term “alpha” at that time was highly significant not only because the most dominant individuals were referred to as “alpha”, but that all others began to be referred to as “subordinate”. This terminology connoted a structure of hierarchy, where the alpha individual is considered a valued position to have. This way of describing the social environment of animals persisted and was for the most part, well-received by primatologists. From Huxley’s (1932) science fiction novel of social hierarchy in a futuristic human society in the 1930s, to its pervasion into leadership studies in the 2000s until today, the idea of the alpha female has undergone many iterations. Despite these iterations what has remain unchanged is that the traits and behaviors that have been popularized and presented in the academic literature and the popular media originate from what has been learned from animal and nonhuman primate studies.

Testing of the social construction of the alpha female identity revealed that for the sample of North American women in this first study, the alpha female is an expressed and accepted form of female identity. The findings of the first study also revealed that much of what is known about the human alpha female is predominantly based on the alpha male nonhuman primate despite
CHAPTER 5. CONCLUSION

research that has shown alpha female nonhuman primates to be “different” from her male counterpart. The results of the textual analyses allowed for an examination for the first time of how two popular conceptualizations of the alpha female identity – one a more “masculine” and the other a more “feminine” one – may be associated with 21 traits related to the expression of the alpha female identity, including masculine and feminine traits, in a small non-random sample of women in North America (N=398).

The results were both expected and unexpected. Consistent with previous research that has linked masculine traits to the alpha female, the measure of masculine traits in this research was found to be a predictor of alpha female status. Additionally, the finding that leadership traits, strength, and low introversion are also linked to alpha female status is also consistent with previous research. Unexpectedly however, the measure of masculine traits was the only predictor. Based on previous research it was expected that social dominance and sexual dominance would also be predictors however, this was not the case. Further, although there was a highly significant difference in mean leadership scores between alpha and non-alpha females, with alpha females scoring higher, alpha and non-alphas were equally likely to hold a leadership/management position at work. These results, therefore, challenge the common assumption that leadership position, and, social and sexual dominance are inextricably linked to the expression of the alpha female identity.

Given the phylogenetic relatedness between nonhuman primates and humans, it is no surprise that the relationships between biological factors such as hormones, and morphological features such as the 2D:4D ratio – the ratio of the differences between the ring and index fingers – and the behaviors of alpha female nonhuman primates may also be considered as physiological markers of the human alpha female. When it comes to hormones and alpha status, much of the research has focused primarily on the relationships between circulating hormone levels and masculine traits. Specifically, research has demonstrated that hormone concentrations of cortisol, estrogen, testosterone, progesterone, and oxytocin have been linked to aggression. While some research has shown an association between social rank and stress in primates as measured by elevated cortisol levels (Sapolsky, 2005), other research has found no association (Feng et al.,
2016). There has been evidence however, that show high levels of estradiol and high levels of progesterone are associated with low levels of aggression and that estradiol may also influence behaviors in women other than aggression including dominance, assertiveness, and risk-taking behaviors (Denson et al., 2018). There has also been evidence of testosterone and cortisol jointly regulating dominance in women leaders (Mehta and Josephs, 2010).

Surprisingly, testosterone was not correlated with masculine traits and this result is inconsistent with previous research linking testosterone concentrations to the expression of masculine traits in women. The only hormone associated with alpha status was cortisol, specifically, lower levels of cortisol concentration. Consideration of these results alongside those from the previous study on the social construction of the alpha female identity, raises questions regarding what it means to be an alpha female from a biosocial perspective.

This research also included an evaluation of a prenatal biomarker associated with the expression of masculine and feminine traits, the 2D:4D ratio. The difference in relative finger lengths, specifically, second to fourth finger length ratio or 2D:4D, has been found to be an indirect biomarker for prenatal testosterone and estrogen exposure in humans (Brown et al., 2002; Kuepper and Hennig, 2007; Yang, Gray, Zhang and Pope, 2009). A smaller digit ratio (2D:4D ≤ 1) is considered an indirect indicator of higher prenatal testosterone exposure and a larger ratio (2D:4D ≥ 1) of higher prenatal estrogen exposure (Manning et al., 2014). The results revealed that neither the left nor right 2D:4D ratios predicted alpha status.

Included in this evaluation was an assessment of parental effects and alpha female status later in life. According to identity theory, social identities are constructed through interactions with people that are significant in our lives and are influenced by the social contexts within which people are embedded (Stryker and Serpe, 1994). Research has shown that relationships and interactions with significant others such as parents and mentors early in life, can influence ideas about gender identity later in life. No association was found with mothers identified as alpha or
mentors and alpha female status. However, a statistically significant effect was found in the case of alpha fathers. The findings of the present research add to the growing area of research that examines the association between 2D:4D and masculine and feminine personality traits, as well as to understanding the role that the social environment after birth may play in the development of alpha female identity later in life.

5.2 Limitations and Future Directions

The results of the present research are subject to several important limitations. Firstly, the present study relies on self-identification as the method of identifying alpha and non-alpha women and does not include data on how those women would be identified by their peers. The degree to which individuals and groups are perceived by others or non-group members represents another dimension (Abdelal et al., 2009). As such, though some women may self-identify as alpha female, this may or may not align with the perceptions and beliefs of others (Horowitz, 2012). Future research that considers the opinions and perceptions of non-alpha women and men, of particular self-identified alpha women may also provide insight into the social construction of the alpha female identity.

Because data were collected through the survey and focus groups, self-identified alpha females were not observed in their natural environments limiting the insight into the potential variation in the expression of the identity. This is important because humans, like other primates, have complex social lives and operate in varying contexts, belong to different social groups and hierarchies, and perform a variety of social roles (Sapolsky, 2004). Within this context, self-identifying as alpha female may not necessarily mean that she is all alpha, all of the time. For example, in two studies conducted with approximately 900 college students (men and women), Hawley and Hensley (2009), found that when it comes to connecting on a sexual level with dominant or alpha males, women who identified as alpha, preferred forceful submission fantasies more than women who identified as subordinate (Hawley & Hensley, 2009). Similarly, others have found that although alpha females like to stay in control in the bedroom, they are willing to relinquish this control to men when it suits them (see Rhodes and Schneider, 2014; Wesley, 2018). Thus, the alpha female may not always choose to be alpha in every context. Further,
people tend to value those hierarchies in which they are ranked the highest. For example, a person who works in the mailroom of their company and is the top baseball player on the company team, may derive more self-esteem from the latter hierarchy (Sapolsky, 2004). Additionally, depending upon the context, people also tend to alter the psychological meaning of a rank (Sapolsky, 2004). For example, a novice runner who completes a marathon would be more pleased with themselves than a person who was expecting to win but placed 5th (Sapolsky, 2004). Future research focused on the daily lived experiences and the various contexts of the alpha female may provide greater insight into the potential fluidity and variation in the expression of the alpha female identity.

Although measures of sex frequency, sex enjoyment, dominant role in sexual encounters, initiation of sex, and sexual experience were included in the present study, data on the type of sexual activity performed were not collected. Currently, there is no research that examines this with respect to the alpha female, though there has been some research which has demonstrated that some forms of sexual activity potentially contribute to one potential trait of alpha female status, life satisfaction (i.e. penile-vaginal penetration for women is linked to lower life stress than oral sex, or masturbation (see Brody and Costa, 2009; Brody, 2010). Further research into which forms of sexual activity alpha females perform may provide greater insight into the alpha female’s sexual profile.

The present study is also limited by non-random sampling, and therefore may include some bias, the nature of which is unknown. It is also potentially limited by small sample sizes for both the non-alpha and alpha groups. It is therefore possible the results do not accurately reflect the differences between these groups of women in North America. The non-random small sample also limits the potential to generalize to a larger population beyond the scope of the present study.

Use of the BSRI also poses a limitation. In some cases, the BSRI has been shown not to be a valid measurement of psychological androgyny due to localized constructions of masculinity and
femininity (e.g. Ward and Sethi, 1986). This suggests that the BSRI may not accurately reflect gender expression in other cultures and societies for example, matrilineal societies such as the Minangkabau of Indonesia (Kato, 1978) and the Mosuo of China (Johnson and Zhang 1991). Examining the alpha female construct in such societies may require a modification of the current BSRI to accommodate for such cross-cultural differences.

Although data on the ethnicity of women was collected its influence on social rank and potential impact on social hierarchy was not part of scope of the present research. Data on sexual orientation was not collected or examined as a potential influencer of social hierarchy. The present research examined hierarchy strictly in the sense of being exhibited through social dominance. An examination of how social rank is expressed through such aspects, and how they may or may not intersect with the identity itself may provide more context to the alpha female as a value-laden identity.

The results of the hormonal analyses contribute to, and have direct implications for, research on dominance and status-seeking behaviors in humans, specifically research on the human alpha female. It also has direct implications for future leadership and alpha leadership research, and for the study of social hierarchy in research on organizational behavior and culture, including research that examines associations between hormones and the attainment of social status (e.g. Sherman, 2012, 2016). The finding that alpha women exhibit lower cortisol levels than non-alpha women also has implications for research on the relationship between alpha status and stress in humans. Though hormones can affect many aspects of human behavior, the correlations between specific hormones and specific behaviors are often weak and are likely influenced by many factors (Eisenegger et al., 2011). Further, future research that evaluates the relationships between testosterone and cortisol, and female leaders who are both alpha and non-alpha, may shed light on whether these particular hormones do in fact play a role in the likelihood of occupying a leadership position for women more generally, and more importantly, may also provide the opportunity to gain deeper insight into a potential variant of leadership itself – the alpha female leader. Additionally, the result that leadership is positively associated with stress warrants follow-up research on alpha females who occupy leadership roles.
Though no relationship between oxytocin and any other variable was found in the present study, the measuring of oxytocin in hair poses a significant limitation. This is because to date there have been no studies that suggest that oxytocin can be reliably measured in hair, or any other substrate. In recent years, oxytocin research has come under fire for overstated claims about the validity of assays in saliva as well as other substrates (Leng and Sabatier, 2016). Perhaps the reason for this is that oxytocin is a peptide hormone and thus likely to break down after a short period of time. As a result, oxytocin levels measured in the present study may reflect concentrations from other peptides. Despite this, the assumption made in the present study was that the uptake of oxytocin into the hair shaft from the scalp is similar to that of cortisol and testosterone. As such, oxytocin was extracted in the same manner as the other hormones and measured by mass spectrometry. In one study by Hamel (2015), it was stated that hair may not provide a good means for measuring long-term oxytocin levels since it is possible that oxytocin may not be incorporated into hair in the same way as cortisol. In that study however, it is unclear whether the extraction of oxytocin from hair, or if their method of measurement, enzyme immunoassay (EIA) may have been the reason for their determination that hair may not be an appropriate substrate to measure oxytocin concentration. Thus, it is unclear whether measurement of oxytocin by mass spectrometry in the present study mitigates the problems with measuring oxytocin in hair suggested by that study (e.g. Taylor, Keevil, and Huhtaniemi, 2015). Future research that establishes how the uptake of oxytocin occurs in the hair shaft along with research that validates the measurement of oxytocin in hair is needed. Additionally, sex hormones, such as estrogens and progesterone significantly impact women throughout different stages of life because they are produced cyclically and naturally fluctuate throughout the life course (Del Rio, 2018). This may represent a limitation of the present study’s use of a 3-month average.

Although the finding that alpha females who consider their fathers as alpha may confer alpha female status in later life is compelling, the fathers of alpha females were not asked if they considered themselves alpha, nor were their alpha related traits assessed. The identification of fathers, and mothers, was solely based on the participant’s assessment. Additionally, it cannot be confirmed that all mothers and fathers were biological parents of alpha women. Some may have
been adopted or regard the terms “mother” and “father” to be a person that is mother-like or father-like. Thus, a potential genetic link for expression of the alpha female identity later in life cannot be confirmed nor denied based on the findings. The results from the analysis of parental effects provides an opportunity for future research in this area which would involve the collection of historic data and narratives from both alpha females and their fathers to gain a deeper understanding the operationalization of their individual alpha identities. More research, however, is needed to determine the mechanisms through which this may occur. This could also include comparisons of the 2D:4D ratios of alpha fathers with alpha female daughters, as well as other non-genetic testing to evaluate potential epigenetic transfer of alpha status. A more comprehensive examination of the interplay between 2D:4D and parental/mentor effects was not within the scope of the present research. Much of the previous research in this area, examines the interplay between 2D:4D and parental behaviors such as maternal smoking during pregnancy and possible effects of in-utero testosterone (e.g. Rizwan, Manning and Brabin, 2007). Perhaps a future area of research may be to examine the interplay between 2D:4D and parental as well as mentor influences early in life, as well as the mechanisms that may underly it not only for the alpha female identity but for females in general.

The present research was an exploratory study with correlational rather than causal implications. Therefore, caution is warranted when generalizing to any group outside the participants in this study. Future research on the alpha female identity should focus on replicating these results in other populations.
5.3 Concluding Remarks

In recent decades women’s social roles in the West have changed significantly. Today, more women are employed, educated and have taken on senior leadership roles in their vocations, quashing earlier stereotypes of women being passive, non-competitive and non-progressive (Ward et al. 2010). Earlier theorists have presented categories of “woman/women” as singular and homogenous however, as women have entered the workforce these categories have become varied resulting in differing archetypes of female identity (Cheng, 2007). One such archetype is the “alpha female” or “alpha woman”. Both these terms are used interchangeably in popular and academic courses and predominantly refer to women who are born biologically female. Research has demonstrated that though she possesses masculine traits which include being assertive, tough and strong like her male counterpart the alpha male, the alpha female also possesses feminine characteristics of high self-esteem, high emotional intelligence, and, team and cohesion building through developing affiliations. Much of the alpha literature focuses on male characteristics of social and sexual dominance, confidence, leadership and charisma, and how these characteristics can be detrimental or beneficial in the corporate world. However, as evidenced in this research, by donning characteristics associated of both masculinity and femininity, the alpha female identity challenges the presumptive Western gender binary opposition of male and female. Within this context, the existence of the alpha female identity supports the view of those scholars that reject binarisms such as male/female and masculine/feminine, which divide humans into two distinct categories of men and women. Within the category of woman, the alpha female therefore is an example of the variation in gender identity that exists within the category of “woman”.

There are four important findings that have come out of the present research. First, although alpha females may be identified by their self-reported expression of masculine traits, they equally report expression of feminine traits – they may be more masculine, but not at the cost of their femininity. Second, being an alpha female does not necessarily mean being a leader in one’s career or vocation – it does not necessarily mean that women in leadership positions are alpha females and vice versa. Third, there does not appear to be a biological signature of the alpha female, specifically, with respect to hormones or 2D:4D ratios, though lower cortisol levels suggest that alpha females may be less stressed than their non-alpha counterparts. Finally, and
most important, what is “known” about the alpha female identity in terms of behaviors and biology is largely based on untested and unsubstantiated assumptions – that is, 1) what is known about alpha male and alpha female nonhumans primates in terms of social hierarchy and behaviors related to acquiring or maintaining social status, hormonal profiles, and a morphological marker, the 2D:4D ratio, has been mapped onto the human alpha female, and 2) the concept of leadership is also an assumed characteristic of the identity such that leaders are considered alpha and vice versa. I would like to elaborate on these two points in particular.

First, when it comes to the mapping of nonhuman primate behavior, sociality and biology onto humans, it is widely known and accepted that humans and non-human primates have a close phylogenetic relationship. Both are also similar in physiology, neuroanatomy, reproduction, development, cognition, and social complexity (Phillips et al., 2014, p. 801). Thus, because humans and nonhuman primates share a common ancestor, behavioral studies of nonhuman primates have had a greater impact on our ideas about human behavior in comparison to studies of other groups of organisms (Mackinnon and Fuentes, 2005). Nonhuman primate models in biomedical research have contributed to the study of human infectious, autoimmune oncogenic, and neurological diseases (Rivera-Hernandez et al., 2014, Estes et al., 2018). In the case of vaccines for example, nonhuman primates provide reliable models for immunogenicity and contribute to our understanding of pathogenesis and protection against associated diseases (Rivera-Hernandez et al., 2014, p. 313). With emerging viral infections becoming epidemic, nonhuman primate models of disease are becoming invaluable benchmarks for investigating the disease pathogenesis and prophylaxis of human viral infections (Estes, 2018). However, what the results of this work have revealed is that although animal and nonhuman models may be predictive and analogous to humans when it comes to our understanding of diseases, when it comes to examining gender variations, this “mapping on” is more complicated and not necessarily analogous.

Several scholars and researchers have argued that generalizing primate behavior to human behavior is a complicated endeavor and, in some cases, potentially problematic (Buss, 1989, 1994, 2003; de Waal, 1989; Ghiglieri, 1999; Low, 2000; Elsworth, Ray, 1999; Sapolsky, 1993;
The challenge and risks of relating nonhuman primate social behavior to humans has been a topic of discussion and contention in both primatology and sociocultural anthropology. Marks (2003) attributes this to what he calls, the “98% issue”, the genetic commonality between chimps and humans. Marks (2003) argues, that this commonality invites comparison – a comparison that is problematic as it engages in a method of comparison that “takes two ends and points and connects them directly to a common origin” (Silverman, 2003). More recently, primatologists have found that there is variation in behaviors and sociality, especially as they relate to the alpha male across different primate species (MacKinnon and Fuentes, 2005) – there is no one suite of behaviors or traits that is universal across all primate species. Second, according to MacKinnon and Fuentes (2005), reductionist accounts of primate behavior with little or no basis in the primatology evidence have made their way into popularized narratives and are often put forward as evidence of an underlying natural condition or of normative roles in human behavior (Mackinnon and Fuentes, p. 83). Finally, the mapping of nonhuman primate behavior onto humans is also complicated by the fact that humans have complex social lives and operate in varying contexts, belong to different social groups and hierarchies, and perform a variety of social roles (Sapolsky, 2004). In the case of the human alpha female these reasons are especially relevant. Research that categorizes women a priori as alpha and non-alpha based on social and/or biological traits that are not same across all alpha nonhuman primates, that are put forward as evidence of normative roles, does not take into account the complexity with respect to varying contexts within which women operate. Thus, this runs the risk of reductive, and at times universalizing, accounts of what it means to be an alpha female. It is not my intent is to minimize or negate the contribution of the study of nonhuman primates to medical and scientific advancements and our understandings of the human condition. Rather, as other researchers and scientists have before me, in this work I am cognizant of this complexity. Nonetheless, this is a slippery slope – one that runs the risk of naturalizing gender identity in humans based on “ideas” about biological connectedness with nonhuman primates rather than evidence – a slippery slope that may contribute to reductionism and simplification of human behavior which may have consequences.
Perhaps it is this oversimplification that has also contributed to the assumption that “alpha” means “leader” and vice versa. This makes sense given that ideas about the alpha female are based on the concept of social hierarchy, and those at the top are in charge and lead the group, and that leadership is defined as “the act of leading a group of people or an organization”. Thus, that the alpha female as leader does not seem to be a far leap, even if it is assumed. The concept of social hierarchy, however, connotes ideas about inferiority and superiority - advantages and disadvantages - benefits and costs. Specifically, in the case of the alpha female as a high-ranking female in the workplace such as a manager, we must be aware of the potential consequences associated with this thinking.

Previous research has demonstrated that socially developed personality traits and behaviors influence an individual’s position in social structures. For example, professional network structures such as the workplace play an important role in the development of social status and the attainment of individual socioeconomic outcomes. Consideration of this raises some important questions. For example, what are the potential risks for women who consider themselves to be alpha female, and for that matter, those women that do not? In particular, what might be the social impact when organizations recruit for alpha women to take on leadership roles? Further, for such women, what is at risk if they do not “behave” as expected after they are hired? What does this mean for other women who are not considered to be alpha by such organizations when it comes to their career trajectory? What is at stake here? I can speak to some of these questions from personal experience.

In my current role as an executive leadership coach and behavior change expert for clients who are in senior leadership roles in industries such as manufacturing, IT, telecom, and medical devices, I have had first-hand experience engaging in conversations about what leadership means more generally in the workplace including associated leadership attributes and behaviors. More often than not, the senior leaders I coach, both men and women, openly state “We need an alpha for this role. You know someone who is not afraid, who is assertive with a take-charge attitude and holds people accountable”. Although these traits are not written into the job descriptions this results in them being expected. Women leaders are often referred to as being part of the “boys
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cub” that they know how to behave like a senior male leader would. On the other side, I have also observed leadership actively not recruiting specific individuals for certain roles that are high-demanding because they do not possess the so called “alpha” qualities that they are looking for those positions. For such women who want these roles it means sacrificing your family time, and at times choosing your career over your family in lieu of a senior title and the renumeration that comes with it. For women who do not behave in the way that is expected of senior leadership or the “alpha” way, it means the loss of an opportunity and a limited career trajectory. Recruiting for alphas also has implications for the glass ceiling hypothesis. If organizations are specifically looking for alpha females (the female version of the alpha male) to fill their leadership positions, then the implication for women more generally is that there is the potential perhaps of the glass ceiling being broken but only by those women who are deemed alpha and thus, such women may be favored or “selected” over others. Though more females may gain higher positions in the workplace this does not mean necessarily that the glass ceiling is breaking. Rather, this may reinforce the idea that in modern, complex societies dominant leadership is often the norm favoring the ascendancy of men, or in the case of the alpha female, certain women into top leadership roles. My experience in conducting this research, however, has allowed me to broaden my coaching skills to help others consider attributes about leadership beyond their assumptions, beyond thinking that all alphas are leaders and all leaders are alpha. This has been invaluable in helping me help them coach those that report to them towards success in achieving their personal and organizational goals. Within this context, the results of this research suggest though previous research on the alpha female was used to explain the influence of the shift in women’s roles, this is largely based on unsubstantiated assumptions regarding the relationship between leadership and the alpha female and the validity of the alpha female as a universal identity/category in society. I argue that in an effort to engage in the gender-equality discourse, such assumptions have contributed to the notion that the alpha female is the female representation of her male counterpart, the alpha male. This in turn has added to the discourse that leadership and being alpha female are inextricably linked. This conclusion would not have been reached had self-identification as an approach to identify alpha females as opposed to identification through predetermined and assumed alpha female behavior traits, including leadership, not been utilized.
As anthropologists we spend a great deal of time and effort to ensure that we do not assume, that we let the data and the people speak for themselves. We strive to understand how gender is shaped and constructed, how it is experienced by those that live it themselves, from their perspectives. The studies in this thesis examine the alpha female identity from those that are most likely to embody it, women themselves, rather than placing women in two categories of alpha and non-alpha women based on what has been assumed about the alpha female identity. This approach allowed for the first time, an opportunity to both validate and challenge many of social and biological assumptions that have been associated with the identity.

One of the most important contributions of the present research is the history of the alpha female identity. Although the evolutionary importance of the alpha female or the emergence of the alpha female identity was not in the scope of the present research, it does warrant some discussion. Based on what has and is still being said in the popular media it would not unreasonable to entertain questions regarding a possible evolutionary link. Has the alpha female always existed and if so, in what form? At what point was there selection for the alpha female? Does the alpha female identity exist across other cultures and if so, how is she similar or different from Western understandings about her gender? How would she compare to the nonhuman alpha female primate? These questions are compelling, and the results of the present study can perhaps shape some thoughts around this. What I have learned through the experience of this research is that the alpha female identity has no specific phenotype associated with it. Perhaps there is a partial one, given that masculine traits were found to predict alpha female status. Perhaps what we should be looking for in our evolutionary history is not the alpha female but the female leader, or for that matter, the male leader. Perhaps it is time to stop conflating the two and looking for those females that have influence on others, on group dynamics, when they are present and when they are not. What may be the evolutionary origins of leadership and followership in humans? How might this relate to the dominance-subordinate interface in nonhuman primates? Would gaining insight into this area allow for a reconceptualization of leadership as an alpha trait, as an outcome of strategic interactions among individuals who “follow different, yet complementary decision rules to solve recurrent problems” (Van Vugt, 2006). Within this context what traits would be associated with leadership? The undertaking of this research has allowed for an
opening to investigate the concept of leadership and followership that does not include use of the term “alpha”. Rather it offers the opportunity to understand leadership within the context of other traits such as taking initiative, intelligence, task performance competencies as well as others (e.g. Van Vugt, 2006). Taking leadership research into this area, is both promising and useful in broadening our understanding of the leader/follower dynamic both within organizational structures as well as other social contexts.

On a final note, to say that gender is culturally constructed and not biologically determined is not equivalent to saying that biological differences among females don’t matter. The question to ask is how, and how much they matter, and as was revealed in the present research, whether they even matter at all. It is neither correct to say that what it means to be a woman, or man for that matter, is entirely the product of culture, or the product of biology, or that either must be unequivocally proven to confirm “realness”. Though it can be argued that because of the power that biological models have on our ideas about gender does its inclusion set the terms of reference, albeit unintentionally for the researcher and for the audience to whom it speaks to? Perhaps it does. Despite this, however, I suggest that it is important to investigate potential links, even if no links are found, and that such challenging work should be undertaken, though this requires the researcher to be cognizant of the potential dangers of engaging in any form of determinism whether it be social or biological. Integrating the perspectives of the social and the biological allows for transdisciplinary cooperation through which to assess the complexity of the human condition. It is also important to note that using self-identification to identify alpha females as opposed to identification through measuring women’s engagement in specific traits related to the expression of the alpha female identity, allowed for the deconstruction of the category itself, as well as arriving at the result that much of what is considered to be known about the alpha female identity is merely assumed.

In closing, I would like to take the reader back to the main purpose of this research - to determine whether alpha women are distinguishable from a social and/or biological perspective from other women. Clearly, not all women are alpha females, regardless of whether an instrument such as the Alpha Female Inventory (AFI) (Ward et al., 2010) is used to categorize them as such, or whether women are asked themselves. It is also clear, that being an alpha female is not a zero-
sum game, it is not all or nothing. She is not always masculine, not always feminine, and not always a leader. She might be less stressed than other women. What I have learned from the women in this study, is that being an alpha female is complicated. It is not entirely premised on the assumptions of either primatology or leadership studies, nor does it necessarily have any of the expected benefits such as higher position in the workplace, more income, or social status. I have also learned that given that testosterone was not associated with masculine traits, the expression of these traits may be underpinned by social influences rather than biological ones – that perhaps the expression of masculine traits for the alpha female is a learned behavior. The question that now comes to mind is, if this is case, why would women choose to identify as alpha female at all? Perhaps, the language of alphaness itself is inadequate because of its pre-existing assumptions. Perhaps it is this inadequacy which fuels the desire to identify with a category that escapes existing binaries. It is apparent that the idea of alphaness is critical cultural terrain for discussions around gender, nature, and leadership. The results of this research revealed that the human alpha female is far more complex when social construction and measurable expressions of the identity are included in the discourse.
5.4 References


CHAPTER 5. CONCLUSION


CHAPTER 5. CONCLUSION


Appendices

Appendix 1
Search Terms for Data Queries
alpha female, alpha woman, alpha women alpha girl, alpha man, alpha male, alpha men, femininity, masculinity, masculine traits, male traits, feminine traits, female traits, education, income, age, management position, leadership, strength, extroversion, low introversion, collaboration, social dominance, social support, social network, communal, cooperative, satisfaction with life, promiscuity, sex frequency, sexual dominance, dominant role in sexual encounters, sexual experience, sex partners, self-esteem, confidence, aggression, assertiveness, independence, competitiveness, independent, affectionate, caring, sensitive to the needs of others, loyal, understanding, alpha female the same/different as the alpha male, success, leadership position, leadership role, women’s leadership, female leadership, male leadership, hierarchy, social hierarchy, alpha female identity
Appendix 2  Survey Instrument

PARTICIPATION AND WITHDRAWAL- You may withdraw at any time during the survey without consequences of any kind. You may also refuse to, answer any questions you do not want to, provide a hair sample or finger measurements and still remain in the study.

RIGHTS OF RESEARCH PARTICIPANTS-You are not waiving any legal claims, rights or remedies because of your participation. This study has received ethics clearance from the University of Toronto's Research Ethics Board. If you have any questions about your rights please contact Dean Sharpe, Research Ethics Manager, University of Toronto, 416-978-5585, dean.sharpe@utoronto.ca

* 1. I agree to participate in this study and complete the survey.
   (yes)
   (no)

* 2. Please select your age group
   (18-19)
   (20-29)
   (30-39)
   (40-49)
   (50-59)
   (60 and over)

* 3. Please select your highest level of education completed.
   (High school)
   (Diploma from college, junior college or trade school)
   (University undergraduate degree (bachelor's degree))
   (Master's degree)
   (Doctorate degree (including D.Ed, JD, MD, DVM, DSc, or PhD))
   (Other (please specify))
4. Please select your employment status
   - Unemployed
   - Part-time (under 35 hours)
   - Full-time (at least 35 hours)
   - self-employed/business owner

5. Please select your current income (not your family income).
   - NA
   - $10,000 to $40,000 per year
   - $40,000 to $70,000 per year
   - $70,000 to $100,000 per year
   - $100,000 to $130,000 per year
   - $130,000 to $160,000 per year
   - over $160,000 per year

6. Please select the management level that best describes your position at work.
   - non-management
   - low-management
   - mid-management
   - upper-management
   - NA

7. If others report to you at your place of employment, how many people do you supervise?

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* 8. As per Statistics Canada’s 2006 Census Report, the following represent ethnic groups in Canada. Please select which best describes your ethnicity.

- Black
- Chinese
- European
- Filipino
- Japanese
- Korean
- Latin American or Hispanic
- Middle Eastern
- Native (First Nations, Metis, Inuit or Native American)
- South Asian (India, Pakistan or Bangladesh)
- West Asian
- Southeast Asian
- Other (please specify)

For statements 10 to 26 please select the response that best describes your level of agreement.

* 9. I like to lead group projects.

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* 10. My friends know me as the leader

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* 11. In social settings I am usually quiet.

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* 12. I am destined to be a leader.

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* 13. I consider myself more introverted.

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* 15. I am assertive in what I want or believe.

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* 16. I am a dominant force in my areas of interest.

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* 17. As a woman, I don't consider myself that strong compared to men.

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* 18. I look forward to challenges.

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* 19. I consider myself tough.

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* 20. I'd rather be behind the scenes as opposed to the forefront.

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* 21. I am physically and mentally stronger than most women I know.

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* 22. I enjoy athletics and physical activity.

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* 23. I typically prefer to be persuasive rather than forceful.

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* 24. Instead of asserting my opinion, I prefer to build consensus.

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* 25. In the face of adversity I prefer coalition building rather than handling it on my own.

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* 26. I am good at making connections with people in new social settings.

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* 27. Which of the following best describes your marital status?

SN1

- Single
- Currently married and living together, or living with someone in a marital-like (partner or common-law) relationship
- In a relationship with boyfriend/girlfriend
- Recently divorced/separated from spouse, partner or common-law
- Widowed

* 28. How many children do you have?

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* 29. If you have adult or independent children (i.e. not still living with you), how many of them do you see or communicate with (including phone, texting and email) at least once every 2 weeks?

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* 30. If you have adult grandchildren how many of them do you see or communicate with (including phone, texting and email) at least once every 2 weeks?

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* 31. If your parents are living do you see or communicate with (including phone, texting and email) either of them at least once every 2 weeks?

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<th>mother only</th>
<th>father only</th>
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* 32. On average do you see or communicate with (including phone, texting and email) either of your spouse, common-law, or partner's parents at least once every 2 weeks?

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<th>no</th>
<th>mother only</th>
<th>father only</th>
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* 33. How many relatives other than your children or parents do you see or communicate with (including phone, texting and email) at least once every 2 weeks?

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* 34. How many close friends do you see or communicate with (including phone, texting and email) at least once every 2 weeks?

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* 35. If you belong to a church, temple, or other religious group how many members do you see or communicate with (including phone, texting and email) at least once every 2 weeks?

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* 36. If you are a student, how many fellow students or teachers do you regularly see or communicate with (including phone, texting and email) at least once every 2 weeks?

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* 37. How many of your neighbours do you visit or chat with at least once every 2 weeks?

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* 38. If you belong to any non-religious group(s) how many members do you see or communicate with (including phone, texting and email) at least once every 2 weeks?

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* 39. How many people at work (other than those you supervise) do you communicate with (including phone, texting and email) at least once every 2 weeks?

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</table>

* 40. If you volunteer, how many people involved in this volunteer work do you see or communicate with (including phone, texting and email) at least once every 2 weeks?

<table>
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<tr>
<th></th>
<th>0</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 or more</th>
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</table>

For items 41 to 62 please select the response which best describes your opinion or feelings about the statement provided. *Please answer how you feel about the statement rather than how you think you should or ought to feel about it.

* 41. We would have fewer problems if we treated people more equally.

<table>
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* 42. Some groups of people are simply inferior to other groups

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43. In getting what you want, it is sometimes necessary to use force against others

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44. Hierarchies exist in society, it is just a fact of life, and that is okay.

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45. We should do what we can to equalize conditions for different groups.

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46. Some people are just more deserving than others.

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<tbody>
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</table>

47. We should have increased social equality.

<table>
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<tbody>
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<td>SDO9</td>
<td></td>
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</tbody>
</table>

48. It is okay if some groups have more of chance in life than others.

<table>
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<tr>
<th></th>
<th>strongly disagree</th>
<th>disagree somewhat</th>
<th>neutral</th>
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<tbody>
<tr>
<td>SDO5</td>
<td></td>
<td></td>
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</tbody>
</table>

49. We should strive to make incomes as equal as possible

<table>
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<th>neutral</th>
<th>agree somewhat</th>
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<td>SDO8</td>
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50. To get ahead in life, it is sometimes necessary to step on others.

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<th>agree somewhat</th>
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<td>SDO7</td>
<td></td>
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51. Group equality should be our ideal.

<table>
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<tr>
<th></th>
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<th>neutral</th>
<th>agree somewhat</th>
<th>strongly agree</th>
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<tbody>
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<td>SDO10</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
52. No one group should dominant in society.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
<th>Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td>SDO10</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

53. I am satisfied with myself

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSES1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

54. Sometimes I think I am no good at all.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
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</thead>
<tbody>
<tr>
<td>RSES2</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

55. I feel I have many good qualities

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
<th>Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td>RSES3</td>
<td></td>
<td></td>
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</tbody>
</table>

56. I don't feel I have a lot to be proud of

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
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<td>RSES4</td>
<td></td>
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</tbody>
</table>

57. I am able to do things as well as most other people

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
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<tr>
<td>RSES5</td>
<td></td>
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</table>

58. Sometimes I feel useless

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
<th>Strongly Agree</th>
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<tbody>
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<td>RSES6</td>
<td></td>
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</tbody>
</table>

59. I feel I am a person of worth and on a equal plane with others

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td>RSES7</td>
<td></td>
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</tbody>
</table>

60. I wish I could have more respect for myself

<table>
<thead>
<tr>
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<th>Disagree Somewhat</th>
<th>Neutral</th>
<th>Agree Somewhat</th>
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<tr>
<td>RSES8</td>
<td></td>
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</tbody>
</table>
* 61. I often feel like a failure.

<table>
<thead>
<tr>
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<th>disagree somewhat</th>
<th>neutral</th>
<th>agree somewhat</th>
<th>strongly agree</th>
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<td>RSES9</td>
<td></td>
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</table>

* 62. I take a positive attitude towards myself.

<table>
<thead>
<tr>
<th></th>
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<th>neutral</th>
<th>agree somewhat</th>
<th>strongly agree</th>
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For the terms in questions 63 to 77 please rate yourself.

* 63. Aggressive

<table>
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<th>rarely</th>
<th>sometimes</th>
<th>often</th>
<th>always</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEMM1</td>
<td></td>
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* 64. Affectionate

<table>
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<tr>
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<th>always</th>
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<tbody>
<tr>
<td>BEMF1</td>
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* 65. Conscientious

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<tr>
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<th>rarely</th>
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<th>often</th>
<th>always</th>
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<tr>
<td>BEMN1</td>
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</table>

* 66. Ambitious

<table>
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<tr>
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<td>BEMM2</td>
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* 67. Gentle

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<th>always</th>
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* 68. Adaptable

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</table>
* 69. Assertive

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* 70. Loyal

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* 71. Reliable

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* 72. Competitive

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* 73. Sensitive to the needs of others

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<th>often</th>
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* 74. Likeable

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* 75. Independent

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<th>always</th>
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<td>BEMM5</td>
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</table>

* 76. Understanding

<table>
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* 77. Tactful

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</table>
* 78. Please select what best describes your level of stress during an average month.

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<th>moderate</th>
<th>high</th>
<th>very high</th>
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<td></td>
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* 79. If you exercise, on average, how many times per week do you exercise and for approximately how many minutes in total? If you do not exercise please enter "0" in both boxes.

B2

<table>
<thead>
<tr>
<th>times per week</th>
<th>minutes per week</th>
</tr>
</thead>
</table>

* 80. Describe the level of satisfaction and fulfillment you feel in your life.

<table>
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<th>moderate</th>
<th>high</th>
<th>extremely high</th>
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<td>LS</td>
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<td></td>
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</tbody>
</table>

81. Questions 81 to 86 relate to the leadership role you may or may not take in terms of your sexuality. If you do not wish to answer these questions simply skip them and proceed to question 87.

In an average month how many times do you engage in sexual intercourse?

S1

- none
- 1-5
- 6-10
- 10-15
- more than 15 times

82. What is your sexual preference?

<table>
<thead>
<tr>
<th></th>
<th>men</th>
<th>women</th>
<th>both</th>
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</thead>
<tbody>
<tr>
<td>S2</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

83. On a 5-point scale how much do you enjoy sexual intercourse (1=not at all and 5=very much).

S3

5 points max

84. How often do you initiate sex?

<table>
<thead>
<tr>
<th></th>
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<th>sometimes</th>
<th>half the time</th>
<th>most of the time</th>
<th>all the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4</td>
<td></td>
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</tbody>
</table>
85. How often do you play a lead or dominant role during your sexual encounters?

<table>
<thead>
<tr>
<th></th>
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<th>sometimes</th>
<th>half the time</th>
<th>most of the time</th>
<th>all the time</th>
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<td>S5</td>
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</table>

86. Please select your level of sexual experience (different partners)

<table>
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<th>low</th>
<th>what I think is average</th>
<th>high</th>
<th>very high</th>
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<tbody>
<tr>
<td>S6</td>
<td></td>
<td></td>
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</tbody>
</table>

* 87. Please identify whether you are left-handed, right-handed, or ambidextrous.

<table>
<thead>
<tr>
<th></th>
<th>left-handed</th>
<th>right-handed</th>
<th>ambidextrous</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td></td>
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</tbody>
</table>

---

In the popular media and academic literature, the term alpha woman/female has been used to describe women who view themselves as leaders, who feel a sense of dominance over others, who have others seek her guidance, who are extroverted, and who believe that men and women are equal.

* 88. Have you ever heard of the term the "alpha female" or "alpha woman"?

<table>
<thead>
<tr>
<th></th>
<th>no</th>
<th>yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 89. Please select the option that you feel is most true.

- The alpha woman exists solely as a construct of popular media and DOES NOT exist as a true identity in Canadian society.
- The alpha woman is more than just a construct of popular media and IS a valid identity in Canadian society.

* 90. Do you consider yourself an alpha woman?

<table>
<thead>
<tr>
<th></th>
<th>no</th>
<th>maybe</th>
<th>yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF2</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

* 91. Do you consider your mother an alpha woman?

<table>
<thead>
<tr>
<th></th>
<th>no</th>
<th>yes</th>
</tr>
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<tbody>
<tr>
<td>AF3</td>
<td></td>
<td></td>
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</tbody>
</table>
* 92. Do you consider your father an alpha man/male?

<table>
<thead>
<tr>
<th></th>
<th>no</th>
<th>yes</th>
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</thead>
<tbody>
<tr>
<td>AF3</td>
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</table>

93. Aside from your parents, have you had a mentor or role model (e.g. coach, relative etc.) as a child or teenager that was a strong positive influence on you?

<table>
<thead>
<tr>
<th></th>
<th>no</th>
<th>yes</th>
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<tbody>
<tr>
<td>AF3</td>
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</table>

* 94. The alpha woman is a positive female identity.

<table>
<thead>
<tr>
<th>level of agreement</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
</tr>
</thead>
</table>

95. The potential relationship between hormone levels and women’s leadership is also being evaluated. Please confirm if you agree to provide a hair sample and finger measurements. If you qualify, you will be contacted directly by Monika and your information will remain confidential and assigned a random number. If you do not wish to participate in this part of the study simply skip this question and the survey will end.

Name

Email

Contact # (optional)

Any hormonal therapy (i.e. birth control or hormone replacement therapy)

* 96. This question relates to your hormonal levels. Please select which best describes your menstrual cycle.

<table>
<thead>
<tr>
<th></th>
<th>regular (roughly 28 to 35 days)</th>
<th>irregular (changes from month to month)</th>
<th>peri-menopausal (transitioning into menopause)</th>
<th>menopausal</th>
<th>post-menopausal</th>
</tr>
</thead>
<tbody>
<tr>
<td>B3</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Appendix 3 - BSRI-M, BSRI-F, & BSRI-N (Bem, 1977)

BSRI-M
1. Aggressive
2. Ambitious
3. Assertive
4. Competitive
5. Independent

BSRI-F
1. Affectionate
2. Gentle
3. Loyal
4. Sensitive to the needs of others
5. Understanding

BSRI-N
1. Conscientious
2. Adaptable
3. Reliable
4. Likeable
5. Tactful

Note: All items were scored on a 5-point Likert Scale from never (1) to always (5)

Appendix 4 Collaboration Index (CI) (Sumra, 2019)
1. Q23-MSPO I typically prefer to be persuasive rather than forceful.
2. Q24-MSCONO Instead of asserting my opinion, I prefer to build consensus
3. Q25-MSCOAO In the face of adversity I prefer coalition building rather than handling it on my own
4. Q26-MSAFFO I am good at making connections with people in new social settings
Appendix 5 Alpha Female Inventory (AFI) – (Ward et al., 2010)

AFI-L
1. I like to lead group projects
2. My friends know me as the leader
3. I am a dominant force in my areas of interest
4. I am assertive in what I want and believe
5. I am destined to be a leader
6. I look forward to challenges

AFI-S
7. I consider myself tough
8. I am physically and mentally stronger than most women I know
9. I am just a girl. I don’t consider myself that strong. MODIFIED “As a woman, I don't consider myself that strong compared to men”
10. I enjoy athletics and physical activity

AFI-LI
11. I consider myself rather shy
12. In social settings, I am usually quiet.
13. I consider myself to be more introverted – MODIFIED “I CONSIDER MYSELF MORE INTROVERTED”
14. I’d rather be behind the scenes as opposed to the forefront

Note: All items were scored on a 5-point Likert Scale from strongly disagree (1) to strongly agree (5). Items 9, 11, 12, 13 and 14 were reverse coded.

Appendix 6 Rosenberg Self Esteem Scale (Rosenberg, 1965)
1. I am satisfied with myself
2. Sometimes I think I am no good at all
3. I have many good qualities
4. I am able to do things as well as most other people
5. I don’t feel I have a lot to be proud of
6. Sometimes I feel useless
7. I feel that I am a person of worth, at least on an equal plane with others
8. I wish I could have more respect for myself
9. I often feel like a failure
10. I take a positive attitude toward myself

Note: All items were scored on a 5-point Likert Scale from strongly disagree (1) to strongly agree (5). Items 2, 5, 6, 8, and 9 were reverse coded.
Appendix 7 Alpha Female Sexuality Profile (Sumra, 2019)
1. In an average month how many times do you engage in sexual intercourse?
   None, 1-5, 6-10, 10-15, more than 15 times
2. What is your sexual preference?
   men, women, both
3. How often do you initiate sex?
   never, sometimes, half the time, most of the time
4. How often do you play a lead or dominant role during your sexual encounters?
   never, sometimes, half the time, most of the time, all the time
5. On a 5-point scale how much do you enjoy sexual intercourse?
   1=not at all and 5=very much
6. Please select your level of sexual experience (different partners).
   very low, low, what I think is average, high

Appendix 8 Social Dominance Orientation Scale (Pratto et al., 1994)
1. We would have fewer problems if we treated people more equally
2. Some groups of people are simply inferior to others
3. In getting what you want it is sometimes necessary to use force against others
4. Hierarchies exist in society. It’s just a fact of life, and that is ok
5. We should do what we can to equalize conditions for different groups
6. Some people are just more deserving than others
7. We should have increased social equality
8. It is ok if some groups have more of a chance in life than others
9. We should strive to make incomes as equal as possible
10. To get ahead in life it is sometimes necessary to step on others
11. Group equality should be our ideal
12. No one group should be dominant in society

Note: All items were scored on a 5-point Likert Scale from strongly disagree (1) to strongly agree (5). Items 2, 3, 4, 6, 8, and 10 were reverse coded.