THE ALLOMOTHERING HYPOTHESIS: AN EXAMINATION OF THE ADAPTIVENESS
OF FEMALE SEXUAL FLUIDITY IN SELF IDENTIFIED HETEROSEXUAL AND
MOSTLY STRAIGHT WOMEN

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The Allomothering Hypothesis: An Examination of the Adaptedness of Female Sexual Fluidity in Self-Identified Heterosexual and Mostly Straight Women

Doctor of Philosophy Spring 2016

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Abstract

Exclusive same-sex sexual behaviour is problematic from the viewpoint of evolutionary theory because one of evolutionary psychology's fundamental tenets is that species need to survive and reproduce. I contend that female sexual fluidity is an evolved predisposition in heterosexual women and the behaviour evolved as a result of the need for allomothering—helping each other's offspring survive—and also providing assistance with survival of the females themselves. The Allomothering hypothesis asserts that same-sex sexual behaviour can be adaptive in condition-dependent circumstances because it promotes pair bonds that ultimately contribute to the survival of offspring. A revised definition of sexual fluidity, one that is different from the traditional definition, was devised. In this dissertation the revised definition states “sexual fluidity occurs when self-identified heterosexual (straight) or predominantly heterosexual females experience short-term fleeting physical (sexual) attraction to and/or a deep emotional connection (like romantic love) with other females in a condition-dependent circumstance.” Four studies were conducted to find evidence in support of the allomothering hypothesis. The first study compared self-identified heterosexual (mostly straight) women and men in terms of same-sex sexual experience. Overall, women more than men have engaged in various dimensions of same-sex sexual behaviour. The second study compared pornography geared toward heterosexual women and pornography geared toward heterosexual men. Female

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same-sex sexual behaviour occurred in almost all the top selling movies for both heterosexual women and men. The third study tested the allomothering hypothesis by having self-identified heterosexual (mostly straight) women who have engaged in same-sex sexual behaviour rate the person they had the experience with on “good mothering traits.” The more the women enjoyed same-sex sexual behaviour, the higher they rated the person they had the sexual experience with. Various aspects of same-sex sexual behaviour among heterosexual (mostly straight) women and allomothering were explored. The final study was an assessment of captive Bonobos (*Pan paniscus*) at the Milwaukee Zoo. Bonobos are humans’ closest genetic relative along with Chimpanzees (*Pan troglodytes*). The study examined the connection between female same-sex sexual activity among bonobos in relation to pair bonding, grooming, play, and allomothering.

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Dedication

For my wife, Michele Quinlan

Thank you for your unwavering encouragement for all these years, and for being my constant source of support as I embarked on my graduate school journey. You have been positive, patient (I could go on) and extremely understanding through the whole process. I could not have done it without you. I love you.

“Let everything happen to you, beauty and terror, just keep going, no feeling is final.”

-Rainer Maria Rilke

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Chapter 1: Introduction

There has been substantial debate within the field of evolutionary psychology concerning the topic of sexual orientation. Exclusive same-sex behaviour is problematic from the viewpoint of evolutionary theory because one of evolutionary psychology's fundamental tenets is that species need to survive and reproduce. Humans (*Homo sapiens*) are (so far) the only species where exclusive same-sex behaviour is observed, for which there are several possible explanations. As with every living organism, humans are influenced by biological and social factors thus, the interaction of biological and sociocultural factors make the human animal complex in the formation of behaviour, including same-sex sexual behaviour. Non-human animals that are extremely social (those that have a highly developed frontal lobe) and have rudimentary forms of culture—for example, dolphins and bonobos—in conjunction with the influence of biological factors, have been observed to engage in same-sex sexual behaviour, much like humans (Poiani, 2010). There are some instances of same-sex sexual behaviour in birds and lizards (Bagemihl, 1999). However in humans, cultural factors may mask the expression of same-sex sexual behaviour and that makes it a difficult subject to investigate (Bagemihl, 1999).

Before discussing human same-sex sexual behaviour, however, a brief description of non-human animals and same-sex sexual behaviour will serve to highlight the existence of the behaviour in the animal kingdom and show that same-sex sexual behaviour does exist and that it does not thwart reproduction. Numerous animals engage in periodic same-sex behaviour, including dolphins, elephants, monkeys, and great apes (Bagemihl, 1999). The closest living relative of humans, the bonobo (*Pan paniscus*), is

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the most striking example of a primate who engages in tremendous amounts of same-sex sexual behaviour (Kano, 1992). All bonobo troop members engage in same-sex and other-sex behaviour, but same-sex sexual behaviour is especially apparent in female bonobos (Furuichi, 1989; Kano, 1992).

Although reproduction is the crux of evolutionary psychology, an organism who cannot survive to the age of reproduction, or help their own offspring to survive, will be a genetic dead end, meaning the genes of the organism will not have been passed on. Assistance of many kinds, including cooperation, alliances, pair bonding, and, at times, same-sex sexual behaviour can enhance an organism's chance to survive and to sustain survival of its offspring. Same-sex sexual behaviour, then, does exist in the animal kingdom, and does so without interfering with reproduction. Humans may be similar to bonobos and dolphins in that they engage in same-sex sexual behaviour and human reproduction is not thwarted.

Human female same-sex sexual behaviour is dissimilar to male same-sex sexual behaviour (Kinnish, 2005; Kinsey, Pomeroy & Martin, 1952; Rieger, Cash, Merrill, Rounds et al., 2015). However, the study of female same-sex behaviour development was once (and often still is) amalgamated with the study of male same-sex sexual behaviour development (McCoy, 2000; Stamos, 2008; Walsh & Andre, 2010). Two points of view emerge: the first is that females are generally different from males with respect to same-sex sexual interaction, and the second is that they are in fact similar, in that they go through the same trajectory to reach the point of engaging in same-sex sexual behaviour (Hamer & Copeland, 1994). As a result of the discrepancy, it is difficult to assess female same-sex behaviour from an evolutionary perspective. There is not abundant research on

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female same-sex behaviour and there are different degrees of same-sex sexual behaviour among females. Some females follow a typical male trajectory in their development of same-sex sexual behaviour, however, females more than males generally come to the realization of their same-sex sexual behaviour in various ways (Diamond, 2008; Walsh & Andre, 2010). For example, there are women who have self-identified as heterosexual most of their lives who are deemed “late bloomers” and engage in female same-sex sexual behaviour usually after they have been married to men and have had offspring (many women purport that they were not suppressing same-sex attraction) the same phenomenon is generally not observed in self-identified heterosexual males (LeVay, 2011; McCoy, 2000; Strock 2008). There are many lesbians who are similar to gay men in their sexual orientation development in that they knew they were attracted to the same-sex when they children (LeVay, 2011). Similar to gay men, many lesbians also “come out of the closet” at a point in life and identify as a lesbian for their entire lives (LeVay, 2011). Generally, more women self-identify as bisexual compared to men (Diamond, 2008; LeVay, 2011; Rieger et al, 2015) and women are also noted to have more of a “plasticity” to their orientation in that women who are seemingly heterosexual engage in more same-sex sexual behaviour (for long or short duration of time) compared to men (Baumeister, 2000; Diamond, 2008; LeVay, 2011).

The most recent term that has been associated with female same-sex sexual behaviour is “sexual fluidity.” The term was coined by Diamond (2008), who conducted an eight-year longitudinal study of 80 females of various sexual orientations and found that the females often shifted in this respect. For example, at one point in the study, a female identified as homosexual, but two years later she labeled herself as heterosexual

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(Diamond, 2005, 2007, 2008). That kind of back and forth shifting happened to many of the females Diamond studied. Diamond's (2008) groundbreaking work struck a cord within sexual orientation research. Many females are not binary, but are instead what she calls "sexually fluid." Diamond (2008, pg. 3) defines sexual fluidity as the "situation-dependent flexibility in women's sexual responsiveness. This flexibility makes it possible for some women to experience desires for either men or women under certain circumstances, regardless of their overall sexual orientation." Situation-dependent flexibility" can include various circumstances such as where women might socialize, such as a nightclub, school, or work (Diamond, 2008). Diamond includes all females (from heterosexual to homosexual) in her definition of sexual fluidity, while the newer definition does not. Diamond's definition suggests that sexual fluidity involves a major shift (sometimes recurring) for a definite period of time. Thus, the person is switching orientations. Sexual fluidity is a newer branch of research and there may be various forms of sexual fluidity and new definitions of what sexual fluidity entails may surface as more research is conducted.

What follows is my own modified definition of sexual fluidity for the purpose of this dissertation. The new definition came to fruition as my own data revealed that many women who label themselves as "completely heterosexual" or "mostly straight" engage in same-sex sexual behaviour. Thus, sexual fluidity occurs when self-identified heterosexual (straight) or predominantly heterosexual females experience short-term fleeting physical (sexual) attraction to and/or a deep emotional connection (like romantic love) with other females in a condition-dependent circumstance" (Radtke, 2013). The new definition focuses on self-identified *heterosexual* (mostly straight) women who

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sometimes engage in same-sex sexual behaviour, rather than women with other sexual orientations (bisexual, lesbian, etc.) as Diamond (2008) has done.

The overall goal is to present the allomothering hypothesis as an answer to the question of why many heterosexual (mostly straight) women (but not men) have a predisposition to engage in fleeting same-sex sexual behaviour. This dissertation argues that women needed extra help in raising offspring and in helping themselves survive in the Environment of Evolutionary Adaptedness (EEA). The EEA is an environment in which a species is adapted (Tooby & Cosmides, 1990). The human species emerged roughly 200,000 years ago, therefore the human brain is in large part optimized for the environmental conditions of that time period (Tooby & Cosmides, 1990). Evolution and natural selection is a slow process, therefore the human brain is “ancestral” in that it is optimized for survival in an environment that existed eons ago.

I argue that females thus engaged in allomothering behaviour, a phenomenon in which the raising of offspring is carried out by anyone who is not the biological mother of that offspring (Hrdy, 2008, 1999). Allomothering behaviour is found in various cultures around the world and in many animal species (Hrdy, 1999; 2008). Receiving help from other women in the EEA may have been critical for the survival of many women (Fletcher, Simpson, Cambell, & Overall, 2015). An essential strategy to keep a dyad close is through sexual activity (Crenshaw, 1996; Meston & Buss, 2009).

Before proceeding further, it is imperative that the point be made that the current dissertation is examining general trends in the population. It is not examining exceptions to the rule. For example, there are many sections throughout the dissertation that describe self-identified heterosexual women as being more open to same-sex sexual behaviour

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relative to males. Further, women report tendencies of bisexuality more often compared to men and also are presented as being more sexually fluid compared to men. I am not arguing that there are no sexually fluid or bisexual men, or men who self identify as heterosexual but engage in same-sex sexual behaviour. Nor do I argue that all heterosexual women will experience sexual fluidity in their lifetime. I do, however, argue that there are fewer men who have this experience.

Research Background and Motivations

The motivation for conducting research on female same-sex sexual behaviour development stems in part, from my undergraduate thesis work (Radtke, 2006). The thesis compared gay and straight males. The thesis investigated the differences between gay males and straight males sexual behaviour, their desire to engage in sexual behaviour, and the amount of casual sex behaviour both groups of males preferred. The study used the Sociosexual Orientation Inventory (SOI) created by Simpson (1991) which assesses desire to engage in casual sex, the number of casual sex partners, and how many sex partners a person wants. The SOI also measures attitudes toward casual sex. The goal of my undergraduate thesis was to investigate male mating strategies and what would occur if no females were involved.

The thesis was conducted within an evolutionary framework where it was hypothesized that gay men would have much higher rates of casual sex partners and sex partners in general because only men are involved. The hypothesis was supported. Although they wanted many casual sex partners, because women's mating strategies are different, straight men generally did not have as many casual sex partners or sexual partners in general as compared to the gay males. Notably, most males (whether

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heterosexual or homosexual) scored at the extreme ends of the Kinsey Scale meaning they were either heterosexual or homosexual.

With no strategic interference (females are involved in a gay man's sexual life), a pattern emerged. Both gay and straight males had similar attitudes towards casual sex and wanting many sex partners. However, gay males had substantially more sexual partners compared to straight males, presumably because the gay male's mating strategy was not blocked by any female mating strategy. During recruitment, males were asked to define their sexual orientation and fill out the Kinsey Scale of Sexual Orientation, which is a seven-point scale that measures how a person identifies in terms of sexual orientation. If a person scores a zero then they identify as exclusively heterosexual, if they score a six, the person identifies as completely homosexual, and if a person scores from one to five, they are somewhere in between completely heterosexual or homosexual (Kinsey et al., 1952) (discussed in more detail later). Out of 210 males, only 3 identified as bisexual. The finding is in keeping with studies such as that of Savin-Williams and Ream (2007), which demonstrated that females identified themselves as bisexual or lesbian more frequently than males. Similarly, a Norwegian study found that females reported more instances of attraction, sexual fantasy, and romantic feelings towards the same sex when compared to males (Wichstrom & Hegna, 2003).

My master's thesis (Radtke, 2009), on the other hand, focused only on females, and considered various aspects of sexual orientation and activity. The goal was to investigate distinctions between homosexual and heterosexual females. During these female-only studies, patterns started emerging. Unlike males, females were not scoring at the extreme ends of the Kinsey Scale of Sexual Orientation (completely heterosexual or

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homosexual). There were stark differences within the female participants with respect to their sexual orientation development. Further, the study found that certain terminology, such as “bisexual,” does not accurately represent many females. There were many reasons or ways that females came to engage in same-sex sexual behaviour; there was not a general script to which females adhered. At the time (2009 and currently), there was a small amount of literature on the evolutionary explanations of female same-sex behaviour. To further investigate the issue of evolutionary reasons for same-sex sexual behaviour, I researched non-human same-sex sexual behaviour and found that the bonobo (*Pan paniscus*), displayed prominent female same-sex behaviour. The bonobos also seemed to engage in allomothering behaviour. Bonobos are as closely related genetically to humans as the common chimpanzee (*Pan troglodytes*).

With this in mind, bonobos were investigated because female bonobos engage in daily same-sex sexual behaviour as well as other-sex behaviour (Kano, 1992). As a result, they could be an interesting model for human females and same-sex sexual behaviour from an evolutionary perspective. After researching bonobos, the allomothering hypothesis was developed to test a certain kind of sexual fluidity. Thus, allomothering and sexual fluidity are key components to test the hypothesis that same-sex sexual behaviour is apparent in heterosexual females. The dissertation also examined males regarding sexual fluidity in order to determine if sexual fluidity is a sex-specific trait.

There have been theories put forth regarding male same-sex sexual behaviour from an evolutionary perspective (Hamer & Copeland, 1994; Wilson, 1978). However, as noted, there is very little research on possible evolutionary reasons for female same-sex sexual behaviour. Diamond’s (2008) mentions a “readiness” among many females, but

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not males, for same-sex sexual behaviour. No explanation is given for why there may be this “readiness.” Why would there be a predisposition for same-sex sexual behaviour in many heterosexual women, but not heterosexual men? Research was needed to investigate whether a “readiness” for same-sex sexual behaviour in heterosexual females indicates a possible biological/evolutionary explanation.

Evolution and Same-Sex Sexual Behaviour in Females: A Gap in the Literature

Same-sex sexual behaviour in males has been examined from an evolutionary perspective (Wilson, 1978; McKnight, 2007). The most notable theory is Wilson’s kin selection theory (1978). Wilson (1978) postulated that gay males incur inclusive fitness benefits by helping close kin (siblings, nieces, nephews, cousins) survive and reproduce, instead of reproducing themselves (McKnight 2007; Wilson, 1978). By doing so, they increase their genetic lineage via inclusive fitness. Inclusive fitness is the notion that people are more likely to help their relatives than help strangers, as their relatives share their genes (Wilson, 1978). Further, male same-sex sexual behaviour has generally been attributed to genes, thus making male homosexuality a rigid, non-fluid orientation (Baumeister, 2000; Hamer & Copeland, 1994; Safron et al., 2007). Wilson’s prominent theory has generated results that do not support the hypothesis and some that do (Bobrow & Bailey, 2001; Rahman & Hull, 2005). Other evolutionary explanations for male homosexuality include a gene that is present in gay men but also in heterosexual women, the gene in women increases chances of her fecundity, therefore the gene is not weeded out by natural selection (Camperio, Corna, & Capiluppi, 2004).

There is a large gap in the evolutionary literature regarding female same-sex behaviour. Human females have often been overlooked in research of same-sex sexual

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behaviour from an evolutionary perspective and at times sexual development in general, because they are often thought to develop in a fashion analogous to males (Hrdy, 1981; Gowaty, 2003; Barash & Lipton, 2001).

The Allomothering Hypothesis

The main concept that will be discussed is female sexual fluidity, which I propose is linked to allomothering. Evidence of sexual fluidity is exemplified by many supposedly heterosexual women who have engaged in same-sex sexual behaviour, and at times, questioned their sexual identity (Diamond, 2008; Morgan & Thompson, 2011; Rieger et al, 2014). Morgan and Thompson (2011) found that among heterosexual females, 67% had previously questioned their sexual identity, and many of these females engaged in same-sex sexual behaviour at some point in their lives (the specific behaviours were not identified).

Condition-dependent circumstances are situations that may cause same-sex sexual behaviour to occur. Some of these circumstances are likely different from what occurred 200,000 years ago in human evolutionary history but some conditions may be similar. For example, in the Environment of Evolutionary Adaptiveness, a condition-dependent circumstance might have been the death of the father of a female's offspring. Another circumstance is a female's male partner leaving the relationship for another female. In such a situation, that female's mate-value generally will decline (Buss, 1989, 2004; Schmitt, 2003), making it difficult to secure another relationship with a man, at least until offspring was old enough to fend for itself, that being around age seven or eight (Hrdy, 2008). These females were placed in a precarious situation in that they needed help in raising offspring, an extremely difficult task. Often help came in the form of

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allomothering by non-kin (Hrdy, 2008). Females may then have engaged in same-sex sexual behaviour with other females in the same predicament, thus acquiring assistance in surviving and raising offspring. Female sexual bonding may increase the survival rate of each female's offspring and increase the chances of survival of the mother(s). The female dyad would help protect each other's offspring, engage in food sharing, protection from predators, unruly males, unruly kin, and other factors that existed in the EEA and currently as well.

I propose females engage in same-sex sexual behaviour to secure a strong pair bond and subsequently engage in allomothering behaviours if conditions are optimal for allomothering to occur. The sexual behaviour(s) can range from intimate body contact, heavy petting, oral sex, light or heavy kissing, and so on. Sex is not only for reproduction but is also behaviour used to pair-bond individuals (Crenshaw, 1996; Meston & Buss, 2010; Wilson, 1978). Physical and emotional love can occur separately or together (Diamond, 2008, 2010). Physical love is the kind of love associated with sexual attraction and desire for intimate sexual activity, and emotional love is associated with romance and a desire for emotional closeness and intimacy, often associated with a romantic type of love feeling (Diamond, 2008, 2010). Sexual behaviour increases key bonding chemicals such as oxytocin and progesterone, which, when it is produced in the body, helps to bond dyads (Chapais, 2008; Crenshaw, 1996; Fleischman, Fessler, & Cholakians, 2014; Meston & Buss, 2010). Therefore, females who engage in same-sex sexual behaviour are, in theory, more bonded to each other than females who are "just friends." As females help each other in raising offspring, just as in a heterosexual dyad, the pair becomes emotionally close with one another, forming a resilient pair bond (Hrdy, 2008). Sexual

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contact is a way to strengthen pair bonds between two individuals (Crenshaw, 1996; Fletcher, Simpson, Campbell & Overall, 2015). As the allomother dyad grows stronger in terms of emotional and physical love, I propose it is likely that women would be more invested in their non-related offspring as they care very much for the biological mother. The relationship is a reciprocal one as both females can rely on each other for help in rearing each other's offspring. One of the key arguments of the theory presented in this dissertation is that intimate sexual contact dramatically increases the bond between individuals, more so than a close friendship without sexual contact (Crenshaw, 1996; Kirshenbaum, 2011).

Females form very close relationships with other women and often describe close female friends in terms that are similar to male lovers (Goodman & O'Brien, 2000; Morgan & Thompson, 2006). Women often become jealous when a very close friend begins a friendship with another woman; further, women often report feeling excited and nervous (similar to the beginning of a romantic relationship) when meeting with a new friend (Goodman & O'Brien, 2000). Even though the need for assistance in raising offspring may not be as urgent in the current environment compared to the EEA, I argue that the underlying mechanism of engaging in same-sex behaviour exists, and can be elicited by close female contact whether in a friendship context, or a social environment (such as a nightclub), or by being surrounded by many females, like in a University residence environment (Walsh & Andre, 2010). There are many circumstances where same-sex sexual behaviour in heterosexual women can be stimulated.

Each chapter in this dissertation will contribute to the argument that heterosexual women have a predisposition to engage in same-sex sexual behaviour, and that it is a sex-

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specific trait. Four studies will provide evidence that heterosexual (straight) or mostly straight women are “readied” for same-sex sexual behaviour and that it is often a covert readiness. The theory argues most women are predisposed to this same-sex sexual behaviour—“sexual fluidity”—because of allomothering benefits. Four studies will be presented that explore sexual fluidity and allomothering.

Rationale for Studies

The goal of study one was to compare self identified heterosexual females versus heterosexual males regarding several facets of same-sex sexual behaviour. The study examines females and males across sexual orientation using Diamond’s (2010) Scale “Assessing Multiple Facets of Attraction to Women and Men” and Kinsey Scale (Kinsey et al., 1952) scores. The study compares women and men who self-identify as straight and how often they engage in same-sex sexual behaviour. Then, only those individuals who identify as heterosexual were tested to examine if females and males who self identify as heterosexual engage in same-sex sexual behaviour. Four components were measured: Same-sex physical attraction, emotional attraction, sexual fantasies and sexual behaviour. Both women and men were asked to write down the percentage of attraction they felt to women over men on the dimensions listed. A section of the Human Sexuality Questionnaire (Zuckerman, 2010) on same-sex behaviour was also administered to self-identified heterosexual women and men to investigate engagement in same-sex sexual behaviour. The study demonstrates that heterosexual (straight) or mostly straight women engage in more same-sex sexual behaviour compared to men.

The goal of study two was to investigate if female same-sex behaviour activity was included in pornography made for heterosexual women. Further, since I argue that sexual

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fluidity is a female sex specific trait, an examination of pornography was conducted to assess if male same-sex behaviour appeared in pornography made for heterosexual males. The pornography industry, which generates billions of dollars each year and can illuminate what men and women generally want to watch as the industry depends on what the audience buys (Pound, 2002). Most of the movies have generally been geared towards men, either heterosexual or homosexual (Buss, 1994; Pound, 2002). It was once thought the only men enjoyed visual sexual stimulation; however, women also enjoy visual sexual stimulation but many women are not satisfied with heterosexual pornography that is made for men, rather they are more likely to enjoy pornography that is catered to female audience (Lust, 2010). Many heterosexual females do not enjoy pornography that is made for a straight male audience, and so several female pornography directors have started to produce movies that are geared for a heterosexual female audience (Lust, 2010). The top-selling pornography made for heterosexual men and heterosexual women was analyzed to see how many same-sex scenes were in each, and to see whether the appearance of male-male same-sex behaviour appears in pornography made for both heterosexual women and men and to assess if female same-sex sexual behaviour was included in movies made for males and movies made for females.

Ultimately, the reasoning behind the pornography study is that if heterosexual females have a predisposed capacity to engage in same-sex sexual behaviour, it may manifest itself in movies made by women for a heterosexual female audience.

Pornography exploits the desires of what many women and men desire and fantasize about (Fahr, 2007; Pound, 2002). The best-selling movies made for women and the best-selling movies made for men were compared for same-sex sexual content.

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The third study aims to determine if some women who self-identify as heterosexual enjoy same-sex contact, and more importantly if they think that women with whom they had the last same-sex contact has the traits of a good mother, and, which traits and behaviours they take to be those of a “good mother.” Further, the study asked if the heterosexual women would leave their offspring, for either a long or short duration of time, with the women with which they had had the same-sex sexual experience. Essentially, the study tests the allomothering hypothesis.

Finally, the fourth study is on bonobos, a species where females engage in same-sex sexual behaviour and possibly accrue the benefits of allomothering from other members of the troop by using sexual contact to increase pair bonding. The goal of the study was to examine if bonobo females groomed certain bonobo females more than others, and if that related to the amount of genito-genital rubbing. Further, the goal was to see if there was an allomothering link among those bonobos. The question of the relationship between this behaviour in bonobos and human same-sex behaviour in females has never directly been studied; this seem like a species, however, that could provide valuable insight into human female same-sex sexual behaviour, bonding, and allomothering. By observing a troop of bonobos for three months at the Milwaukee Zoo, the grooming and sexual partner preference of bonobos, along with their allomothering relationships, was studied.

Conclusion

As a result of a study of sexual fluidity and allomothering (Kuhle & Radtke 2013), I now have a new understanding of sexual fluidity, as well as a reason for my modification of Diamond's (2008) original definition. Kuhle and Radtke (2013) did not actually test any hypotheses; the current dissertation will add to this research by testing the allomothering hypothesis in relation to sexual fluidity and survival. The next section outlines additional research that sheds light on the sexual fluidity of females.

To reiterate, when Diamond discusses sexual fluidity, she includes all sexual orientations; when this dissertation refers to sexual fluidity in the discussion, it refers specifically to self-identified heterosexual women who engage in fleeting same-sex sexual behaviour. "Sexual fluidity," as Diamond utilizes it, is not defined in a way that suits the conducted research. A more refined definition was needed, and that became clear after the literature review and the results of the data for the dissertation. Sexual fluidity as redefined is likely a more narrow band of Diamond's sexual fluidity; there may be other types of fluidity, but, for the purposes of the evolutionary arguments of sexual fluidity and allomothering presented in this dissertation, the revised definition is better-suited.

Chapter 2:

A History of Sexual Orientation Research:

Literature Review on Sexual Orientation, Bisexuality, and Fluidity

Defining “sexual orientation” is not a simple task, and it is especially difficult when it involves females. Female sexual orientation has traditionally been fused with male sexual orientation development and the terms used to describe females and males in this context are the same—for example, “gay,” “straight,” or “bisexual” (Lippa, 2005). As more studies on female sexual orientation have taken place, however, results have shown that female and male sexual orientation is dissimilar (Baumeister, 2000; Diamond, 2008; Pillard & Bailey, 1998). Often, female sexual orientation does not fit into the male default model of sexual orientation development (Gowaty, 2003). For example, many males often report that they knew they were gay from an early age, while not as many females report knowing so early, although they sometimes recollect that they knew they had attraction towards females since childhood (Diamond, 2008). Further, many males go through stages, culminating with “coming out of the closet,” where they announce to people that they are gay, which is not the case for many females. Once the process of coming out occurs, it has traditionally been thought that sexuality remains stable over a person’s lifetime (Garnets & Kimmel, 2003).

Components of Sexual Orientation: Behaviour, Fantasy, and Attraction

There is an ambiguity in what is meant by the term “sexual orientation.” As will be discussed, women can experience physiological (genital) arousal even if they indicate that they are not subjectively aroused. Genital responding studies thus highlight the difficulty in defining “sexual orientation.” For example, if a female is physiologically,

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but not subjectively, aroused by two females performing a sexual act, what is her sexual orientation? Is sexual orientation defined by what causes a person to become genitally aroused, or her genitals respond to these stimuli, should this response determine her sexual orientation? As Chivers et al. (2004, 2007, 2010) have demonstrated, females show a disconnect between what they think they find arousing (subjective arousal) and what their genitals actually find arousing (objective arousal). Objective arousal may indeed reveal that women are more likely than men to exhibit fluid behaviour, same-sex attraction, or same-sex fantasy in their lives, despite what women subjectively report when asked (Chivers et al., 2004). Sexual behaviour is when a person actually engages in same-sex sexual behaviour. The behaviour can vary from lightly intimate (kissing) to genital sexual contact. Attraction is when a person feels sexually attracted to someone but may or many not disclose that information. Sexual fantasy is when a person sexually fantasizes about a person, sometimes fantasy indicates a behaviour that some actually wants to engage in, but in some cases, fantasy may be sexual thoughts a person will never act on (Garnets & Kimmel, 2003). Emotional attraction is when a person feels a close romantic feeling toward another person. Individuals may feel all three components at once or experience each separately (Diamond, 2008; Walsh & Andre, 2010).

Researchers debate what sexual orientation means and how it should be conceptualized. Some have argued that sexual orientation reflects what a person imagines and fantasizes about (Garnets & Kimmel, 2003). For example, a woman may be married to a man her entire life, but be a lesbian; she can hide her sexual orientation to the outside world, but internally she may feel attracted to, and fantasize about, other females. Further, there are differences between physical attraction and emotional attraction

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(Diamond, 2008; Garnets & Kimmel, 2003). Often emotional and physical attractions are in sync; however, sometimes they occur separately, as has been found in many narratives describing same-sex attraction in women (Diamond, 2008; Levin & Blitzer, 2006; Walsh & Andre, 2010). Many women have reported that they first had very strong emotional feelings for another woman, which then manifested into physical attraction (Diamond, 2008; McCoy, 2000; Walsh & Andre, 2010). Other women proclaim themselves to be only physically attracted to women, but would not have a romantic relationship with a woman (Diamond, 2008; Walsh & Andre, 2010). These scenarios describe the many different trajectories of how females engage in same-sex behaviour.

As noted above, the standard terminology of sexual orientation for women is often limited to “heterosexual,” “bisexual,” or “gay or lesbian” (Hutchins & Kaahumanu, 1991). Moreover, it is traditionally thought that individuals fit into these discrete categories and that no change in orientation will occur over someone’s lifetime (Diamond, 2008). However, these are not the only terms by which women label their sexual orientation. There is “queer,” which is someone who is a member of the gay community in some way (Baumgardner, 2007). Queer can also mean someone who is politically active in the gay and lesbian community (Baumgardner, 2007). “A lesbian who has sex with men” describes lesbians who are mostly attracted to other women, but sometimes have sexual relationships with men (Hutchins & Kaahumanu, 1991). “Bi-curious” is a term that usually refers to women who identify as straight but occasionally have a desire to engage in a sexual relationship with another woman (Diamond, 2008; Walsh & Andre, 2010). “Has-bian,” is a term used to describe a female who was once defined as a lesbian but is now in a relationship with a male; this term is often used in a

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pejorative manner (Diamond, 2008; Walsh & Andre, 2010). “Bi-lesbian” is similar to “lesbian who has sex with men,” but a bi-lesbian may desire more sexual relationships with men (Hutchins & Kaahumanu, 1991; Walsh & Andre, 2010). “Pansexual” is a person who does not consider gender when entering a relationship; a pansexual may claim to fall in love with the person rather than their gender (Walsh & Andre, 2010). “LUG” is an acronym for “Lesbians Until Graduation,” meaning females in their college years that experiment sexually with other women and then cease this behaviour once they have graduated (Walsh & Andre, 2010). Finally there are women who do not want to put any sort of label on their sexual orientation (Baumgardner, 2007; Diamond, 2008; Hutchins & Kaahumanu, 1991; Walsh & Andre, 2010). The terms described for female sexual orientation are non-exhaustive; they are simply meant to indicate that there are many ways to describe female sexuality.

When examining sexual orientation terms for men, there are fewer labels than those used for women. There are more terms indicating what a gay man prefers to do sexually—such as being a “bottom” or a “top” or both—than there are labels defining his sexual orientation and sexual identity. The term “bisexual” is used to indicate that a man is sexually interested in women and men, however, the numerous sub-categories of same-sex behaviour used in defining women’s sexual orientation is rarely applied to men (Hamer & Copeland, 1994; Garnets & Kimmel, 2003). In sum, labels that are associated with men allude to male sexual behaviour rather than expressing overall sexual orientation preference, as is observed in the terminology applied to women.

What is clear in the Diamond (2005, 2008) and Chivers et al. (2004) studies is that the women who experience same-sex attractions do so differently as compared to

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males, and as compared to each other. Many women do not actively pursue other women, but just happen to discover women in their lives who they find attractive, while some women report having always felt a sense of sexual attraction to other women (Diamond, 2008). Although there is not likely to be a single, clear answer, many different reasons may explain why there is such variation across female sexual (and same-sex) behaviour.

Thompson and Morgan (2008) questioned a sample of mostly straight women about their sexual identity, they then compared these women to those who describe themselves as completely straight, lesbian, and bisexual in order to investigate their identity development by qualitative means. There are some women who identify themselves as mostly, but not entirely straight. Thompson and Morgan (2008) found that some females with same-sex attraction felt most comfortable attesting to a mostly straight orientation. Those who identified as mostly straight expressed some interest in same-sex sexual behaviour or contact but the contact that was most sought out was kissing, as opposed to more intimate contact such as oral sex. Further, many females did not want to eschew a bisexual identity, because of uncertainty about what could happen in the future, suggesting that these females did not want to discount the possibility that they might engage in same-sex behaviour at some point (Thompson & Morgan, 2008). In sum, there are many ways a female may define and express sexual orientation.

As a result of the numerous sexual orientation terms for women, there is a problem where generalizability and replication of findings are concerned. For example, Mercer et al. (2007) and Lippa (2005) use the term “bisexual” in their respective studies; however, it is not clear if they mean “fluid” because Mercer et al. (2007) found that bisexual women have more male casual sex partners compared to heterosexual and

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lesbian women. Again, it is not clear if fluidity is included in their definition of “bisexual” because there was no category to indicate “fluid.” Studies have indicated that females, abundantly more than males, are capable of shifting their sexuality over their lifespan (Diamond, 2005, 2008). Women are less likely to fit into restricted definitions of sexual orientation such as gay, straight, or bisexual (Baumeister, 2000; Diamond, 2008; Hutchins & Kaahumanu, 1991; Walsh & Andre, 2010). Therefore, Diamond (2008) suggests that instead, a concept of fluidity is needed to better capture the nuances of female sexuality and its associated definition.

Fluidity and Bisexuality

As stated earlier, Diamond (2008, pg. 3) defines sexual fluidity as “situation-dependent flexibility in women’s sexual responsiveness.” She says that “this flexibility makes it possible for some women to experience desires for either men or women under certain circumstances, regardless of their overall sexual orientation.” Fluidity is not limiting nor is it unlimited; it is not limiting in that it does not place a woman in a particular category, and is not unlimited in that it does not mean she does not fit into any category. There is considerable room for variance and movement over a person’s life in regards to sexual fluidity. It should be noted that Diamond’s studies excludes men, which is an issue addressed in the dissertation.

As discussed thus far, there are different facets to what constitutes female same-sex attraction or female sexual orientation. Diamond (2008) and Kinnish et al. (2005) analyzed differing components of sexual orientation including fantasy, romantic attraction, actual sexual behaviour, and how individuals label themselves. This dissertation will do the same, but will focus on providing a reason as to why sexual

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fluidity exists in self-identified heterosexual women. The findings regarding fantasy, attraction, behaviour, and labeling shed light on the way women view all four components and highlight some differences between women and men.

Diamond acknowledges that fluidity is different from bisexuality but recognizes that the terms are difficult to tease apart (personal communication, January 31st, 2012). In some cases the “bisexuality” label applies. For example, Diamond (2008) found that some self-identified bisexual women equally rated their intensity of attraction to women and men. She also found that some bisexual women were more intensely attracted to men, while others were more intensely attracted to women.

Many of Diamond’s reasons for the need to distinction between fluidity and bisexuality are based on interviews. Diamond (2008) conducted a 10-year longitudinal research project to examine female sexual orientation with respect to the gender/sex of their partners. Eighty women were periodically interviewed with the goal of exploring non-heterosexual orientation. Many of the women demonstrated a varied pattern of sexuality, shifting from women to men and men to women, whether they identified as lesbian, bisexual, or heterosexual (Diamond, 2008). Numerous women did not label their sexuality, as they did not know where their desires would shift in the future. She also found that women provided various reasons for becoming involved with same- or other-sex partners. For example, many women claimed to fall in love with the person overall rather than their gender/sex. Diamond’s study demonstrated that in some cases “bisexuality” is not an accurate label for women who are attracted to women and men. As a result of the variance between women over a ten-year period, she coined the term

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“sexual fluidity.” However, additional research is necessary to extrapolate the differences and similarities between what it means to be fluid versus bisexual.

Fluidity is a component of sexual orientation that influences attraction, behaviour, fantasies, and affections over a woman’s lifespan according to Diamond. Diamond (2008) notes that sexual fluidity does not suggest that women have an unending variability, but that they have a wide range of erotic tendencies that act in tandem with their overall sexual orientation (Diamond, 2008). Some of the women Diamond studied identified with a bisexual orientation and their day-to-day attractions reflected their orientation. Other women reported that they generally had attractions to one gender most of the time; however, these women would sometimes meet individuals who ignited unexpected same-sex desires and attraction (Diamond, 2008). Heterosexual females, for example, may not be aware that they have the capacity to experience same-sex attraction. Many heterosexual females who have described experiences of same-sex attraction articulate that it happened suddenly, without having occurred to them before (Diamond, 2008; Levin & Blitzer, 2006; McCoy, 2000; Walsh & Andre, 2010). This phenomenon exemplifies how many women are unaware of the possibility that they have of becoming attracted to members of the same sex.

The cornerstone of fluidity, according to Diamond (2008), is an element of change or transition. Bisexuality and fluidity share some similarities but they are distinct categories. The obvious similarity is that someone who is bisexual or fluid will be attracted to both women and men. The difference is that bisexuality seems to be part of an individual’s awareness in particular, in that they know that they possess an attraction to both women and men (Garnetts & Kimmel, 2003; Kinnish, Strassberg, & Turner,

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2005). Fluidity can be overt in a similar manner to bisexuality, with the person knowing that they are attracted to both women and men; however, it also often operates in a covert manner wherein an individual who proclaims to have had no prior same-sex attraction is suddenly attracted to a person of the same sex (Diamond, 2008; Kinnish et al., 2005).

Sexual fluidity does not necessarily manifest in a lasting same-sex pair bond; women may simply engage in same-sex contact, such as kissing another woman or acknowledging attraction to other women. On the other hand, some women claim to have never had any awareness of same-sex attraction until they meet a particular person to whom they become attracted (Andre & Walsh, 2010; Diamond, 2008). In many instances of sexual fluidity, females who were attracted to males most of their lives are observed to leave their heterosexual pair bond and engage in a long-term same-sex relationship. In some instances, women over the age of forty, who have been married, had children, and have lived a heterosexual life, report meeting a woman and subsequently falling in love. These cases are deemed “late bloomers,” and there is growing research on this subject (e.g. McCoy, 2000).

Understanding the similarities and differences between bisexuality and fluidity will most likely be enhanced with research. In a personal communication with Diamond (January 31st, 2012), she reasons that there are different types of bisexuals: some based more on fluidity, and some not. Further, she posits that fluidity is most noticeable when a person who is on the more extreme sides of the Kinsey Scale (Kinsey et al., 1952, discussed below) end up engaging in same-sex activity. For example, if a female was a zero (completely heterosexual) on the Kinsey Scale and all of sudden became a six (completely homosexual) on the scale. Diamond (2008) states that these women, similar

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to women who exhibit different degrees of sexual orientations, also have different degrees of sexual fluidity. Some women will have stable patterns of desire and love throughout their lives; however, other women will not experience stable patterns. At this time, there is no way of determining which women will have a more stable trajectory in her love and desire and which women will have an unstable trajectory of love and desire throughout life (Diamond, 2008). Why and how sexual fluidity comes to be is likely determined by many factors.

There are many ways females arrive at same-sex attraction. But what is the reason for the attractions, and why is sexual fluidity seemingly more common in women than men? I will investigate why female same-sex expression occurs and will argue that same-sex behaviour is adaptive. There are some theories that are not evolutionary in nature, that try to explain female same-sex sexual behaviour (although research is still scant on both of these theories), the two most prominent theories that exist will be discussed: The “learning theory” and the “by-product theory.”

Learning theory: There are some researchers who question whether women even have a sexual orientation (Baumeister, 2000; Diamond, 2008). Baumeister (2000) argues that women, more so than men, are influenced by their environment, so that if that a female is raised by lesbians, for example, she has a higher chance of also becoming a lesbian (Baumeister, 2000). He also notes that women have a lower sex drive compared to men, therefore their sexual proclivities are easier influenced by the environment and cultural factors, resulting in engaging in same-sex behaviour (Baumeister, 2000). The explanation given by Baumeister (2000) is weak and relies on the presupposition that females have a low sex drive, although there is evidence that the female sex drive is not as low as once

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thought (Meston & Buss, 2010). There is some support for the argument of the malleability of female sexual orientation, or that females can learn by observation if raised, for example, in a household with other lesbians (Belsky, Steinberg, & Draper, 1991). However, it could also be that women have a propensity for sexual fluidity, and if faced with a household of same-sex sexual behaviour, they may be triggered to steer to women instead of men. Learning theory (Bandura, 1986; Belsky, Steinberg & Draper, 1991) argues that a behaviour (such as same-sex sexual behaviour) can be learned, and that once learned, it is very difficult to rid the learned behaviour.

By-product theory: Another possible explanation for same-sex sexual behaviour is the by-product theory. In this model, behaviour is passed on genetically, but it has no adaptive purpose for humans. The philtrum, for example, is a dent in the upper lip for which there is currently no purpose. It dates back million of years, and is inherited via our evolutionary relationship to fish (Shubin, 2009). Similar to anatomical features that are not interfering with survival are behaviours that also do not interfere with survival. Same-sex behaviour in females, according to a by-product explanation, could be an example of such behaviour. If a female is engaging in sexual behaviour with another woman but also is engaging in heterosexual behaviour there is not an overwhelming need for selection pressure against the behaviour if the behaviour is not interfering with reproduction. Both the by-product and learning theory need to be researched in more depth and described in more detail, with more studies that actually test the learning and by-product theory pertaining to female same-sex sexual behaviour.

Therefore, although there have been some studies conducted on female same-sex sexual behaviour, there is still not a forthright reason for its prominence in humans. As

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studies in the area have been growing slowly, explanations from an evolutionary point of view are scarce (Buss, 2004). It is not clear if the explanations pertain to lesbians, bisexual, or females who periodically engage in same-sex sexual behaviour. What is clear is that none of the explanations provide an evolutionary explanation, such as the sexual fluidity and allomothering theory proposed in this dissertation.

Scales Measuring Sexual Orientation

The Kinsey Scale of Sexual Orientation: The best-known scale that measures sexual orientation is the Kinsey Scale of Sexual Orientation, developed in 1948 by Kinsey et al. (1952). Participants circle a number indicating where they fall on a continuum of sexual orientation. The scale ranges from “0,” indicating that a person considers his/herself as completely heterosexual, to “6,” indicating that a person considers himself or herself completely homosexual. If a person circles “3” they are equally heterosexual and homosexual. The scale was one of the first that acknowledged that people did not fit into specific categories of completely heterosexual, bisexual, or homosexual, although it should be noted that several researchers, such as Diamond (2008), Baumeister (2000), and Kinnish et al. (2005), propose that the Kinsey Scale needs even more categories, as it is still too limited. Although the Kinsey Scale is well known, it has not been used as was intended by Kinsey (Heath, 2004). The scale was not meant to be a static measure of a person’s sexual orientation (Heath, 2004). The intention was to use the scale at various points in time, with the assumption that preference was dynamic. It was not meant to be the final say on a person’s orientation. However, currently, the Kinsey Scale is still used in as a tool to measure someone’s sexual

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orientation as a static aspect of identity. There are several other measure that have been developed to measure sexual orientation and try to replace or improve the Kinsey Scale.

The FACE Sexual Orientation Scale: The FACE was developed by Heath (2000). The FACE Scale consists of 48 items intended to measure frequency of sexual fantasy, sexual attraction, and conduct. Many aspects of sexual orientation are measured including future, past, and current sexual behaviour. The 48 items for many researchers were too lengthy, and this is one reason the scale is not widely used (Sell, 1997).

The Multidimensional Scale of Sexuality (MSS): Berkley et al. (1990) developed the Multidimensional Scale of Sexuality (MMS). It is criticized for not being grounded in theory (as are many of the scales of measurement discussed) and it has never been vigorously tested on a proper sample thus making it less likely to be used in sexual orientation research. Additional information is required if the MMS is ever to be used in sexual orientation research (Sell, 1997). Further, the MMS scale does not have a general focus on sexual orientation but instead focuses on primarily bisexuality.

The Shively & DeCecco Scale (SDS): The SDS scale was developed by Shively & DeCecco (1977). It has five points ranging from “not at all heterosexual” to “very heterosexual” and “not at all homosexual” and “very homosexual.” The wording of the scale allows for an assessment of two dimensions of sexual orientation. The words describe the same concept but are constructed differently. For example, “very homosexual” and “not at all heterosexual” mean the same thing, but are different descriptions. The scale is rarely used in sexual research (Sell, 1997).

The Klein Sexual Orientation Grid: The Klein Sexual Orientation Grid was developed by Klein, Sepekoff, and Wolf (1995). It measures different facets of sexuality such as sexual

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fantasies and sexual attraction. It measures a person's past, present, and ideal sexual attraction or behaviour. The scale is rather cumbersome and complicated and many researchers tend not to use it for this reason (Sell, 1997). The scale attempts to measure various parts of sexual orientation, which was innovative (Sell, 1997). Sell (1997) found that much of the content was not grounded in theory, another reason why it is not readily used.

Diamond (2008) noted that some aspects of female sexuality were not being captured by existing scales and so created her own scale "Assessing Multiple Facets of Attraction to Women and Men." The scale consists of several questions pertaining to sexual fluidity and it measures several variables including frequency of attraction to women and men, emotional and sexual attraction to women and men, and sexual fantasies about women and men. Most importantly, the scale can be used to measure physical attraction, emotional attraction, and sexual fantasy at various time intervals. The scale will be discussed in further detail in the following chapters.

Diamond, among others, notes that women often do not realize they have same-sex sexual feelings until their teenage years, as young adults, or as older adults (Diamond, 2008; McCoy, 2000; Morgan & Thompson, 2006; 2011; Stock, 2008). When some women reveal their attraction to other women, they often continue engaging in other-sex behaviour, shifting from women to men (Diamond, 2008). Many heterosexual women do not remain at a score of "0" on the Kinsey Scale; they may fluctuate at some point in their life, moving from "0" to "1" or "3," and even shifting to a "5" or "6.

Men are less likely to fluctuate their Kinsey scores. Sexual fluidity does not always lead to a lifetime change in sexual orientation; for example, a heterosexual woman may have

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sex with women during her teenage or young adult years and then engage in relationships with men for the rest of her life. Or, a woman may kiss another woman passionately, and that may be the extent of her sexual fluidity. It is women who identify as heterosexual or mostly straight and engage in same-sex sexual behaviour that are pertinent to this dissertation.

Pornography and Genital Responses in Females and Males

Genital responses in women and men were discussed before but will be discussed in greater detail and show that there is a disconnect between the way women respond subjectively and genitally to depictions of sexually explicit visual material versus the way men respond subjectively and genitally to sexually explicit material. One way to assess attraction is to measure genital arousal patterns of individuals who are watching sexual activity. Genital responses are sexual arousal patterns measured by blood flow to the genitals. When conducting genital arousal studies, the sexual arousal of participants watching sexually explicit films are measured and commonly subjective-arousal responses (or subjective arousal) are also obtained. Generally, physiological response patterns are similar to studies that also measure only physiological arousal. Measuring subjective responses along with physiological arousal to sexually explicit films is important to consider as women's subjective and physiological often do not match their physiological responses while men's physiological responses mirror what their subjective measure is indicating (Chivers et al., 2004).

To measure women's genital responses, a vaginal photoplethysmograph is used to assess vaginal pulse amplitude. A similar apparatus is used to evaluate male sexual arousal by measuring blood flow to the penis (Chivers et al., 2004). In women, a higher

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rate of vaginal pulse amplitude reflects higher sexual arousal; this has been shown to be specific to sexual response. (Chivers, Seto, & Blanchard, 2007). Measuring sexual arousal levels in women and men allows researchers to assess how individuals respond physiologically to sexual stimuli. Further, subjective arousal (self-reported) is often measured along with physiological arousal (genital response) to assess if there is a discrepancy between the two. Female and male genital responses to images of sexual acts have produced some fascinating results. Female genital arousal findings correspond to research conducted by Diamond (2008), Kinnish et al. (2005), Savin-Williams and Ream (2007), and Wichstrom and Hegna (2003) in that self-identified heterosexual women were generally more likely to engage to in same-sex sexual behaviour while self-identified heterosexual men were less likely to engage in same-sex sexual behaviour. Further, women more than men were more likely to identify as bisexual (LeVay, 2011).

Women and men respond differently to various depictions of sexual stimuli (Baumeister, 2000; Diamond, 2008; Hamer & Copeland, 1994). Chivers et al. (2004) conducted a study on physiological and subjective arousal that illustrated this conclusion. Heterosexual and homosexual participants were recruited for the study. Participants were given the Kinsey Scale (Kinsey et al., 1952) to determine their sexual orientation. Only individuals indicating an exclusively homosexual or heterosexual tendency were selected to participate. Participants were tested in a private room where genital arousal patterns were measured. They were shown several two-minute video clips of sexually explicit material, accompanied by sound. The depictions shown varied by sex (male or female) and sexual acts. All participants saw male-female vaginal penetration, female-female cunnilingus, female vaginal penetration with a strap-on dildo, male-female cunnilingus,

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male-male penile-anal penetration, and male-male fellatio. A neutral stimulus was used to create a baseline measure. As all the participants watched the films, they were asked to subjectively rate the films on a scale from “very arousing” to “not very arousing.”

These results indicate that women’s subjective appraisals tend to be more disconnected from their patterns of genital sexual arousal than are those of men (Chivers et al., 2004, 2007). Male participants, whether gay or heterosexual, had subjective arousal patterns that matched their physiological arousal patterns. If a heterosexual man reported that women aroused him, he would respond most highly to women portrayed in sexual acts (Baumeister, 2000; Chivers et al., 2004; Hamer & Copeland, 1994; Kinsey et al., 1952). Women, whether lesbian or heterosexual, generated physiological arousal patterns that were similar regardless of the sexual stimuli shown, whereas their subjective arousal patterns matched what sex they reported to prefer (Chivers et al., 2004). The finding alludes to a default physiological sexual fluidity in some females. Chivers et al. (2007) conducted another study to once again assess heterosexual and homosexual men and women’s physiological and subjective responses to sexual material. In this case, they also measured the physiological arousal’s correspondence to the intensity of the sex acts depicted in the stimuli. As in Chivers et al. (2004), genital monitors were attached to men and women to measure physiological arousal, and participants were also asked to report their subjective arousal levels.

The sexual activities shown in the study were slightly different than those in the original study: they included nude male exercise, male masturbation, male-male penile-anal intercourse, nude female exercise, female masturbation, and female–female intercourse using a dildo. Patterns of response were similar to those in Chivers et al.

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(2004), except one finding that showed lesbian women were more aroused physiologically by female-female sexual activity. This was a significant finding that demonstrated that some lesbians might be more category-specific compared to heterosexual women and other lesbians. These findings indicate that a stable lesbian orientation may follow a different developmental path compared to the orientation of other women who experience same-sex attraction. Further, the results demonstrate that categorizing females with same-sex attraction is not a simple task.

In a meta-analysis of the physiological and subjective arousal of women and men, a significant sex difference was found, with females once again showing a greater disparity between what they found subjectively arousing and what they found physiologically arousing (Chivers, Seto, Lalumiere, Laan, & Grimbos, 2010). As noted above, lesbians who adhered to a stable identity had a more category-specific vaginal arousal pattern when compared to mostly heterosexual women and those who had a less stable lesbian identity (Chivers et al., 2004, 2010). Lesbians who gave themselves higher ratings of masculinity had a more category-specific response to female stimuli, which is similar to how both gay and heterosexual males responded physiologically and subjectively to stimuli involving their preferred sex (Chivers et al., 2004, 2010). Further, lesbians who are rated as having more masculine traits act more in line with a male-mating repertoire (i.e., are more category-specific), however further research is still needed on this distinction (Singh, Vidaurri, Zambarano & Dabbs, 1999).

Arguments have been put forward that females lubricate (respond) to various depictions of sexual stimuli not because women are sexually fluid, but instead for protection against rape (Suschinsky & Lalumiere, 2011). The main theory put forth is that

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females, in lubricating and becoming aroused to various sex acts, are readied for sexual penetration, either consensual or forced (Suschinsky & Lalumiere, 2011). In the case of rape, it would be adaptive for women to lubricate to avoid severe injury to the vagina (Suschinsky & Lalumiere, 2011). Although there is some merit to this suggestion, there are some problems with the theory. Most notable is that some lesbians who self-identify as more masculine than the average female do not lubricate to the various depictions of sex acts in the Chivers et al. (2004, 2011) studies. Instead, the more masculine lesbians had a response pattern similar to men. They were more aroused by the primary sex they were attracted to (Chivers et al., 2004). If the purpose of lubricating to all sex acts is to be ready either for consensual sex or rape, then why would lesbians not lubricate? It is beneficial for all women to avoid serious injury from unwanted sex acts. As a result of the discrepancy between women, the arousal as a rape defense may not fully explain why many females, but not males, become aroused by numerous depictions of sexual activity.

To summarize, defining, measuring, and labeling female sexual orientation is more challenging than categorizing male sexual orientation. The genital response research highlighted a difference between women and men, and also between women with varying sexual orientations.

Same-Sex Sexual Behaviour and Evolutionary Theory

As noted earlier, evolutionary psychology has not often been used to investigate female same-sex behaviour and its possible adaptive origins. Diamond (2008) alludes to possible evolutionary reasons for fluidity but does not discuss the issue in detail. She simply states that human females are “readied” for same-sex experience, but does not explain why this may be the case (p. 132). To assert that human females are “readied” to

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engage in same-sex activity demands explanation. From an evolutionary framework, why would fluidity be adaptive for the human female? One of the main goals of this dissertation is to explore the idea that female sexual fluidity is evolutionarily adaptive. Cultural influences may mediate the expression of female same-sex sexual behaviour and perhaps male same-sex sexual behaviour (cultural influences will be addressed at a different point in the dissertation), however, I will argue that fluidity is adaptive for women.

Before reviewing why same sex behaviour may be adaptive, it should be noted that I am not advocating that all females have a capacity to be lesbian, but instead that many have the capacity to be sexually fluid. For example, in a book *Dear John, I love Jane*, there are narratives that describe how women who have been married to or have dated men for long periods of time leave their male partners for women (Walsh & Andre, 2010). Levin and Blitzer's (2006) book, which has more of a lesbian theme, contains several chapters on how to "hook up" sexually with straight, bi-curious, and mostly straight women, where "hooking up" is defined as having a sexual relationship with someone that is more likely to be casual than serious. There are many books that are geared toward heterosexual and mostly straight women in relation to engaging in same-sex sexual behaviour. The books have tips on how to engage in same-sexual behaviour with women and how the experience could be very pleasurable and natural (Levin & Blitzer, 2006; Sincero, 2005; Strock, 2008; Waxman, 2007). One book explicitly states that it is for women who may want to have a same-sex sexual experience entitled *The Straight Girls Guide to Sleeping With Chicks* (Sincero, 2005). The very existence of such

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books attest to some self-identified heterosexual women and their propensity to engage in same-sex sexual behaviour at some point in their lives.

Allomothering and Pair Bonding

The main theory of female sexual fluidity proposed by this dissertation is the allomothering hypothesis. Allomothering is defined as the phenomenon of someone other than the genetic mother or father helping to take care of, protect, and rear offspring (Hrdy, 1999, 2009; Konner, 2010). Although human females compete with each other for mates, they also form strong alliances (Hrdy, 1999, 2009; Fletcher et al., 2015). Hrdy (2009) has conducted extensive cross-cultural research on who helps in rearing offspring besides genetic parents. Often, genetic relatives such as sisters, aunts, or cousins engage in allomothering behaviour (Hrdy, 2008; Allen, Callan, Dunbar, & James, 2011) however, in many instances, non-genetically related females extensively help in rearing unrelated offspring. Unrelated females engage in this behaviour significantly more often than unrelated males (Hrdy, 2009; Konner, 2010). Thus the question becomes why are females engaging in helping behaviour for non-kin?

Humans have lived as hunter-gatherers for most of their evolutionary history (Potts & Sloan, 2010), and it is speculated that cooperation between individuals, and especially between females, increased their chances of survival (Chapais, 2008; Fletcher et al., 2015; Hrdy, 1999, 2009). If two unrelated females help in rearing each other's offspring, it would increase the offspring's survival and also the survival of each genetic mother (Hrdy, 1999, 2009). If two women have a resilient pair bond, they will be more likely to protect each other's offspring. Further, if females band together, they can cooperate to ward off predators and aggressive males (Hrdy, 1999). Bonded females can

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also help each other find food and shelter, which increases the chances of survival for both (Fletcher et al., 2015). The relationship is a reciprocal one, and hormones that are produced in strong pair bonds, such as oxytocin, increase the likelihood of help from another individual (Crenshaw, 1996; Raffaele, 2010; Zahed, Prudom, Snowdon, & Ziegler, 2007). Pair bonding between women is a key point in relation to allomothering. Examples of allomothering include teaching, protecting, and sharing food. Allomothering is observed in humans cross-culturally, and in other primates (Hrdy, 2008). It is not restricted to caring for offspring less than one year old (Hrdy, 2008). Examples of allomothering include teaching, protecting, and sharing food. Further, play has been associated with allomothering behaviour (Keverne, 2005)

Males in the human ancestral environment died earlier than females (despite women dying due to childbirth), due to war, fighting, and engaging in more strenuous activities such as hunting, thus potentially leaving behind females and their offspring (Buss, 2004; Potts & Sloan, 2007). If offspring were young and the father was absent for whatever reason, this would make the child more vulnerable to attack by predators and more difficult to protect (Hrdy, 2009). Further, women often have more than one child, making the task of protecting and raising them to a reproductive age more challenging (Potts & Hayden, 2008). With more children to attend to, it is more difficult to protect them in an environment that was most likely harsh, rife with predators and finding food would also be an issue that lone females contended with (Potts & Sloan, 2007; Potts & Hayden, 2008). Besides men dying earlier, females also have to contend with men leaving them for other women. Males are more likely to abandon an older female, especially if there is an opportunity to be with a younger, more fertile female, thus giving

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the male a chance to have more children, increasing his reproductive fitness (Buss, 1989, 2004; Schmitt, 2003). Abandoned females are left in a precarious situation, as raising offspring is not easy, and help from others is therefore vital for survival (Hrdy, 1999, 2009). These others, then—those providing the help—are the allomothers. For two nonrelated females to be close and have a vested interest in each other's offspring, the relationship between the two women would need to be that of a stable and bonded dyad.

As Wilson (1978) articulated, sexual behaviour is used for more than reproduction in humans. Sex is used to help two people engage in pair bonding (Wilson, 1978). One of the ways a female/female dyad could be strengthened is through sexual contact. Sexual contact such as intimate kissing, hugging closely, holding hands, and genital touching strengthens bonding between two human individuals as intimate contact releases hormones that are crucial for such bonding such as oxytocin (Crenshaw, 1996; LeVay, 2011; Raffaele, 2010).

Morgan and Thompson (2006) conducted research on same-sex friendships and behaviour within these friendships. Many female friendships are emotionally intense (Morgan & Thompson, 2006) and at times are akin to a romantic relationship. For example, in the early stages of female friendship, many women experience feelings of jealousy over time spent with other individuals, think about their new friend all the time, and want to spend much of their free time with the friend (Kinnish et al., 2005; Morgan & Thompson, 2006). These intense female friendships, and the accounts of them that women provide, are similar to descriptions of male-female romantic relationships (Morgan & Thompson, 2006). Male same-sex friendships generally do not share the same components as female same-sex friendships, such as strong emotional attachments,

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thinking about the person frequently, and feelings of jealousy when the friend is spending time with someone else (Morgan & Thompson, 2006). There is an omission of female pair bonding in the evolutionary literature. The majority of literature that focuses on humans in the ancestral hunter-gatherer time period frequently describes male bonding during group hunting trips or when males engage in-group attacks (Potts & Sloan, 2010).

Goodman and O'Brien (2000) elucidated the tendency for women to have intimate female friendships. They studied female friendships and found that they are vital to many women's health and well-being. For example, several women stated that their best friend means as much to them as their husband (Goodman & O'Brien, 2000). They described the emotional closeness of the relationship and the benefits of the emotional intimacy and often stated that they could not achieve the closeness with a man (Goodman & O'Brien, 2000). Many of the women described friendships with other females using language similar to that used to describe a romantic relationship, comparable to findings by Kinnish et al. (2005) and Morgan & Thompson (2006). It would be noteworthy to conduct a study asking males to describe how they feel regarding same-sex friendships in comparison to how women describe same-sex friendships. Goodman and O'Brien (2000) do not discuss anything beyond friendship; however, throughout the narratives, themes of intense pair bonding are described. For example, many women turn to their best women friends as opposed to their husbands during a crisis. Further, many women are devastated if one of the friends in the pair bond has to move away, leaving many women feeling depressed for a long period of time (Goodman & O'Brien, 2000).

It is important to mention female competition for mates (and possibly allomothers) occurs along with female alliances, the two are not mutually exclusive

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(Clutton-Brock, 2008). Competition among females for allomothers is a subject that needs further exploration. Allomothers may seek other women who are for example, physically attractive, the reason being that attractiveness (symmetry of a person) denotes a healthy person who has lower pathogens compared to individuals who are less attractive (Grammer, Fink, Moller, & Thornhill, 2003; Symons, 1979). Studies on attractiveness and allomothering would be a new frontier in the research of female/female alliances and competition regarding how women decipher who a good allomother would be. Perhaps if there are more women (and less men) present in a certain environment, competition for fit allomothers may occur. If the sex ratio is low (few women) then competition for allomothers may not be prominent.

As a result of the emotional closeness within many female same-sex relationships, it may be possible for the women involved to become slightly or overtly sexually or emotionally attracted to one another as is elucidated in Diamond (2008). Many women are emotionally close before sex occurs and before a sexual experience takes place. The pair-bonding that takes place among many women is a fundamental question to explore, as it would help to assess how and why same-sex sexual behaviour comes to fruition in some women, but not others. What makes some women attracted to other women and others not? Even though Western culture and media are thought to embrace females engaging in same-sex behaviour more readily than male same-sex behaviour, cultural factors may contribute to why females who are very close do not engage in same-sex behaviour. Prejudices and discrimination are still a large factor as to why individuals hide feelings of same-sex attraction (Ryan & Jetha, 2010).

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Besides caring for each other's non-related offspring, women need to survive themselves. They need to survive for their own purposes for reproduction, and they need to survive to help raise their already born offspring. Sexual dimorphism is exhibited in humans with men generally being stronger and larger compared to women (Winston & Wilson, 2006; Potts & Sloan, 2010). The difference in size means that often women cannot easily defend themselves from violent male partners. One of the reasons females are generally attracted to strong, athletic men is for protection against violent acts, such as sexual coercion, perpetrated by other men (Buss, 2004; Muller & Wrangham, 2009). Women do not always receive protection from strong males, and therefore violence towards females and their offspring is a serious issue (Muller & Wrangham, 2009). The existence of cooperative females that help to protect one another and their offspring against a violent male is paramount for survival (Hrdy, 2008).

Female bonding may have been particularly prominent when humans were hunting and gathering; male partners may have been away for substantial amounts of time. In these situations, with no male mate around for protection, females were at risk of becoming potential victims of violence (Muller & Wrangham, 2009). Therefore, females would rely on other women to assist in protection. In sum, although men are generally physically stronger than women, women can form pair bonds with each other, which could help ward off aggression and also predators (Miller, 2001).

Sexual violence has most likely always been a serious issue for women (Buss, 2004; Muller & Wrangham, 2009; Stamos, 2008). Rape is one of the most abhorrent acts that can happen to women, not only psychologically, but also from an evolutionary perspective; rape eliminates female choice in mating and is detrimental to reproductive

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success (Buss, 2004; McKibbin, Shackelford, Goetz, Starrat, 2008; McKibbin, Shackelford, Goetz, Bates, Starrat, Miner, 2009). Women who are raped and become pregnant often suffer dire consequences, such as being shunned, having to raise a child by an unwanted man, and experiencing difficulty in finding another mate. In general, in the context of evolutionary theory, women of the EEA who had been the victims of rape lost mate-value (Buss, 1994, 2004; McKibbin et al., 2008). To circumvent the consequences of raising offspring alone, women may have turned to each other emotionally and physically to ensure survival for themselves and their offspring.

In sum, a key element in the sexual fluidity adaptive hypothesis is that sexual activity of any kind induces intimacy between two individuals and increases pair bonding, thus increasing chances for survival (Crenshaw, 1996; Meston & Buss, 2009; Raffaele, 2010).

Female Same-sex Behaviour in Bonobos (*Pan paniscus*)

A crucial method in evolutionary psychology research is examining behaviour in closely related primate species. One of humans' closest living relatives is the bonobo who are 98% genetically related to humans (Pfufer et al., 2013). A key component in studying human allomothering and sexual fluidity is therefore comparing humans to bonobos. Examining apes, which are genetically very similar to humans, allows for comparison in behaviour and also, possibly, for explanation as to why some human behaviour occurs.

Humans are included in the five families of great apes in the super family Hominoid. All great apes except for humans live in restricted regions of the world, either Southeast Asia or Africa (Rowe, 1996). The five great apes—chimpanzees (*Pan troglodytes*), bonobos (*Pan paniscus*), orangutans (*Pongo pygmaeus*), gorillas (*Gorilla*

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gorilla), and humans (*Homo sapiens*)—share common behaviours in development, mating, and sexual activity (Morris & Parker, 2009; Raffaele, 2010; Robbins & Boesch, 2011). For example, all great ape infants have an extended juvenile period. Females are usually the predominant caregivers of offspring, although male help is observed intermittently (de Waal & Lanting, 1997; Goodall, 1971; Savage-Rumbaugh & Wilkerson, 1978). Bonobos and chimpanzees share 98% of their DNA with humans. Humans, bonobos, and chimpanzees are more related to each other than the chimpanzee is to the gorilla. The split between the last common ancestor of humans, bonobos, and chimpanzees occurred roughly 5–6 million years ago (Rowe, 1996). Divergence of the bonobo and chimpanzee occurred approximately 2 million years ago (de Waal & Lanting, 1997).

Bonobos live in the rainforests in the Democratic Republic of the Congo, bounded by the Congo River (Rowe, 1996). Modern bonobos resemble the common ancestor of all three modern species of bonobo, chimpanzee, and human (Kano, 1992). Therefore, they are conjectured to be the pre-eminent living model of the prototype of these three modern species of *Homo* and *Pan*. Female bonobos are dominant over males in bonobo society (de Waal & Lanting, 1997; Kano, 1992; Savage-Rumbaugh & Wilkerson, 1978; Woods & Hare, 2011). The behaviour that allows for dominance by bonobo females is extremely strong pair bonding leading to resilient female-female alliances (de Waal, 2005; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978).

Bonobo society is saturated with sex, and bonobos engage in sexual behaviour for more than reproductive purposes (de Waal, 2005; de Waal & Lanting, 1997; Kano, 1980; Rowe, 1996; Savage-Rumbaugh & Wilkerson, 1978). In most animal species, sex is used

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mainly for reproduction, for the main goal of passing on genes. Most female mammals only mate when they are in estrus (Burnie & Wilson, 2005). For bonobos, as with humans, sex is also used for pleasure; in fact, bonobos have been observed masturbating with their hands and feet, or with tools (de Waal, 2005; Kano, 1980). Sexual behaviour is also used for appeasement in stressful and aggressive situations and for reconciliation (de Waal, 2005; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978; Woods & Hare, 2011). For example, if aggressive behaviour between two bonobos is imminent, they will employ sexual behaviour to deflate tension, thus reducing aggression (Hohmann & Fruth, 2000; Kano, 1980). Face-to-face copulation occurs and is accompanied by eye gazing, where bonobos look into each other's eyes for the entire copulatory period until climax takes place (de Waal & Lanting, 1997; Savage-Rumbaugh & Wilkerson, 1978).

Bonobo females all engage in sexual activity with both males and females (Kano, 1980; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978). Female bonobos, for example, frequently engage in a sexual activity called genito-genital rubbing (GG rubbing). Bonobo females have a large clitoris compared to the other great apes. When females GG rub with each other, they rub their genitals together, accompanied by eye-gazing behaviour that indicates strong emotional bonding (similar to humans), often until they reach orgasm (Hohmann & Fruth, 2000; Savage-Rumbaugh & Wilkerson, 1978). GG rubbing is performed in different positions, such as ventro-ventrally and dorsal-ventrally (Hohmann & Fruth, 2000). Females also engage in these sexual positions with males (Kano, 1980, 1992). GG rubbing has been observed by all researchers studying bonobos both in the wild and in captivity (de Waal, 2005; Hohmann & Fruth, 2000; Kano, 1980; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978). It starts to occur at

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around two years of age (Kano, 1980, 1992; Woods & Hare, 2011). When female bonobos reach adulthood they leave their natal group to join an outside group. Once the female joins another group, she will engage in GG rubbing with the dominant female of the faction that she is infiltrating. This behaviour eases the process of the new bonobo female's entrance into the new group (de Waal, 2005; Savage-Rumbaugh & Wilkerson, 1978).

GG rubbing between the new female and other members of the clan serves as a bonding process that helps in forming sturdy alliances among the females in the group (de Waal & Lanting, 1997; Kano, 1980; Savage-Rumbaugh & Wilkerson, 1978). Kano (1992, p. 196), one of the most prominent bonobo researchers, conjectures that “the external genitalia that are distinctive of female pygmy chimpanzees [former name of bonobos] have a location and shape that are well-suited to females facing each other to rub their clitorises. I am convinced that this evolved for GG rubbing rather than for ventral copulation.” These female ties strengthened by GG rubbing are difficult to fracture. The rate of GG rubbing observed in wild and captive bonobos is quite high; they have been reported at 2.7 per hour (Idani, 1991) and 0.33 per hour (Furuichi, 1989). These rates are similar to their rates of mating with males. Female bonobos engage in very frequent same-sex behaviour and therefore can be termed bisexual or fluid (de Waal, 2005; Savage-Rumbaugh & Wilkerson, 1978). Although males do engage in same-sex behaviour as well, it is not as prominent or as frequent as female same-sex behaviour (Kano, 1992). Female bonobos sometimes prefer female to male sexual partners (Bagemihl, 1999; de Waal & Lanting, 1997); some bonobo females can be seen to ignore

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solicitations by male bonobos in favour of a sexual encounter with another female (de Waal & Lanting, 1997; Bagemihl, 1999).

Research demonstrates that female bonobos form female alliances to ward off male attacks and sexual coercion (Cheney & Seyfarth, 2007). Male bonobos are slightly larger than female bonobos (Kano, 1992). They also have large canine teeth that are not present in female bonobos. However, in bonobo society, females are dominant (Kano, 1992) and adhere to a strong dominance hierarchy. If male bonobos are stronger than females, how can females dominate? Bonobos live in a female-bonded society (Kano, 1992). Females bond with each other early in life, forming lifelong friendships and sexual relationships (Kano, 1992). As a united female troop, bonobos will attack males who give them unwanted attention, who try to steal food, and who are generally out of line according to the rules and culture of bonobo society (Kano, 1992).

Bonobos as a Model of Allomothering and Pair Bonding in Humans

Female bonding is one of the most striking behaviours (de Waal & Lanting, 1997; Kano, 1980, 1992) observed in bonobos and will be the main point of comparison between humans and bonobos in this dissertation (de Waal & Lanting, 1997). Pair bonding is extreme in female bonobos; conversely, male pair bonding is prominent in chimpanzees but male chimpanzees generally do not engage in same-sex sexual behaviour (de Waal, 2005). Humans have traditionally been compared to the common chimpanzee when elaborating on the comparison between human and chimpanzee behaviour. However, humans are just as related to bonobos as they are to chimpanzees (Prüfer, et al., 2012) Some genetic studies proclaim that bonobos are more genetically related to humans compared to the common chimpanzee, while other studies indicate that

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both bonobos and chimpanzees are both roughly equal to humans in terms of shared genes (Prufer, et al., 2012; Rowe, 1994). The main point is that traditionally, humans have been compared to chimpanzees in terms of behaviours that both species share; however there are fewer comparisons of behaviours shared by both humans and bonobos (Rowe, 1994). One reason may be that bonobos only reside in The Democratic Republic of the Congo (DRC), a country that is often politically unstable and dangerous (Sandin, 2011). Field studies therefore are not as readily conducted (Woods, 2010). Before war ravaged the DRC, there were field studies conducted on bonobos (Kano, 1980). Currently, the DRC is more politically stable allowing for more bonobo field studies (Woods, 2010).

Females have often been excluded from primate comparisons altogether (Hrdy, 1999; Radtke, 2013). Often, “man the hunter” has amassed the majority of research and attention, drawing comparisons to the male-dominated, warring common chimpanzee (Hrdy, 1999). However, the female-dominated, pair-bonding bonobo may highlight an evolutionary history that exemplifies the role of females, contrasting the usual comparison between humans and chimpanzees (Radtke, 2013).

However, as previously mentioned, sex in some species (including humans) is used for pair bonding (Meston & Buss, 2009; Wilson, 1978). Sexual behaviour for pair bonding has been observed in humans, dolphins, and bonobos, all of which are socially cooperating species (Raffaele, 2010). As noted above, female bonding is exemplified by bonobo females migrating out of their natal groups and integrating into new groups where most of the females are not related (Kano, 1980), and many bonobos prefer the company of females to males (de Waal & Lanting, 1997; Parish, 1996). Bonobo females

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form strong pair bonds that last the duration of their lifetimes (Furuichi, 2011). When a female bonobo has offspring, other females are tremendously involved in the life of the young bonobo (Hohmann & Fruth, 2000; Furuichi, 2011; Kano, 1992; Woods, 2010). After the bonobo is through the infant stage, young bonobos are often carried by or left with unrelated females while the mother engages in other activities such as foraging for food, eating, or mating (Hohmann & Fruth, 2000; Furuichi, 1989, 2011; Kano, 1992; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978). Young bonobos often leap onto the backs of unrelated female bonobos when afraid or if in danger, even if the genetic mother is near (personal observation; Kano, 1992; Savage-Rumbaugh & Wilkerson, 1978). This demonstrates strong trust between females in terms of caring for each other's offspring.

Bisexuality or fluidity in the species makes bonobos' sexual expression similar in some aspects to the sexual behaviour of humans, who also engage in same-sex activity (Bagemihl, 1999). By no means are bonobo females exclusively homosexual. However, just as there is individual variation in female human sexuality (Diamond, 2008), there is also variation in bonobo sexuality and expression. For example, some female bonobos prefer female company in sexual or emotional bonds, but they always mate with males as well, ensuring reproductive success (de Waal & Lanting, 1997). As reviewed earlier, human females form strong same-sex friendships. Sexual dimorphism is present in humans, and women, who are in groups, or a dyad, are better able to fight off men who approach them with unwanted sexual or physical aggression (Muller & Wrangham, 2009). Similar to female pair bonding in bonobos, women may have engaged in sexual or intimate behaviour with each other to strengthen the pair bond therefore increasing the likelihood of helping a friend or allomother who was in danger from predators.

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In sum, most bonobo females contribute to infant and childcare, and they maintain strong pair bonds with frequent GG rubbing between non-related female members of the troop (Kano, 1980, 1992; Savage-Rumbaugh & Wilkerson, 1978). Humans' closest living relatives engage in frequent same-sex sexual behaviour, which has allowed bonobo females to form close bonds contributing to alloparenting and cooperation, which has led to increased individual and offspring survival. It will be argued that human females have a sexual nature that is similar to bonobos, and that this has evolved to aid in the survival of the species. Although human society is not completely similar to bonobo society—in that sex with many people does not occur as frequently among humans, and rates of same-sex behaviour may not be as high—there may be some connection between female bonobo bisexuality and human female sexual fluidity. This dissertation will explore that connection.

Conclusion

The literature review has shown that there are various ways to describe female same-sex sexual behaviour. These descriptions range from “heterosexual” to “lesbian,” with many variations in between. As was stated, the main goal of the dissertation is to propose an evolutionary based theory as to why self-identified heterosexual (mostly straight) women engage in fleeting (periodic) same-sex sexual behaviour. The behaviour can include romantic and deeply emotional feelings between two heterosexual women along with sexual behaviour. Thus, the dissertation is not focusing on “fluid lesbians,” bisexual women, or women who are closer to the middle of the Kinsey Scale when identifying their orientation; rather, the group that is being focused on is self-identified

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heterosexual, or mostly straight, women. Men have been included in some of the studies as a comparison group when warranted.

By reviewing the literature on the development of sexual orientation and sexual fluidity, it is apparent that female same-sex behaviour requires further research. There are not many researchers who study female same-sex behaviour from an evolutionary perspective. Allomothering may be ultimate cause of the same-sex sexual behaviour; however, the proximate causes (for example being in close proximity to many women such as a University setting and engaging in sexual behaviour) are the shadows that highlight the ultimate cause of heterosexual women engaging in same-sex sexual behaviour.

Chapter 3:
Examining Same-Sex Sexual Attraction, Emotional Attraction, Fantasy, and
Behaviour Among Self-Identified Heterosexual Women and Men

Introduction

Study 1

According to Diamond (2008), women are more sexually fluid than men, regardless of sexual orientation, a claim based on her eight-year longitudinal study of the same group of women. This means that women are more likely than men to switch from sexual and romantic relationships with men to women, or vice versa (Diamond, 2008). Men are less likely to identify as bisexual compared to women, and have been generally thought to have a heritable sexual orientation, while women are thought to have a less heritable sexual orientation (Hamer & Copeland, 1994; Pillard & Bailey, 1998). However, Diamond did not study fluid sexuality in men, creating a gap in the data that needs to be addressed. Therefore, one goal of the current study is to examine the sexual fluidity of men in comparison to women.

Study 1 consists of two parts. Part one will focus on sexual fluidity in women and men and utilize one of four measures used in the study, *The Kinsey Scale of Sexual Orientation*. Part two will build on the findings of part one. The terms women and female and men and male will be used interchangeably throughout the dissertation.

Evidence suggests women, but not men, are likely to be sexually aroused (measured by lubrication to the genital area) to all erotic visual stimuli, including same-sex sexual activity (for example, see Chivers et al., 2007, 2011; Rieger et al, 2015). These studies suggest women's sexual orientation is divergent from that of men. Some lesbians are thought to have a heritable orientation (Hamer & Copeland, 1994), but not as much as

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men. The point is that women seem to follow different trajectories regarding same-sex sexual behaviour compared to men. Women and their same-sex sexual behaviour journey is not as rigid as that of men, who generally are either heterosexual or homosexual rather than bisexual. This is not a suggestion that there are no bisexual men or men who identify as “mostly straight,” but that generally there are less bisexual men compared to bisexual and “mostly straight” women (Hamer & Copeland, 1994).

However, self-identified heterosexual females may nonetheless have a heritable predisposition to engage in same-sex sexual behaviour. Even though these females identify as heterosexual, there seems to be a same-sex mechanism that can be triggered, which otherwise lies dormant under the heterosexual female sexual orientation. The same predisposition is generally not found in heterosexual males and the propensity to identify as bisexual among males is less prominent (Hamer & Copeland, 1994).

The main goal of part one of the study is first to corroborate Diamond’s findings that many women of all sexual orientations are sexually fluid, and then to assess sexual fluidity in men who are generally thought to be less sexually fluid. The study investigated women who self-report as heterosexual, bisexual, and lesbian, and men who self-report as heterosexual, bisexual, and gay.

Part two of the study will build on part one. The goal of part two is to analyze self-identified heterosexual (mostly straight) women and heterosexual (mostly straight) men in relation to same-sex sexual behaviour. The definition of “sexual fluidity” used in this dissertation focuses on heterosexual (mostly straight) individuals who engage in same-sex sexual behaviour. From an evolutionary perspective, it is more interesting to investigate why some members of the species engage in same-sex sexual behaviour at

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some point(s) in life, as much of evolutionary psychology research is grounded in the fact that reproduction is paramount to passing on genes. Technically, two women or two men cannot reproduce and that is why same-sex sexual behaviour has puzzled evolutionary psychology researchers who investigate sexual behaviour (Buss, 2004). Thus when same-sex behaviour is found in a species perhaps there is reason for its existence.

Study 1 will try to demonstrate that women are more sexually fluid than men. Further, it will try to establish that women who self-identify as heterosexual engage in more same-sex sexual behaviour compared to men who identify as heterosexual. Further, differences between women and men are explored to show that other disparities exist. For example, men generally desire more casual sex encounters compared to women (Buss & Schmitt, 1993; Buss, 1994).

Part one of study 1 uses the *Kinsey Scale of Sexual Orientation* scores, which range from 0 to 6, with 0 being exclusively heterosexual and 6 being exclusively homosexual. If a person scores a 3, for example, they are equally heterosexual and homosexual. The hypothesis for part one of the study was that women, more than men, will vary in their Kinsey Scale scores when self-reporting sexual orientation. This means that men in comparison to women, will more likely score a 0 or 6, a score that is at the extreme ends of the scale The Kinsey Scale. Women, will have less extreme scores of 0 or 6. Women more than men will score more frequently between 1 and 3 on the Kinsey Scale.

The main hypothesis for part two of the study was that women who self-identify as heterosexual (mostly straight) have more same-sex sexual experience compared to self-identified heterosexual men. To test this hypothesis, two measures were used. The

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first measure is called *Assessing Multiple Facets of Attraction to Women and Men* (Diamond, 2010). This method measures different components of same-sex sexual behaviour, which include physical attraction, emotional attraction, and sexual fantasy. The hypothesis was that self-identified heterosexual or mostly straight women will have more physical, emotional, and sexual fantasies about same-sex sexual behaviour as compared to heterosexual or mostly straight men.

A section of the *Human Sexuality Questionnaire* (Zuckerman, 2010) that evaluates same-sex sexual behaviour experience was also used to test the hypothesis that self-identified heterosexual women and mostly straight women have more homosexual experience compared to men who self-identify as heterosexual or mostly straight. The *Human Sexuality Questionnaire* on homosexual experience asks questions about different aspects of past same-sex sexual behaviour. It was included to further test the differences between women and men regarding engagement in same-sex sexual behaviour.

The last measure used is the *Revised Sociosexual Orientation Inventory* (SOI-R) (Penske, 2008). The SOI-R measures individual differences with regards to the likelihood of engaging in casual sex relationships. There are several dimensions that are measured, such as past behaviour regarding casual sex and the desire for relationships without romantic attachment. Lastly, there is an attitude component that considers a person's attitude regarding casual sex attachments. The hypothesis was that men, compared with women, want more casual sex partners, desire more casual sex, and have a more open attitude toward casual sex.

Part One

Method

Participants

There were a total of 266 participants in the study ($N = 266$). Of this, 195 were women and 71 were men. Regarding age, women scored $M = 29.48$, $SD = 8.08$ and for men $M = 31.66$, $SD = 9.59$. An additional 33 participants had to be eliminated from the analysis because they did not complete the survey. The ethnic make-up of the male sample was White (36.9%), Caucasian (29.5%), Asian (19.6 %), Black (4.2%), Hispanic (4.2%), African (2.8%), and Middle Eastern (2.8%). The ethnic composition of the female sample was Caucasian (40.9%), White (31.7%), Asian (11.8%), European (9.5%), Black (1%), Jewish (1%), and Middle Eastern (1%). Some participants indicated that they identified as “White” “Caucasian” or “European.” Those three terms were reported separately even though many individuals think “White” and “Caucasian” are very similar, however, I broke down the terms of how the participants self-identified. When asked if religious, for the men ($M = 4.27$, $SD = 2.25$), the breakdown was as follows: Christian (23%), Muslim (7%), Jewish (2.8%), Buddhist (0%), atheist (22%), agnostic (12%), and “other” (16.9%). For women, when asked if they ascribed to any religion, ($M = 4.11$, $SD = 2.29$), the breakdown was as follows: Christian (29%), Muslim (1%), Jewish (2.6%), Buddhist (2.1%), atheist (29.2%), agnostic (15.4%), and “other” (14.9%).

When asked about relationship status and what type of a relationship a person was in, men answered as follows (participants could choose more than one answer): married (18.3%), in a committed relationship (46.5%), single (28.2%), monogamous (23.9%), non-monogamous (9.9%), open relationship (7%), dating one person (14.1%), dating

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casually (11.3%), and dating multiple persons (5.6%). The female participants described the status of their relationships as follows: married (21.5%), in a committed relationship (37.4%), single (34.4%), monogamous (25.1%), non-monogamous (4.6%), open relationship (1.0%), dating one person (13.8%), dating casually (8.7%), and dating multiple persons (2.6%). Participants were asked about which sexual orientation they best identified with (participants could choose more than one answer). The following is the breakdown for the men: straight (64.8%), gay (28.2%), lesbian (0%), bisexual (2.8%), homosexual (22.5%), heterosexual (33.8%), fluid (7.0%), unlabeled (2.8%), queer (7.0%), pan-sexual (1.4%), asexual (0%), bi-curious (9.9%), and “other” (2.8%). The breakdown for women was as follows: straight (64.1%), gay (3.1%), lesbian (6.2%), bisexual (16.9%), homosexual (3.1%), heterosexual (25.1%), fluid (9.7%), unlabeled (9.7%), queer (6.2%), pan-sexual (6.2%), asexual (2.6%), bi-curious (16.4%), and “other” (0.5%).

Measures

Part one uses only *The Kinsey Scale of Sexual Orientation* (see figure 1).

- 0 - Exclusively heterosexual
- 1 - Predominantly heterosexual, only incidentally homosexual
- 2 - Predominantly heterosexual, but more than incidentally homosexual
- 3 - Equally heterosexual and homosexual
- 4 - Predominantly homosexual, but more than incidentally heterosexual
- 5 - Predominantly homosexual, only incidentally heterosexual
- 6 - Exclusively homosexual

Figure 1: The Kinsey Scale of Sexual Orientation.

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The Kinsey Scale of Sexual Orientation measures the sexual orientation of individuals using a seven-point system. Participants are asked which option they best identify with. As stated earlier, if a person scores a 0, they are thought to be entirely heterosexual, whereas if a person scores 6, they are thought to be exclusively homosexual. However, there are many people who do not score at the extreme ends of the scale, but instead may score a 1, for example, indicating a mostly heterosexual orientation but with some incidental homosexual activity. On the other hand, if a person scores a 3, it indicates that this person feels equally heterosexual and homosexual. The Kinsey Scale is one of the most recognized measures in regards to assessing sexual orientation (Sell, 1997).

Procedure

Participants were recruited via Facebook and flyers (see appendix D). All participants who agreed to be in the study conducted the questionnaire online, as there were no responses to the flyers. Participants were asked to fill out the questionnaire via Qualtrics, which is an online survey tool. Participants were told that the study was for a PhD dissertation, and that they were not being lied to or deceived in any manner. They completed the Kinsey Scale. Participants were reassured that, if at any moment they felt uncomfortable, they could discontinue the survey. Participants were asked to consent after reading the description of the study and then were asked to fill out the questionnaire (see appendix E).

Results

The average Kinsey scores for women were $M = 2.13$, $SD = 1.49$, and for men $M = 2.65$, $SD = 2.37$. The following are the Kinsey score breakdowns for the women participants: entirely heterosexual, or 0 (45.5%); largely heterosexual but with incidental homosexual history, or 1 (27.0%); largely heterosexual but with a distinct homosexual history, or 2 (13%); equally heterosexual and homosexual, or 3 (5.2%); largely homosexual with a distinct heterosexual history, or 4 (4.1%); largely homosexual with incidental heterosexual history, or 5 (2.6%); and entirely homosexual, or 6 (2.6 %). The breakdown for the men was as follows: entirely heterosexual, or 0 (57.7%); largely heterosexual but with incidental homosexual history, or 1 (12.7%); largely heterosexual but with a distinct homosexual history, or 2 (1.4%); equally heterosexual and homosexual, or 3 (0%); largely homosexual with a distinct heterosexual history, or 4 (5.6%); largely homosexual with incidental heterosexual history, or 5 (8.5%); and entirely homosexual, or 6 (14.1%).

The hypothesis was that female scores on the Kinsey Scale will not be normally distributed and females will more frequently score between 1 and 3, while male's scores will generally be more at the extreme ends of the scale, either 0 or 6, that is female and male scores will differ on The Kinsey Scale. This hypothesis—that more women than men score more frequently between 1 and 3 on the Kinsey Scale—was supported when examining the percentage of the number of women and men in each Kinsey Scale category. A chi square test was used to test if there was a difference between women and men's Kinsey Scale score distributions. There was a significant difference $\chi^2 (6, N = 266) = 38.69$ $p < .0001$. These results concur with other studies that have found differences

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between the distribution on scores for women and men on The Kinsey Scale (Kinnish et al., 2005; Sincero, 2005). The female distribution on The Kinsey Scale is positively skewed.

Not one man scored a 3 on the scale, and thus no men in this sample identified as equally attracted to both women and men (see figure 2 for the male percentage of Kinsey Scores and figure 3 for the female percentage of Kinsey Scores).

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Figure 2: Percentage of Kinsey Scale scores for men of all sexual orientations. Note that no men scored a 3, which indicates “equally heterosexual and homosexual.”

Figure 3: Percentage of Kinsey Scale scores for women of all sexual orientations.

Part One: Discussion

These results fall in line with other studies indicating that women (including lesbians and heterosexual females) are more likely to vary on the Kinsey Scale, signifying sexual fluidity, while men (whether gay or straight) are more likely to score at the extreme ends of the scale (Kinsey et al., 1952; Diamond, 2005, 2008; Kinnish et al., 2005; Sincero, 2005).

Although Diamond's groundbreaking studies (2008) garnered much attention, not many subsequent studies have taken place on female sexual fluidity. The door to that research, however, is not closed but open, and many studies are needed to investigate fluidity based not only on Diamond's definition but also in terms of alternative definitions of sexual fluidity. Sexual fluidity and bisexuality in women still need to be examined in order to identify the similarities and differences between the two. Further, there may be different forms of sexual fluidity. For example, perhaps some women are more fluid compared to other women; if so, the reasons for these differences should be addressed.

Women who describe themselves as "completely homosexual" are distinct from women who are bisexual or heterosexual (mostly straight) in some studies. Regarding genital arousal, Chivers et al. (2012) and Rieger et al. (2015) found that women who self-identified as completely lesbian responded more to female/female depictions of sexual behaviour. Although women who identified as lesbian also became genitally aroused to other sexually explicit behaviour, for example, female/male sexual depictions, they became more aroused to the gender they declared they were attracted to. The difference

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in the strength of the arousal is interesting. If allomothering is adaptive for heterosexual or mostly straight women, what about self-identified lesbians? Why are they *only* attracted to women? Do lesbian women also have an allomothering gene? Perhaps lesbian sexual orientation is allomothering operating very strongly for some reason. There is no evidence to suggest that lesbian women are individuals who for some reason become attracted to women in all circumstances and in all environments and not just condition dependent circumstances as I argue is the case for heterosexual females, however it is an area of research that could be explored in future studies.

While many women's scores varied on the Kinsey Scale, of particular importance are those who scored 0 and 1. These women are the main population to be examined in this dissertation, as they self-identify as entirely heterosexual or largely heterosexual with incidental homosexual history. The criteria for part two, then, were made more stringent by including only women and men who scored 0 or 1 on the Kinsey Scale. Thus, the analysis in part two deals with self-identified heterosexual (mostly straight) women and men and their proclivity for same-sex sexual behaviour.

Part Two

Part one was conducted as a foundation to part two of the study. Part two examines only self-identified heterosexual (mostly straight) women and men. The study uses several measures to evaluate heterosexual women and men regarding same-sex sexual behaviour.

The main purpose of the study is to determine if heterosexual-identified women have more physical and emotional attraction to the same sex, fantasize more about the same sex, and have more same-sex sexual experience when compared to heterosexual-

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identified men. As seen in study 1, women scored between 1 and 3 more frequently than men. To further analyze self-identified heterosexual women and men, two measures were used: the first was *Assessing Multiple Facets of Attraction to Women and Men* (Diamond, 2010), and the second was the *Human Sexuality Questionnaire* (Zuckerman, 2010) (in which several sub-sections were utilized, the most relevant being the section that surveys homosexual experience). The questionnaire also asked participants about heterosexual behaviours and orgasmic experience. An example of a question about orgasmic experience is, “How many times have you achieved orgasm through homosexual experience and heterosexual experience?” The data that was analyzed in this dissertation was only that of homosexual experience, and not heterosexual experience.

As noted earlier, differences between women and men regarding casual sex were also examined using the SOI-R (Penske, 2010). The measure was included to examine differences in female and male mating strategies. If male and female mating strategies differ, there may be different patterns of behaviour that each sex utilizes to survive and reproduce.

To reiterate, Kinsey scores were filtered to include only self-identified heterosexual females and self-identified heterosexual males. The main goal was to compare women and men who self-identified as heterosexual (mostly straight) on components of same-sex sexual behaviour and also regarding casual mating strategies.

Method

Participants

Out of the same sample of participants used in part one, only those women and men who scored a 0 or 1 on the Kinsey Scale were included in this further analysis. The

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total sample size, including women and men, was $N = 182$. Of these, 134 were women, with an average age of $M = 36.91$, $SD = 14.69$, and 48 were men, with an average age of $M = 48.44$, $SD = 3.99$.

Measures

Three measures were used in part two of this study:

Assessing Multiple Facets of Attraction to Women and Men: This measure was formally developed by Diamond (2010) and was retrieved from the *Handbook of Sexuality Related Measures* (Fisher, Davis, Yarber, & Davis, 2010) to use in the study. There are not many (if any) other measures pertaining to sexual fluidity and the various aspects of fluid same-sex behaviour. This measure asks participants to rate several aspects of their attraction to women and men. In particular, it asks about physical and emotional attraction and sexual fantasy toward women versus men during the past six months. There are 22 items in the scale, and they are divided into physical and emotional attraction, and fantasy. Diamond (2008, 2010) defines “physical attraction” as the type of attraction that a person would associate with a desire for sexual activity. “Emotional attraction,” on the other hand, is associated with romantic love and romance-type feelings that elucidate a strong desire for emotional closeness and intimacy.

For the purpose of this study, the timespan for physical, emotional, and sexual fantasy under consideration was extended to “the past year.” A longer timespan was more readily suited to this study, as long-term attraction was to be tested. Furthermore, Diamond (2010) had not used the measure on men, whereas this study does include men.

Physical and emotional attraction can occur together, but they can also occur separately. For example, an individual may be emotionally attracted to another person,

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without being attracted to them physically (Diamond, 2008, 2010). Fantasy is when a person will think about another individual for a short or long duration of time, in a romantic way, or a physical or emotional way, or both. Fantasy has been shown to be an indicator of desired sexual activity (Ellis & Symons, 1990; Fahr, 2007; Meston & Buss, 2010; Stamos, 2008). Fantasy, however, has also been shown to be just that—something that a person would not necessarily act on or engage in. The definitions of “physical” or “emotional attraction” and “sexual fantasy” that Diamond (2010) uses, as described above, are grounded in past research (Buss, 2004; Diamond, 2008; Meston & Buss, 2010), and the meaning of each will be adhered to throughout this dissertation.

The measure can be used to gauge an individual’s self-identified sexual orientation over time; for example, it can be administered every six months. On average, the measure takes about 10 minutes to complete. Diamond (2010) does not provide reliability and validity information for the scale.

The Human Sexuality Questionnaire: This questionnaire is intended to examine the overarching human sexual experience (Zuckerman, 2010). There are several sections in this measure that can be used alone, and this study used a section devoted to same-sex sexual behaviour called “The Homosexual Experience Scale.” This section features four questions relating to homosexual experience. However, they all had to do with actual genital contact, and this study is interested in types of intimate behaviour that does not necessarily include genital contact. Thus two questions were added to this study: one about kissing someone of the same-sex with tongue and one about kissing someone of the same-sex without tongue. Kissing has been demonstrated to promote bonding, and is an intimate act; thus questions about kissing were added to this particular Homosexual

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Experience scale (Kirshenbaum, 2011). The two questions regarding kissing used the same Likert-type scale answers as the rest of the Homosexual Experience sub-scale, from A (meaning “never”) to E (meaning “ten times or more”). Scoring for the section was as follows: A = 1; B = 2; C = 3; D = 4; E = 5.

For this sub-section, the coefficients of reproducibility were .98 for men and 1.00 for women (Zuckerman, Tushup, & Finner, 1976). The coefficients of scalability were .76 for men and 1.00 for women. Concerning validity, males scored higher compared to females (Zuckerman et al., 1976).

Revised Sociosexual Orientation Inventory (SOI-R): The third measure used was the SOI-R (Penske, 2008). The SOI-R measures differences among individuals with regards to the likelihood of engaging in casual-sex relationships. Those individuals who score high on this measure have a more unrestricted sociosexuality, while lower-scoring individuals have a more restricted sociosexuality. Several dimensions are measured, including past behaviour regarding casual sex, the desire for relationships without romantic attachment, and, lastly, a person’s attitude regarding casual-sex attachments. The SOI-R was included to highlight differences between women and men regarding sociosexual orientation.

The SOI-R consists of nine items, each section asking about sexual behaviour, attitudes, and desire. Regarding reliability, the SOI-R shows good one-year retest stability (Simpson, 1994). For validity, the SOI-R has similar validity scores to the original *Sociosexual Orientation Inventory* (Simpson, 1994). Analyses showed a very distinctive pattern of relationships for the three SOI-R sections indicating good discriminant validity.

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Procedure

Similar to part one, participants were given the survey package online via Qualtrics (see appendix F). The three measures described were administered to all participants in part 2 of the study. Participants provided consent (see appendix E), and were then asked to fill out the entire questionnaire. Participants were reassured that if they felt uncomfortable at any moment, they could discontinue the survey.

Results

The *Assessing Multiple Facets of Attraction to Women and Men* scale was difficult to work with in terms of comparing self-identified heterosexual women and self-identified heterosexual men regarding same-sex sexual behaviour. There was not a sufficient way to compare heterosexual women and heterosexual men in this respect. The first three questions ask about percentages of attraction toward women versus men during the past year. Answers are given in percent values, with 0% indicating no attraction toward women over men, and 100% indicating total attraction toward women over men. Examples of possible answers include 10% attraction to women compared to men, or 30% attraction toward women versus men. The first of these three questions asks about the percentage of physical attraction to women versus men, the second question asks about the percentage of emotional attraction to women versus men, and the third question asks about the percentage of sexual fantasies regarding women versus men.

To be able to conduct a one-way Analysis of Variance (ANOVA) to find out if differences exist between self-identified heterosexual women and self-identified heterosexual men, the absolute values of each answer need to be standardized. Therefore,

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on the Statistical Package for the Social Sciences (SPSS), the data was transformed in the following way:

$$ABS (PercentagePhysicalAttractionTowardWomen - 50)$$

The same equation was used to transform the data for emotional attraction and percentages of sexual fantasies of women versus men. Once the data was transformed, the number 50 was designated as “more heterosexual” and the number 0 was designated as “more homosexual.” Therefore, if a man or a woman scores more toward 50, they are more heterosexual, and if a woman or man scores farther away from 50, they are less heterosexual. After the scores were standardized, self-identified heterosexual women and men could be compared using a one-way ANOVA. The higher the mean for each component, the closer the person is to being heterosexual. That is how the scores were calculated for the section.

For physical attraction, the hypothesis was that self-identified heterosexual (mostly straight) women would have more physical attraction toward the same sex during the past year as compared to men who self-identified as being heterosexual (mostly straight). The hypothesis was supported, as men ($M = 48.54$, $SD = 3.99$) scored higher than women ($M = 36.91$, $SD = 14.69$), $F = (1, 180) 29.20$, $p < .001$, $\eta^2 = 0.14$. Women who self-identified as being heterosexual (mostly straight) experienced higher amounts of same-sex sexual attraction compared to men who self-identified as being heterosexual (mostly straight).

To test emotional attraction, a one-way ANOVA was performed. The hypothesis was analogous to that about physical attraction; self-identified heterosexual (mostly straight) women would have more emotional attraction toward the same sex during the

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past year as compared to men who self-identified as being heterosexual (mostly straight). Once again, the hypothesis was supported with women ($M = 35.53$, $SD = 16.55$) having more emotional attraction toward the same-sex compared to men ($M = 44.10$, $SD = 12.57$), $F(1, 178) = 10.625$, $p < .001$, $\eta^2 = .056$. Thus, heterosexual women experienced more emotional attraction to the same sex as compared to heterosexual men during the past year.

Fantasy toward the same sex during the past year was tested using a one-way ANOVA with a similar hypothesis; self-identified heterosexual (mostly straight) women would have more same-sex sexual fantasies over the past year compared to self-identified heterosexual men. The hypothesis, once again, was supported, where women experience higher rates of sexual fantasy toward the same sex ($M = 36.43$, $SD = 16.36$) as compared to men ($M = 47.20$, $SD = 6.96$), $F(1, 178) = 19.464$, $p < .001$, $\eta^2 = 0.09$.

As mentioned, homosexual experience was tested using a subset of the *Human Sexuality Questionnaire* created by Zuckerman (2010). Components of homosexual behaviour included kissing, touching a person's genitals, penetrative sex, oral sex, and mutual masturbation. The higher the score a person gets, the more homosexual experience that person has engaged in. The hypothesis here was that self-identified heterosexual women would have a higher score pertaining to homosexual experience compared to heterosexual men, and this was tested using a one-way ANOVA. The hypothesis was supported as females scored higher ($M = 9.09$, $SD = 3.99$) than males ($M = 7.58$, $SD = 3.68$) on homosexual experience $F(1, 146) = 4.408$, $p = .037$, $\eta^2 = 0.03$. Self-identified heterosexual women had higher homosexual experience scores compared to self-identified heterosexual men.

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Regarding the SOI-R, there were several hypotheses. The first was that men would have higher total scores for the SOI-R and on the sub-sections of the SOI-R, such as desire for casual sex and more romantic partners, when compared to women. Men were also predicted to have a more relaxed attitude regarding casual-sex behaviours when compared to women. The results of the SOI-R are consistent with what has been found regarding female and male sociosexuality (Schmitt, 2005); the men had higher rates of sociosexuality compared to females (Schmitt, 2005). For the total SOI-R, men scored higher ($M = 50.15$, $SD = 13.34$) than women ($M = 37.72$, $SD = 11.76$) $F(1, 144) = 30.05$, $p < .001$ $\eta^2 = 0.17$ (see figure 4).

For the sub-section of the SOI-R that assesses sexual behaviour, there was a significant difference between self-identified heterosexual women and men. Men had higher scores ($M = 11.58$, $SD = 6.42$) than women ($M = 9.00$, $SD = 5.12$), $F(1, 147) = 6.52$ $p = .012$ $\eta^2 = 0.04$ (see figure 5).

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Figure 4: Mean total of SOI-R scores of self-identified heterosexual (mostly straight) women and men.

Figure 5: Mean SOI-R of behaviour component scores of self-identified (mostly straight) heterosexual women and men.

For the sub-section of attitudes regarding casual sex, there was a significant difference between self-identified heterosexual women and men regarding casual sex.

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Once again, men ($M = 17.00$, $SD = 4.13$) scored higher than women ($M = 15.32$, $SD = 3.7$), $F(1, 149) = 5.629$, $p = .019$ $\eta^2 = 0.04$ (see figure 6).

Figure 6: Mean attitude scores of self-identified heterosexual (mostly straight) women and men on the SOI-R.

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Concerning the desire aspect of the SOI-R, there was a significant difference between self-identified heterosexual women and men, with men ($M = 17.19$, $SD = 6.22$) desiring more casual sex compared to women ($M = 10.20$, $SD = 5.07$), $F(1, 151) = 50.49$, $p < .001$, $\eta^2 = 0.25$ (see figure 7).

Figure 7: Mean SOI-R scores of desire for casual sex in self-identified heterosexual (mostly straight) women and men.

Part Two: Discussion

The majority of the heterosexual women studied indicated that they do have a tendency to engage in same-sex sexual behaviour. The same pattern is not present in the heterosexual men studied. Self-identified heterosexual women were more physically and emotionally attracted to, and had more sexual fantasies regarding, the same-sex when compared to men over the past year. Further, self-identified heterosexual women generally have more homosexual experiences compared to self-identified heterosexual men. Women and men differed on the SOI-R insofar as the men wanted more casual sex partners, and had more lax attitudes regarding casual sex compared to women. Men also desired more casual sex compared to women.

To reiterate, this study shows that women who self-identify as heterosexual are indicating some same-sex sexual attraction in the form of physical, emotional, or sexual fantasy, whereas heterosexual men are not showing the same pattern. Thus, the differing struggles of women and men are illuminated when a trait is sex-specific. The data supports that many women, but not men, are sexually fluid, as heterosexual women are more prone to engage in same-sex sexual behaviour.

Women often were inconsistent in their answers. For example, many women said they were completely heterosexual—a 0 on the Kinsey Scale—yet later, in the survey of *Assessing Multiple Facets of Attraction to Women and Men*, they indicated that they were attracted to women, for example, 20% of the time. (See table 1 for examples of score discrepancies.) Straight men were much less variable, generally directing 100% of their physical and emotional attraction and fantasy to women (see table 2). The discrepancy is rather perplexing, as women who report being completely heterosexual are also

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indicating that they have some physical, emotional, and sexual fantasies regarding other women. Heterosexual women may not be aware of the latent attractions they can have for other women. These attractions may come to fruition if conditions are met, as is suggested in the allomothering hypothesis where women in the EEA faced different challenges compared to men especially regarding parental investment. Same-sex sexual attraction would then also occur in a more “modern” environment. Females may experience same-sex sexual attraction by proxy as a “modern” environment has many more conditions that may induce same-sex sexual attraction or behaviour that is not directly related to allomothering.

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Table 1: Examples of female participant answers: Kinsey score and attraction (percent of attraction and fantasy of women versus men over the past year).

Kinsey Score	Physical	Emotional	Fantasy
0	10	1	1
0	30	10	50
0	20	50	15
0	5	5	30
0	33	12	33
0	10	10	40
0	10	20	0

Table 2: Examples of male participants: Kinsey score and attraction (percent of attraction and fantasy of women versus men over the past year).

Kinsey Score	Attraction	Emotional	Fantasy
0	100	100	100
0	100	100	100
0	100	100	100
0	100	100	100
0	100	100	100
0	100	99	100
0	100	100	100

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One reason for these findings may be that women engage in same-sexual behaviour as a result of allomothering. The allomothering hypothesis states that self-identified (mostly straight) women sexually pair-bond with other women to help in rearing each other's offspring when condition-dependent circumstances (such as mate abandonment or mate death) are met.

The apex of evolution is usually discussed in terms of reproductive success—that is, passing one's genes on to the next generation. However, one must be able to survive to a reproductive age to be able to pass on genes. The allomothering hypothesis maintains that allomothering is a survival strategy, a strategy that is used to help women and their offspring survive under certain conditions. Even though the hypothesis is heavily centered on same-sex sexual behaviour, that behaviour is used as a bonding mechanism, one that is theorized to be strong. The struggle to survive can be harsh (Hart & Sussman, 2008; Potts & Hayden, 2008), and if a strategy such as the proposed allomothering hypothesis helps women and offspring survive, it could be included in the arsenal of survival strategies even though it includes the seemingly counter-productive phenomenon of same-sex sexual behaviour.

Modern humans emerged approximately 200,000 years ago (Dawkins, 2004). The physiological evolution of the brain of the modern human is not as fast as cultural evolution; thus shadows of the brain and its adaptive behaviours can be observed in modern individuals, if properly investigated. Women and men faced different struggles in the Environment of Evolutionary Adaptedness (EEA) (Tooby & Cosmides, 1990). Therefore, many traits that enhance survival are observed among women but not men, and vice versa. If women and men had faced identical struggles and responded similarly

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to those struggles, there would not be a large difference in behaviour outcomes (Buss, 2004). However, if women and men in fact faced differing struggles—and this is especially apparent in parental investment and mating—then there would be, at times, stark differences as to what would benefit women and men in terms of survival and passing on genes.

When women mate, there is much more at stake in terms of reproductive success; the most obvious risk for women is that of becoming pregnant by a man that is unsuitable in terms of remaining in the relationship and helping to rear offspring until they can fend for themselves (Buss, 1989, 2004). Men do not need to worry about becoming pregnant themselves, so they are less concerned about having to expend nine months of energy to support the growth of a baby. Women, on the other hand, risk the chance of becoming pregnant whenever engaging in mating behaviour. If they do become pregnant, many men do remain in the relationship helping to raise offspring and providing resources for mother and child (Buss, 1994). However, there are men who do not continue to be present in the life of the mother and offspring and do not help raise offspring, provide resources, or leave when a child is still very young and this is speculated to be especially true in the EEA, where women and men did not usually live a long life, and men generally died earlier than women (Buss, 1994; Pinker, 2011). Females were thus at risk of losing a male partner by means of desertion or the death of a mate (Buss, 1994). It has been found that when a woman has children and is alone, her mate-value will generally decrease (Buss, 2004). A person's mate-value is associated with many factors that are different for women and men, although cross-culturally there are some generalities (Buss, 1989; Schmitt, 2003). Cross-culturally, women who are older, have children, and are not

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especially fertile decrease in mate-value (Buss 1989; Schmitt, 2003). Single women with offspring were in a precarious situation in the EEA, as kin were not necessarily present to help with raising offspring and other tasks that increased survival, such as food gathering and protecting the self from becoming prey to another animal.

The SOI-R highlights a mating discrepancy between women and men. Men in the EEA would presumably score similarly to men today, exhibiting a greater desire to engage in casual sex and wanting more sex partners, as more sex partners is one way for men to pass on their genes (Buss, 1999). Men's desire for more casual sex partners, and more partners in general, may be one of the reasons that heterosexual females have a readiness for sexual fluidity and thus allomothering. If a male desires other sexual partners, he has a higher chance of leaving any given female (Buss, 1989; Buss & Schmitt, 1993). The male sometimes leaves behind a pregnant female or his own children, allocating precious resources to a different woman and her offspring. The allomothering hypothesis argues that because of male desertion, women might team up, pair-bond, and help in rearing each other's children, and sexual contact could increase the likelihood of either women feeling more bonded to the other. Allomothering and pair-bonding between women may be a key reason that humans have survived, as cooperation was paramount among early human hunter-gatherers (Fletcher, Simpson, Campbell, & Overall, 2015).

The more that is understood about sexuality, the more people will possibly feel at ease with their feelings. More evidence is indicating that many women identify as "mostly heterosexual" (Savin-Williams & Vrangalova, 2013). These women are often confused and disillusioned with their feelings (Diamond, 2008; Walsh & Andre, 2010),

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as the idea of being “mostly straight” has not yet been legitimized or well known among the general public. This information, for now, seems to be accessible mostly to sex researchers. In the sample for this study, many women indicated that they have a Kinsey score of 0, meaning completely heterosexual, but then reported that they are attracted to women some of the time; these are examples of individuals who perhaps feel “mostly straight.” Societal relevance is extremely important when discussing same-sex attraction, as many groups and individuals feel that this behaviour is not “natural” or that it is “going against nature,” and offer a whole plethora of reasons to demonize same-sex sexual behaviour (Barnes & Meyer, 2012; Kaysen, Kulesza, Balsam, Isaac, et al., 2014). However, with more studies such as this one, and more people that understand the reasons why the behaviour may arise, individuals may feel more comfortable with themselves.

Limitations and Conclusion

There are several limitations to this study. One limitation is that the sample had more women than men. Participants mostly identified as “White,” “Caucasian,” and of “European descent.” Another limitation is that participants may not have answered honestly, especially with regards to men and same-sex sexual behaviour. Studies on self-identified heterosexual men have shown that they are less sexually attracted to the same-sex (compared to self-identified heterosexual women) as demonstrated in genital monitoring studies (Chivers et al., 2004; Safron, Barch, Bailey, Gitelman, et al., 2007). The statistical test MANOVA may have been a better test to use as some parts of the study had several dependent variables therefore the chances of a type I error occurring are increased.

There is a stigma that seemingly exists regarding male same-sex sexual behaviour (Pinker, 2011; Stamos, 2008). Same-sex sexual behaviour in males is thought to be, generally, not as widely accepted as female same-sex sexual behaviour, thus it may be under-reported due to the social desirability bias that often occurs in self-report studies (Pinker, 2011). However, the acceptance of male same-sex sexual behaviour (in Western Societies) is changing (Pinker, 2011). Thus the social desirability bias effect may be decreasing (Gallop, 2001, 2002). Due to the increasing acceptance of male same-sex sexual behaviour in many Western countries, genital arousal studies (Chivers et al., 2004, 2007; Safron et al., 2007) are most likely accurate as men may not be as hesitant to suppress same-sex sexual attraction as it becomes more acceptable. Even though there is a rise in the acceptance of same-sex sexual behaviour among men in Western society, there still may be a bias in how some straight men respond. There is converging evidence

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that does support the argument that homosexual male activity is more accepted, however it is not definitive evidence.

Male genital response is difficult to control, if a male is viewing sexually stimulating films; it is tough for many males to control arousal (Friedman, 2003). Therefore genital studies may make it difficult for men (whether gay or straight) to control what it is that genitally arouses them. Further research could conduct a study in a society that is extremely accepting of same-sex sexual behaviour among women and men and investigate the self-reporting rates of same-sex sexual behaviour and measure genital arousal to various depictions of sexual behaviour among self-identified heterosexual men and investigate if there is a difference.

There were problems with the measure *Assessing Multiple Facets of Attraction to Women and Men*, such as the fact that it did not test actual sexual behaviour; while it tested fantasy, as well as physical and emotional attraction, there was not any indication as to whether any actual sexual behaviour took place. The second issue is that, statistically, the measure was difficult to adapt for the purposes of this dissertation. As stated previously, to better compare straight women and men, a standardization of scores closest to 50 (where 50 indicated attraction to the opposite sex, and 0 to the same sex) was developed.

Although Diamond (2010) has ushered in a different way to examine female same-sex behaviour, there are some issues with her studies. The first is that Diamond has used the same sample of 80 women for at least eight years, as she describes in her book. Although 80 is an adequate sample, it would be more prudent to have data on more than 80 women who have consistently been referenced. Radtke (2013) highlights the issue the

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situation by suggesting that more studies are needed regarding female sexuality in general and studies that specifically study female sexual fluidity behaviour.

In sum, there is evidence that sexual fluidity is a sex-specific trait, as study 1 has shown. Women in general are more variable on the Kinsey Scale, and self-identified heterosexual women (but not men) show a discrepancy in physical and emotional attraction to the same sex. Heterosexual women also have sexual fantasies about other women, but heterosexual men do not seem to fantasize about the same sex at the same rate as women. Heterosexual females engage in more same-sex sexual behaviour as compared to men, although men are more inclined to want casual sex, have more relaxed attitudes toward casual sex, and have a desire for sex in general compared to women. This sex-specific trait, apparent in self-identified heterosexual women but not men, is evidence that women have a particular capacity for same-sex sexual behaviour. Why heterosexual women have this latent tendency for same-sex sexual behaviour is not known at this point; however, the allomothering hypothesis provides one possible reason.

One area that exploits female and male mating strategies and proclivities is the pornography industry. The industry caters to what men and women want to see and thus makes billions of dollars exploiting male and female mating strategies. The next study will examine pornography geared toward heterosexual women and pornography geared toward heterosexual men in order to assess what sexual repertoires the industry is exploiting. Specifically, are pornography films made for women showing scenes of female same-sex sexual behaviour, and does pornography made for men include male same-sex sexual behaviour?

Chapter 4:
**Differences between Same-Sex Sexual Behaviour in Pornography Made for
Heterosexual Women and Heterosexual Men**

Introduction

One way to examine the phenomenon of self-identified heterosexual (mostly straight) women having a propensity to engage in same-sex sexual behaviour is to study the pornography industry. Analyzing the amount of same-sex sexual content that appears in movies made for heterosexual women may be one way of highlighting an inclination for same-sex sexual behaviour. Likewise, analyzing movies made for heterosexual men may be a good indicator of whether heterosexual men have an inclination for same-sex sexual behaviour. The study investigates the content in the films rather than focusing on who watches the material. The content of the sexually explicit films is of particular interest as the movie directors will include scenes that heterosexual women prefer and what heterosexual men prefer. The question is, why is certain sexual content included in films that are made for heterosexual women or for heterosexual men? Thus, the goal of the study is to see if pornography geared toward heterosexual women includes depictions of female/female sexual behaviour, and to see if depictions of male same-sex sexual behaviour activities are included in movies made for men. An exploration of what type of sexual activity occurs in pornographic movies made for women and pornographic films that are geared toward men will be conducted.

Differences between male and female pornography have been delineated in past research (Buss, 1994; Traeen & Daneback, 2013). The pornography industry is a billion-dollar industry, traditionally catering to men (Traeen & Daneback, 2013). Often, females indicate that they are not as interested by sexual depictions in pornography generated for

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a male-only audience (Glascock, 2005). It is often thought that males watch pornographic movies and females read romance novels (also a billion-dollar industry) because of differing mating psychologies (Buss, 1994; Coles & Shamp, 1984; Hald, 2006; Lust, 2010). However, some women do enjoy watching visual depictions of sexual behaviour, although they feel that the pornography industry generally neglects the female audience (Lust, 2010). Therefore, many females have begun to direct pornography geared toward heterosexual women. Such prominent female directors include Erika Lust and Candida Royalle (Beggan & Allison, 2003; Lust, 2010). The rate of women watching pornography has increased, although men still generally watch and purchase pornography more frequently than women (Lust, 2010). Lust (2010) argues that heterosexual women may not have watched sexually explicit material as often as men because the content of the films made for heterosexual men generally did not appeal to heterosexual women. Although men are the primary consumers of pornography, many women also enjoy pornography if it caters to what they generally want to see. Pornography that is directed by women instead of men is being generated for heterosexual women (Lust, 2010). Pornography consumption among women may change as more directors take into account what females want to see in pornography and try to change the thinking that pornography is something mostly men consume (Beggan & Allison; Lust, 2010).

Evolved mating preferences can be extrapolated from what males and females find arousing in pornography. The same kind of exploitation occurs when fat and sugary foods are marketed to individuals. From an evolutionary perspective, fat and sugar were difficult to find in hunter-gatherer conditions; food was not as easy to obtain, and higher caloric foods were therefore appetizing to individuals. The food industry exploits the

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human tendency to want high-caloric food by advertising and producing such foods, making large amounts of money thanks to these evolved preferences (Buss, 2004). The pornography industry engages in the same activity by making movies that exploit evolved mate preferences. Pornography made for men generally depicts young women, who appear to be fertile, which is attractive to men (Buss, 2004). Further, the content of pornography for men features many instances of casual sex, where women will have sex with a man right away, which is not usually the case in everyday life (Buss, 2004). Pornography for men often contains threesomes between two women and one man, female masturbation, orgies, and sex with more than one woman (Lust, 2010). The content of porn has been studied from sociological, feminist, and other academic perspectives; however, the examination of content from an evolutionary perspective is not as common. An evolutionary perspective analyzes, in terms of adaptive mating strategies, why such content is in pornographic movies. For example, why is casual sex featured so prominently in pornography made for men? Why is it that two women having sex or threesomes having sex is such a common occurrence in pornography made for men? What adaptive trait does this content exploit? Pornography made for women has not been as readily studied as pornography made for men; however, pornography made for women will most likely exploit what women find arousing and attractive. Again, here an evolution-based examination will focus on why certain depictions of sexual activity are included in these films.

Generally, the best-selling pornography movies of all time were not sub-genre films such as “MILF” films or movies that, for example, only contained scenes of oral-genital sex. They were mainstream films. However, there were two films in the sample

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(*Girlfriends* and *Where the Boys Aren't*) in which the content was specific and which only depicted women having sex with other women.

This study will compare movies and portrayals of sexual behaviour that are made for heterosexual women, and those that are made for heterosexual men. The study will place an emphasis on depictions of female/female same-sex sexual behaviour in pornography geared toward women and pornography geared toward men. There is some evidence that sexual fantasy correlates to desired sexual behaviour and that pornography caters to evolved mating psychologies (Ellis & Symonds, 1990).

The first hypothesis is that heterosexual women have a predisposition to engage in same-sex sexual behaviour and thus depictions of female same-sex sexual behaviour will appear in pornography made for a heterosexual female audience, highlighting women's inclination to be sexually fluid. Further, it is predicted that male pornography will also have scenes depicting female/female same-sex sexual behaviour, and thus there will not be a significant difference between female/female sexual behaviour in pornography made for heterosexual women and pornography made for heterosexual men. An analysis of male/male same-sex sexual depictions will also be analyzed both in pornography made for women and pornography made for men. Pornography made for straight men is predicted not to feature a high amount of male same-sex sexual behaviour, as it does not seem to exploit a mating mechanism that could be adaptive, further, pornography geared toward heterosexual women is predicted to have very few depictions of male same-sex sexual behaviour. The behaviour does not seem to exploit any mechanism of survival for females or males. Male and female sexual behaviour is predicted to be in movies geared toward heterosexual women and movies made for heterosexual men.

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To investigate how female and male pornography may or may not differ, analyses will be conducted of percentages of scene depictions featured in pornographic movies made for women and films made for men (see figure 3 for scene depictions and their coding schemes).

Method

Materials

The top-grossing 15 pornographic movies of all time geared toward heterosexual women and the top-selling 15 movies of all time intended for heterosexual men were used in the analysis. These were the top-selling movies as of late 2013, and may differ from the current top-selling movies of all time (for the names of the movies used, see tables 3 and 4). The films made for men were selected from *Adult DVD Empire*, the largest online store that sells pornography. The website has a list of the top-selling pornography movies ever made. A cross-check was performed on another popular website, *Vivid Entertainment*, to see if the films matched in sales, and indeed, many of them did. In the case of movies geared toward men, attaining the best-selling pornography was not difficult; however, attaining the all-time best-selling pornography films for females was more challenging, as there were not as many websites devoted to heterosexual female pornography, and further, movies made for heterosexual females were not easily identifiable. To address the issue, the top-selling movies on Erika Lust's website was consulted (the website sells movies by other female directors as well) and caters to pornography made for females (Lust, 2010). The website is popular with women who are seeking sexually explicit films geared toward a female audience

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Films that were compilations of best-selling scenes were not used in the analysis, as they did not represent a single film but combine scenes from various films, and so did not feature independent plots. Another genre of movies geared toward men, listed as “virtual sex,” feature only one woman looking directly at the camera where the man can imagine he is having sex with the woman by her positioning; these films were also not used, even though many were listed as best-sellers. The lists of top-selling movies for women did not include any films that featured “best-of” collections of scenes from a particular pornography company or “virtual sex” movies. In contrast, 10 of the best-selling movies for men were compilation videos, and two were “virtual sex” videos. They were not included in the study. A MANOVA will be used to test the data as it has nine outcome variables (scenes in pornographic movies), using a MANOVA will decrease the chances of a type I error occurring.

Procedure

Each movie was rented online and was watched twice by one coder. Scenes depicting female and male same-sex sexual behaviour and male and female sexual behaviour were of particular interest. The percent of sex scenes, such as male and female, or female and female, was coded along with other sexual behaviour featured in the movies, such as scenes featuring two females and one male or two males and one female. An example of a code for male/female is MF (see table 3).

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Table 3: Codes used to identify sexual scenes in movies made for men and movies made for women.

Sexual Behaviour	Code
Male/Female	MF
Female/Female	FF
Female/Female/Male	FFM
Female/Female/Female	FFF
Female/Male/Male	FMM
Orgy (four or more people)	O
Solo/Woman	SW
Solo/Man	SM
Male/Male	MM

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Table 4 identifies the top-selling movies geared toward men, the years in which they were made, their duration, and the companies that directed them. Table 5 lists the best-selling pornographic movies made for women, the years in which they were made, their duration, and the companies that directed them.

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Table 4: Best-selling pornography movies made for men.

Name	Year	Duration	Company
<i>Flashpoint</i>	1999	111 minutes	Wicked Pictures
<i>Pirates</i>	2005	129 minutes	Digital Playground
<i>Island Fever</i>	2001	83 minutes	Digital Playground
<i>Island Fever 3</i>	2004	87 minutes	Digital Playground
<i>Dream Quest</i>	2000	127 minutes	Wicked Pictures
<i>Brianna Loves Jenna</i>	2002	80 minutes	Club Jenna
<i>Bad Wives</i>	1997	74 minutes	Vivid Entertainment
<i>Ancient Secrets of the Kama Sutra</i>	1997	72 minutes	Vivid Entertainment
<i>The New Miss Devil in Miss Jones</i>	2005	109 minutes	Vivid Entertainment
<i>Flesh Hunter: Jules Jordan</i>	2001	139 minutes	Digital Playground
<i>Space Nuts</i>	2003	185 minutes	Wicked Pictures
<i>The Awakening</i>	1998	86 minutes	Vivid Entertainment
<i>Forbidden Tales</i>	2001	83 minutes	Digital Playground
<i>Euphoria</i>	2001	139 minutes	Wicked Pictures
<i>Where the Boys Aren't #12</i>	1999	83 Minutes	Vivid Entertainment

Table 5: Best-selling pornography movies made for women.

Name	Year	Duration	Company
<i>Cabaret Desire</i>	2011	80 Minutes	Erika Lust Films
<i>Life/Love/Lust</i>	2010	35 Minutes	Erika Lust Films
<i>5 Hot Stories for Her</i>	2007	120 Minutes	Erika Lust Films
<i>Dirty Diaries</i>	2009	105 Minutes	Njuta Films
<i>Pink Prison</i>	1999	87 Minutes	Innocent Pictures
<i>Matinee</i>	2010	30 Minutes	Blue Artichoke Films
<i>Skin like Sun</i>	2009	60 Minutes	Blue Artichoke Films
<i>Expert Guide to Cunnilingus</i>	2007	78 Minutes	Vivid Ed Films
<i>X-Femmes</i>	2009	135 Minutes	Erika Lust Films
<i>All About Anna</i>	2008	91 Minutes	Innocent Pictures
<i>Ooooooh!</i>	2010	72:37 minutes	SoFemmes Productions
<i>Submission of Emma Marx</i>	2013	117 Minutes	New Sensations
<i>The Seven Deadly Sins and Lust Vol. 3</i>	2007	87 Minutes	Maria Beatty's Fetish Films
<i>Constance</i>	1998	70 Minutes	Zentropa Films
<i>Girlfriends</i>	2001	137 Minutes	Andrew Blake Films

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Table 6: Percentage of type of sexual scenes in pornography movies geared toward men (see table 3 for meaning of acronyms).

Movie	MF	FF	FFM	FFF	FMM	Orgy	SF	SM	MM
<i>Pirates</i>	60%	30%	10%	0%	0%	0%	0%	0%	0%
<i>Flashpoint</i>	37.5%	12.5%	25%	0%	0%	25%	0%	0%	0%
<i>Island Fever</i>	83%	0%	0%	0%	0%	0%	17%	0%	0%
<i>Island Fever 3</i>	83%	17%	0%	0%	0%	0%	0%	0%	0%
<i>Dream Quest Brianna</i>	66.6%	16.7%	16.7%	0%	0%	0%	0%	0%	0%
<i>Loves Jenna</i>	42.9 %	42.9 %	0%	0%	0%	14.2%	0%	0%	0%
<i>Bad Wives</i>	67%	16.7%	16.7%	0%	0%	0%	0%	0%	0%
<i>Ancient Secrets of the Kama Sutra</i>	43.0 %	14.28%	14.28%	0%	14.28%	14.28%	0%	0%	0%
<i>New Devil in Miss Jones</i>	50%	33.3%	16.7%	0%	0%	0%	0%	0%	0%
<i>Flesh Hunter: Jules Jordan</i>	50%	12.5%	25%	0%	0%	0%	12.5%	0%	0%
<i>Space Nuts</i>	81.8%	9.10%	9.10%	0%	0%	0%	0%	0%	0%
<i>The Awakening</i>	67%	25%	0%	0%	0%	8.3%	0%	0%	0%
<i>Forbidden Tales</i>	87.5%	12.5%	0%	0%	0%	0%	0%	0%	0%
<i>Euphoria</i>	50%	33.3%	16.6	0%	0%	0%	0%	0%	0%
<i>Where the Boys Aren't #12</i>	0%	60%	0%	20%	0%	20%	0%	0%	0%

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Table 7: Percentage of type of sexual scenes in pornography movies geared toward women (see table 3 for meaning of acronyms).

Movies	MF	FF	FFM	FFF	FMM	Orgy	SF	SM	MM
<i>Dirty Diaries</i>	43%	57%	0%	0%	0%	0%	0%	0%	0%
<i>Constance</i>	50%	37.5%	0%	0%	12.5%	0%	0%	0%	0%
<i>Skin Like Sun</i>	100%	0%	0%	0%	0%	0%	0%	0%	0%
<i>5 Hot Stories for Her</i>	75%	25%	0%	0%	0%	0%	0%	0%	0%
<i>7 Deadly Sins</i>	75%	25%	0%	0%	0%	0%	0%	0%	0%
<i>Lust Love Life</i>	75%	25%	0%	0%	0%	0%	0%	0%	0%
<i>Cabaret Desire</i>	80%	20%	0%	0%	0%	0%	0%	0%	0%
<i>Matinee</i>	100%	0%	0%	0%	0%	0%	0%	0%	0%
<i>Pink Prison</i>	60%	20%	10%	0%	0%	0%	0%	0%	10%
<i>Expert Guide to Cunnilingus</i>	60%	40%	0%	0%	0%	0%	0%	0%	0%
<i>X-Femmes</i>	60%	40%	0%	0%	0%	0%	0%	0%	0%
<i>All About Anna</i>	75%	25%	0%	0%	0%	0%	0%	0%	0%
<i>Ooooooh! Submission of Emma Marx</i>	75%	25%	0%	0%	0%	0%	0%	0%	0%
<i>Girlfriends</i>	0%	100%	0%	0%	0%	0%	0%	0%	0%

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Table 8: Mean percentage of total movie scenes made for women and men (see table 3 for meaning of acronyms).

Total Scene Percentages	MF	FF	FFM	FFF	FMM	O	SW	SM	MM
Made for Women	68.0%	30.0%	0%	0%	0.83%	0%	0%	0%	1.3%
Made for Men	57.9%	23.0%	10.0%	1.3%	0.95%	5.4%	1.9%	0%	0%

Results

For the types of scenes that were depicted in movies made for heterosexual men, see table 6, and for the types of scenes depicted in movies that were made for heterosexual women, see table 7. A MANOVA was used to test the differences of the percentage of various sexual scenes in pornography movies that are made for women and pornography movies that are made for men. Using Pillai's trace, there was a significant difference between the movies made for women and movies made for men regarding the percentage of various sexual scenes $V = 5.3$, $F(8, 21) = 2.9$, $p = .023$.

However, separate ANOVA's on the outcome variables found that there was no significant difference regarding female/female sex scenes in pornography made for women ($M = 30$, $SD = 25.7$) and movies made for men ($M = 23.0$, $SD = 17.0$), $F(1, 28) = .776$, $p = .386$. For male/male sexual scenes, there was no significant difference between movies made for women ($M = 1.3$, $SD = 5.2$), and those made for men ($M = 0$, $SD = 0$), $F(1, 28) = 1.0$, $p = .326$. Scenes that depicted male/female sexual activity did not differ for movies made for women ($M = 68$, $SD = 25.6$), and films made for men ($M = 58.0$, $SD = 23.0$), $F(1, 28) = 1.3$, $p = .268$.

For differences between pornography made for women ($M = 0$, $SD = 0$) and pornography made for men ($M = 10.0$, $SD = 9.4$) regarding female/female/male sexual scenes there was a significant difference $F(1, 28) = 16.8$, $p < .001$. There was no significant difference of female/male/male scenes and pornographic movies made for women ($M = .83$, $SD = 3.2$) and movies made for men ($M = .95$, $SD = 3.6$), $F(1, 28) = .009$, $p = .926$. For scenes that depicted orgies, there was a significant difference between movies made for women ($M = 0$, $SD = 0$) and those made for men ($M = 5.4$, $SD = 8.6$), F

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(1, 28), = 5.9, $p < .05$. Regarding scenes of solo masturbation by women there was no significant difference between movies geared toward women ($M = 0$, $SD = 0$) and movie geared toward men ($M = 2.0$, $SD = 5.3$), $F(1, 28) = 2.1$, $p = .159$. There were no depictions of male masturbation in movies made for women or men. Regarding female/female/female sexual scenes, there was no significant difference between the scenes in movies made for women ($M = 0$, $SD = 0$) and movies made for men ($M = 1.3$, $SD = 5.2$), $F(1, 28) = 1.0$, $p = .326$.

The hypothesis that the top-selling pornography movies made for heterosexual females and movies made for heterosexual males would both feature depictions of female same-sex sexual behaviour supported. There was no statistical difference. There was no statistical difference in the percentages of male/male sexual scenes, in movies made for heterosexual men. Not one movie geared toward heterosexual men featured male/male sexual behaviour. Movies made for women and movies made for men did not differ in male/female sexual scenes, there was no significant difference. There was a significant difference regarding female/female/male sexual scenes and a significant difference for depictions of orgies. Solo masturbation by women, solo masturbation by men, female/female/female, and male/female/female scenes garnered no statistically significant results. There were some scenes in the films made for men that were not in the female films (see table 8).

Discussion

Movies that were made for heterosexual men did not significantly differ from those made for heterosexual women with respect to scenes of female/female sexual behaviour, male/female sexual behaviour, and male/male sexual behaviour which were the categories most pertinent to the study.

The content of sexually explicit films needs to be examined and not attributed to “common sense.” If it is “common sense” that certain behaviour is included in pornography movies, the question then becomes, why is it common sense? To say that something is just “common sense” seems to be a weak argument, and that does not answer the question of why content is included in films.

There are some similarities and differences that emerge between pornography made for heterosexual women and pornography made for heterosexual men. The most prominent of these is perhaps that movies that are made for heterosexual men contain more variety, such as where sexual encounters take place, more positions, and more orgies, as compared to films made for heterosexual women (see tables 6, 7, & 8). The pornography industry has long exploited the mating strategies of men (Pound, 2002). The same may be true of pornography that is now being made for women (Lust, 2010). Movies made for men often show an idealistic view of what men desire (Buss, 1993). These exploits match what evolutionary-based studies have found—namely, that many men prefer (provided the choice) younger women with a high waist-to-hip ratio, indicating fertility (Pound, 2002). Further, the movies depict fast, casual sex, where women will engage in a sexual encounter without much banter (Lust, 2010). The films highlight how the female character wants to have sex with the male character right away.

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Female/female scenes figure prominently in almost all the movies made for men, and male/female/female scenes are also prominent. Sometimes, more than two women are shown to eagerly want to participate in sexual behaviour with each other and with the man in a scene.

The same patterns are not found in pornography that is made to exploit the ideal mating habits of women. Films that were made for women did not have a large variety of sexual-scene depictions; most of the scenes were either women and men engaging in sexual behaviour or two women engaging in sexual behaviour. Sex was portrayed in a slower fashion, and women often had sex with men who were generally attractive. This was not always the case in movies made for a male audience; for example, one movie made for men portrayed a man dressed as an alien having sex with a woman.

Male same-sex sexual behaviour was not a popular occurrence in pornography made for women; only one movie, *Pink Prison*, contained a male/male sexual scene. The hypothesis that pornography movies made for men would contain no depictions of men engaging in same-sex sexual behaviour was supported; none of the best-selling movies contained a male/male sexual scene. Instead, male pornography contained an ample amount of depictions of two women engaging in same-sex sexual behaviour in various ways, such as two women alone, and two women and one man. Of the films geared toward heterosexual males, 14 out of 15 (93%) had a female/female sexual scene.

In fact, one of the best-selling films for men featured *only* women having sex with each other (*Where the Boys Aren't #12*). None of the movies made for heterosexual men contained sexual activity (anal or oral sex, hand jobs, etc.) between two men. Male same-sex sexual scenes were not in most of the movies made for heterosexual women, either.

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The reason may be that a woman would not benefit, in evolutionary terms, from mating with two men at the same time. The woman could only become pregnant by one of the men, and the resulting paternity uncertainty could lower her mate-value (Buss, 2004). In this case, there seems to be no alloparenting benefit that might serve to trigger a preference for viewing such behaviour in pornography (as I argue is the case with men). Interestingly, one of the top-selling movies made for females (*Girlfriends*) contained *only* female/female sex scenes and had no depictions of any male sexual activity. Both of the films were directed by men (*Girlfriends* is the only film directed by a man on the best selling movies made for women). The film may not have been intended for a heterosexual female audience, however, it did appear on the best selling films heterosexual women purchased.

One of most interesting findings pertaining to the allomothering hypothesis and sexual fluidity, then, is that pornography made for heterosexual women (and for heterosexual men) includes scenes of female same-sex sexual behaviour. This is an indication that filmmakers are exploiting a key part of the female sexual repertoires—namely, that heterosexual women at times engage in same-sex behaviour, or are at least are drawn to it as is illustrated in the pornographic movies made for heterosexual women.

Men, it seems, have a reason to want to take part in, or simply watch, female same-sex sexual behaviour. One reason may be related to the alloparenting hypothesis. If a man engages in a casual encounter with two women, he increases his chances of insemination. Men might have thus developed a psychological preference for watching two females have sex, or two females and a male have sex. If a man does make one of the women (or both) pregnant, he might not worry as much about the well-being of his

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offspring should the two women form a sexual pair-bond for the sake of raising this offspring. The male increases his chances of having a child with adequate rearing to survive.

According to the alloparenting hypothesis, the male is drawn to the female, who could potentially be the mother to his offspring. It is interesting to note that it is not only the pornography industry that is exhibiting a high amount of female/female sexual contact, but also mainstream media. The amount of female same-sex sexual behaviour represented on television and in mainstream movies has steadily increased (Waxman, 2007).

Same-Sex Sexual Behaviour in Mainstream Media

The increase of female same-sex sexual behaviour in mainstream media is often thought to be for entertainment purposes or to titillate men (Diamond, 2005; Ussher, 2005). Women who self-identify as heterosexual and who engage in same-sex sexual behaviour are often berated by self-identified lesbians and bisexuals, who claim that these heterosexual women are experimenting and that their feelings are not legitimate (Sincero, 2005). This point of view is unfortunate. From the perspective of the allomothering hypothesis, self-identified heterosexual women who experiment sexually with other women have a legitimate predisposition to engage in this behaviour. They are not “lesbian,” “bisexual,” or “fake lesbians,” but something altogether different, a sexual category that needs more research. To brush off the same-sex sexual behaviour of heterosexual women and attribute it to being a fad is insulting to women. More research is needed into this category of self-identified heterosexual women who do engage in periodic same-sex sexual behaviour, and the allomothering hypothesis may provide an

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adequate account of why this behaviour occurs. I postulate that female same-sex sexual behaviour among women is not the only possibly evolutionary trend that is prominent in mainstream media. Popular films and television programs often show murder, violence, and passionate sex, and all these themes were issues that needed to be contended with in the EEA (Pinker, 2011). Perhaps the human brain can identify with these themes and that is also why these topics garner a large amount of money among mainstream movies and television programs.

Limitations and Conclusion

There is an interesting pattern in pornography geared toward women versus pornography geared toward men. Female same-sex sexual behaviour figures prominently both in the top-selling movies made for men and those made for women. The allomothering hypothesis can be used to explain why both kinds of movies feature same-sex sexual behaviour between women. According to this theory, heterosexual women are predisposed to engage in sexual relationships with other women in cases where allomothering is beneficial. Thus, women will be sexually drawn to depictions of female same-sex activity, as it is a built-in mechanism that may be triggered by certain environmental circumstances. Two examples are if a male partner dies or if a male partner abandons the relationship. There is not much of a desire to for women to view men engaging in same-sex sexual behaviour, as this provides no such potential benefit to women. On the other hand, men have good reason to be attracted to the idea of female/female sexual activity and threesomes involving two women and a man. Besides being able to inseminate more than one woman at a time, a man may have reason to

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believe that if he does impregnate either of his partners, his children would be taken care of as a result of the allomothering that might take place between these two women.

Future research on the prominence of female same-sex sexual behaviour in pornography made for men might focus on mate attraction. Two women may be able to acquire a high-quality mate (high-genetic quality) by exploiting his desire to be with two women sexually. This may be one of the reasons females also engage in same-sex sexual behaviour with one man—that is, to secure that high-genetic-quality male's offspring, whether he is involved in raising it or not, since the two women could help each other raise the offspring together. More studies are needed to see if there is any merit to this hypothesis.

The limitations of the study include not being able to know for certain who is actually watching these movies. It cannot be assumed, for example, that only heterosexual women are watching the films made for heterosexual women. The same is true of the films geared toward heterosexual males; it is difficult to assess if only heterosexual men are watching these movies, or if women are also watching them. There is no way of tracking who is watching what films. However, as Lust (2010) has indicated, many women have expressed distaste for male pornography and would prefer having more films that were geared toward a female audience. As previously stated, the content that was included in the films was of more interest than who is really watching the films. Indeed there may be overlap as to what women and men watch. The films need to be appealing to the target audience so that the target audience will buy the product and generate revenue (Traeen & Daneback, 2013). Another limitation was that only one coder was used (the author was the coder) to watch and code the movies; however, the coder

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did watch each movie more than once. The sample of movies used for the study are North American, and perhaps the sexually explicit films differ cross culturally. With that being said, Buss and Schmitt (1993) and Schmitt (2003, 2005) conducted cross-cultural studies regarding mating preferences, and generally they were similar worldwide. Therefore the explicit films may indeed represent what women and men want to see in general across cultures.

Thus far, it has been demonstrated that, generally, heterosexual women, but not heterosexual men, have a proclivity to engage in same-sex sexual behaviour. The propensity of self-identified heterosexual females to engage in same-sex sexual behaviour is highlighted by what the pornography industry typically includes in films. However, the question remains, why do self-identified heterosexual females engage in same-sex sexual behaviour? The next study will directly address the allomothering hypothesis and argue that one of the reasons heterosexual women have a tendency to engage in same-sex sexual behaviour is because of the cooperative strategy of allomothering between women, which can aid in the survival of a female and her offspring.

**Chapter 5:
Same-Sex Sexual Behaviour and Allomothering:
Testing the Allomothering Hypothesis**

Introduction

Women and men often faced differing struggles in the EEA. Many of these differing struggles related to mating and raising offspring. Raising offspring to an age at which they can fend for themselves is crucial. It is especially paramount to the sex that invests more time and effort in the mating and reproduction process, which is typically the female (Buss, 1989). As a result of the investment that females make when pregnant, it would make sense that they would be more selective when choosing a mate, and, once offspring is born, go to great lengths to protect that offspring. Men do not need to worry about carrying a child and expending that amount of energy on mating; they can, theoretically, mate with many females, and for some men this is an optimal strategy for passing on their genes. For females, mating with numerous men is often not an optimal strategy. As a result of this discrepancy between the sexes, females may need a survival strategy that is used in circumstances such as mate desertion, mate death, a female's own death, or low mate value. That back-up strategy for women, I propose, is the tendency of heterosexual females to engage in sexually fluid behaviour in order to benefit from allomothering.

Allomothering

The main hypothesis being tested in this chapter is that self-identified heterosexual (mostly straight) women are sexually fluid because of possible benefits related to allomothering. Allomothering is when any organism other than the genetic mother or father engages in raising offspring (Hrdy, 2008). Allomothers are sometimes

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biologically related to the offspring, but sometimes they are not. With a correlational study—an assessment of whether there is a relationship between sexual fluidity and allomothering can take place.

This chapter focuses on allomothering that takes place between non-related animals, as it will explore sexual fluidity in relation to allomothering. Allomothering is observed between non-biologically related non-human animals such as meerkats (*Surricata surricata*), the common marmoset (*Callithrix jacchus*), Japanese macaques (*Macaca fuscata*), and various species of birds (Chism, 2000; Mota & Sousa, 2000; Raffaella, Bonaventura, Koyama, et al., 2006; Luhr, 2007). Allomothering also takes place in some great apes, including humans (Hrdy, 2008).

Allomothering behaviour is not only directed toward the very young, but extends into the childhood and adolescence of the offspring (Hrdy, 2008). When allomothering takes place between family members—for example, if a sister is helping another sister raise offspring—inclusive benefits for the allomother are being reaped. However, many allomothers are not related to each other. The question, then, becomes the following: Why would women help other, non-related women raise offspring?

Some clarification is needed regarding allomothering and how it operates in various ways. For example, allomothering is not just one animal helping rear one infant; in humans, for example, allomothering takes place in schools, daycares, and in extracurricular activities (Bentley & Mace, 2009; Hrdy 2008). Babysitting and play are also forms of allomothering. While play is fun, it also allows the older primate to watch and protect the younger primate, and while play behaviour is occurring, learning may take place (Bekoff, 2001; Keverne, 2005). Learning may take place through activities

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such as block-building, counting, and numerous other activities that take place when adults watch over younger individuals. The point is that allomothering extends beyond the infant period, well into the early and late childhood periods, and even into the pre-teen and teenage years (Bentley & Mace, 2009; Keverne, 2005). Various allomothering circumstances have been observed in humans (Bentley & Mace, 2009). In foraging tribes such as the Soloman Islander and Andaman Islander peoples, biological mothers leave their offspring with other women who are nursing so that the biological mother can perform tasks such as gathering food or attending to other offspring (Hrdy, 1999, 2008).

Sexual Fluidity

The allomothering hypothesis argues that the tendency for same-sex sexual behaviour (sexual fluidity) evolved in heterosexual (mostly straight) women due to the benefits of allomothering. Therefore, I propose that the ultimate cause of same-sex sexual behaviour in heterosexual women is allomothering. Kin are not always present and cannot always be relied on (Hrdy, 2008). Further, if a female is alone with her offspring, it is not an easy endeavor to take care of the offspring and survive. Therefore, if two females are in a similar predicament, or if a non-related female without offspring contributes to allomothering another female's offspring, it becomes a survival strategy that aids in the survival of the offspring as well as in the survival of the biological mother and allomother.

It was demonstrated in chapter 3 of this dissertation that heterosexual women, much more so than heterosexual men, engage in same-sex sexual behaviour even if they label themselves as "heterosexual." It has also been revealed that women experience attraction to the same sex, whether physical or emotional, and have sexual fantasies

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regarding the same sex, more frequently than heterosexual men. Further differences between women and men regarding casual-sex behaviour and the desire for casual sex are highlighted when examining results from the SOI-R. Women and men thus have different mating strategies, and that can result in the emergence of sex-specific traits that are optimal for the survival of one sex but not the other (Buss, 1989). Therefore, sexual fluidity is generally observed more frequently in women than men. A vital point is that the same-sex sexual behaviour usually will not interfere with sexual reproduction, as research has demonstrated that homosocial activities often occur in the stage of the ovulatory cycle when women are not ovulating. Therefore, such behaviour should not interfere with a woman's chances of reproduction (Fleischman, Fessler & Cholakians, 2014).

The study in chapter 4 showed that pornography geared toward heterosexual women is similar to pornography made for heterosexual males, both containing female same-sex sexual behaviour. This indicates a possible evolved mechanism that is perhaps being exploited with respect to what heterosexual women want to watch. As pornography exploits what males and females want to view, it is of interest that heterosexual female pornography contains depictions of female same-sex sexual behaviour.

Testing the Allomothering Hypothesis

While Diamond's (2010) measure, *Assessing Multiple Facets of Attraction to Women and Men*, was useful in measuring certain aspects of sexual fluidity, it did not measure actual sexual behaviour. The survey measured attraction, emotion, and fantasy, but did not ask about any physical same-sex sexual encounters throughout a person's life. It is critical to know if heterosexual women engage in sexual behaviour with each other

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to increase bonding, which could possibly result in the allomothering of each other's children. While physical attraction, emotional attraction, and sexual fantasy are a large part of a person's orientation—this dissertation is not suggesting otherwise—Diamond's measure leaves a large gap as it fails to measure whether self-identified heterosexual women actually have had sexual contact at some point with other women. *The Human Sexuality Questionnaire* measures various aspects of sexual behaviour, and the subsection used for this dissertation in chapter 3 was only a small part of a larger survey. However, it did have a small section on same-sex sexual behaviour, which was utilized to compare women and men with respect to homosexual experiences. This small subsection, however, did not measure the subject's enjoyment of any of the activities, which is important to the allomothering hypothesis as the theory predicts that females will not only partake in but also enjoy the behaviour, and thus more easily pair-bond to one another.

An imperative component to the allomothering hypothesis is its prediction that self-identified heterosexual (mostly straight) women who have had a same-sex sexual encounter would be likely to leave her offspring in the care of that woman, and that self-identified heterosexual women will generally think that women with which they engaged in sexual encounters have the traits of a good mother.

There was no such survey, however, that could adequately measure same-sex sexual behaviour and its relationship to allomothering. Thus, a survey was constructed and called *Self-Identified Heterosexual Females in Relation to Same-Sex Sexual Behaviour and Allomothering* (see appendix H). The survey had several goals regarding women who self-identified as heterosexual but at some point in life had engaged in same-

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sex sexual behaviour. The first goal assessed whether these women enjoyed the same-sex behaviour and to what degree they enjoyed it. The survey asked women to what degree they enjoyed light intimate behaviour, moderately intimate behaviour, and very intimate behaviour. The hypothesis was that the more self-identified heterosexual women and mostly straight women enjoyed the same-sex sexual encounter, the more likely they would be to rate that partner as having the traits of a good mother.

Another question asked if these women would leave their offspring for either a short or long period of time in the care of the woman with whom they had had a same-sex sexual encounter. The hypothesis was that the more women enjoyed their same-sex sexual encounter, the more likely they would be to leave offspring with that woman for either a short or long duration of time.

Reasons for Engaging in Same-Sex Sexual Behaviour

Another goal was to try and decipher why self-identified heterosexual and mostly straight women engaged in same-sex sexual behaviour. Several reasons were presented to the participants, and they then had to indicate which the reason was the one that had encouraged them to engage in same-sex sexual behaviour. The reasons for same-sex sexual behaviour consisted of reasons that were roughly “internal”—for example, “It felt like the right thing to do”—and “external”—for example, kissing another woman to receive attention from men, or being pressured to engage in the behaviour. The hypothesis was that women who engage in same-sex sexual behaviour for internal reasons would be more likely to rate their same-sex partner as having the traits of a good mother, and would also be more likely to leave offspring with that person for a long or short amount of time.

Emotional Attraction, Physical Attraction, Sexual Fantasy, and Openness to Same-Sex Sexual Behaviour

Emotional attraction was also included in the survey. The hypothesis was that the more a woman was emotionally attracted to another woman, the higher she would rate that woman in terms of being a good mother and the more likely she would be to leave her children with that woman for a short or long duration of time. In the case of physical attraction, the hypothesis is similar to that of emotional attraction: the more physical attraction a woman feels toward another woman, the higher the rating in terms of being a good mother and the more likely she is to leave her offspring with that woman for a short or long amount of time.

Women were also asked about sexual fantasies toward other women, the hypothesis being that the more sexual fantasies the woman had, the higher they would rate the object of the fantasy as having good mothering traits and the more likely they would be to leave offspring with the past female sexual partner. Questions regarding feeling love and emotional closeness, openness to same-sex sexual behaviour, and emotional support garnered a similar hypothesis: the higher the scores women gave for each element, the higher they would rate their same-sex sexual partner as having good mothering traits and the more likely they would be to leave their children with that person for a short or long time period of time. Overall, the goal was to find out how these components relate to each other.

Method

Participants

Only female participants were included in the study ($N = 115$), and their ages were $M = 31.15$, $SD = 8.66$. All participants had to self-identify as heterosexual a score of 0, or mostly straight (predominantly heterosexual with incidental homosexual activity) a score of 1 on the Kinsey Scale of Sexual Orientation to be able to conduct the survey. There were 53 women who identified as exclusively heterosexual and 62 women that were predominantly heterosexual with incidental homosexual behaviour. Participants were asked if they typically identified themselves as heterosexual on a daily basis. All participants whether they scored a zero or one on The Kinsey Scale identified as heterosexual on a day to day basis. All the women had to have a same-sex sexual encounter to be included in the study. Participants were recruited online on Facebook (see appendix D).

Participants were first asked if they had any children or if they wanted any children. When asked if they had children, these women responded as follows: 67% had no children, 12.4% had one child, 13.3% had two children, and 7.1% had three or more children. None of the women had adopted children. When the women were asked if they wanted children, 55.4% answered yes, 21.7% said no, and 22.9% were unsure.

Each participant was asked about her relationship status and could choose more than one answer. The breakdown of the responses is as follows: single (20%), dating one person casually (0.9%), dating multiple people (8.7%), dating one person in a committed relationship (29.6%), common-law or married relationship (29.6%), divorced/separated (4.3%), dating multiple people and divorced/separated (0.9%), dating one person in a

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committed relationship and common-law (0.9%), dating one person in a committed relationship and divorced/separated (3.5%), other (0.9%).

Participants were asked how religious they were, using a scale from 1 (not at all religious) to 5 (extremely religious). The mean response was $M = 1.90$, $SD = 0.93$, with the breakdown as follows: not at all (40.0%), a little bit (34.9%), somewhat (21.7%), very (1.7%), and extremely (1.7%).

Measures

The newly created measure, *Same-Sex Sexual Behaviour in Relation to Self-Identified Heterosexual Women in Relation to Allomothering* (see appendix H), was used for this study. To create the survey, aspects of what constitutes a “good mother” were taken from a paper by Brown, Small, and Lumley (1997), who interviewed women on what they thought were the traits of a good mother. Further, other characteristics of being a good mother were acquired from studies by Hrdy (1999, 2008). The common themes from Brown, Small, and Lumley, (1997) and Hrdy (1999, 2008) were used in the construction of the survey (see table 9).

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Table 9: Traits that constitute a good mother.

Mothering Trait	Mothering Trait
Raise your child	Discipline your child in an appropriate manner
Protect your child	Be a responsible person
Provide shelter for your child	Care for your child while also attending to various demands of life
Teach you child appropriate hygiene behaviour	Be able to help your child cope with problems
Do your best to take care of your child	Be sensitive to your child's needs
Be patient with your child	Be able to protect your child from dangerous situations
Be calm and relaxed with your child	Spend quality time with your child
Spend an adequate amount of time with your child	Not lose your temper with your child
Foster a healthy emotional development in your child	Not abandon your child
Be understanding and sensitive to your child	

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There are several parts to the survey consisting of 63 questions. First, the survey examines self-identified heterosexual (mostly straight) women who have had a sexual experience with other women and to what extent they enjoyed it. The participants were asked if they consider themselves heterosexual (straight) or mostly heterosexual. The women were also asked to identify what number they are on *The Kinsey Scale of Sexual Orientation*. Some of the questions regarding intimacy ask ‘to what degree have you enjoyed (or would enjoy) same-sex sexual behaviour.’ The statement “or would enjoy” was included for possible future studies using the same scale. All participants met the criteria for the current study, that is, they identified as heterosexual (mostly straight), and they all engaged in same-sex sexual behaviour, and typically identified themselves as heterosexual. If a participant indicated that they did not have a same-sex sexual encounter, the data from their responses was not used in the analyses. All participants met the criteria.

Women were asked questions regarding emotional and physical attraction to women, and also about sexual fantasies about other women. Further, they were asked an open-ended question about their same-sex sexual experience: “Please describe the context or situation in which you experienced physical or emotional attraction to a woman.”

Another component of the survey was developed to ask women why they engaged in same-sex sexual behaviour. The reasons self-identified heterosexual women might engage in same-sex sexual behaviour were gathered from various sources (Levin & Blitzer, 2006; Sincero, 2005; Waxman, 2007) and the most common reasons were utilized. The women were given options as to why they engaged in same-sex sexual behaviour. There is some suggestion that women are more likely to engage in same-sex

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sexual behaviour because of the acceptance of such acts by Western culture, or because they learn the behaviour through modeling (Baumeister, 2000). If women are following modeled behaviour, they most likely give in to peer pressure, or become intimate with another woman because it is a “cool” thing to do. Questions regarding peer pressure, imitation of celebrities, attracting a man, and being paid, were asked in order to address this point (Levin & Blitzer, 2006; Sincero, 2005; Yost & McCarthy, 2012). Finally, and most crucially, women were asked about the mothering characteristics of the last women with whom they had a same-sex sexual encounter. Participants were given a scenario:

“For the next set of questions, imagine you are a mother of a child and you are facing a serious illness. Imagine you are trying to plan for your child’s future in the event of your death. Thinking about the woman you had the most recent same-sex sexual behaviour, please rate her ability to care for your child by how **likely** she is to do the following ...”

This scenario was included to assess if the last women with whom they had had a same-sex sexual encounter had the traits of a good mother according to the participant. A list of the traits of a good mother (see table 9) was provided to the participants, and they then rated how good at each mothering task they felt that their last same-sex sexual partner would be. The responses ranged from 1 to 7, with 1 being “not at all” and 7 being “extremely likely.” Further, the survey asked whether the heterosexual women would leave their offspring with the woman with whom they had had the same-sex encounter for a short or long period of time. Answers were placed on a seven-point Likert-scale with answers ranging from “extremely unlikely” to “extremely likely.”

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It is important to note that people usually have sex with other individuals whom they think are nice (Meston & Buss, 2012); however, just because another woman is deemed “nice” does not guarantee that she will be a good mother. When someone engages in sexual behaviour with another person, it does not mean they will proclaim that individual to have qualities of a good parent. Another important point is that one of the goals of the study was to connect enjoyment and degree of same-sex sexual behaviour to see if there was a connection between sex and allomothering.

Unlike the Diamond (2010) survey *Assessing Multiple Facets of Attraction to Women and Men*, the questionnaire asked about actual sexual behaviour, and not just attraction and fantasy (even though these are important components to a person’s sexual trajectory). This is paramount, as the allomothering hypothesis predicts that heterosexual women (mostly straight) actually engage in sexual behaviour with other women, thus being sexually fluid while using sex as a bonding process. Such bonding may be vital to survival (Fletcher et al., 2015). After investigating why women may engage in same-sex sexual behaviour (Levin & Blitzer, 2006; Sincero, 2005; Waxman, 2007) and what are thought to be good mothering traits (Brown, Small, & Lumley, 1997), the survey was piloted on 10 female volunteers who self-identified as heterosexual or mostly straight individuals. The feedback returned was positive, questions were said to be clear, and the participants understood the wording and structure of the survey.

Procedure

The survey was conducted on computer and was administered using Qualtrics software. All participants read a consent form (see appendix G) and were then asked either to click to consent to the survey or exit the survey. All aspects of the survey were

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confidential, and there was no connection to the identity of those who filled out the survey. Participants were presented with the study, which first asked about demographic information, then about their degree of sexual enjoyment with women, and also about their physical and emotional attraction to women. Women were asked about how often they fantasized about women (physical and emotional fantasies were measured). Women were asked why they engaged in same-sex sexual behaviour. Participants were given several options as to why they engaged in same-sex sexual behaviour from which they had to choose. They were then given the hypothetical scenario in which they were ill and were asked to imagine the last woman they had had a sexual experience with and rate that woman with respect to the traits that make a good mother. They were then asked whether the woman with whom they had had their last same-sex sexual encounter had the traits of a good mother (if the women did not have children, they were asked to imagine that they did). Finally, they were asked if they would leave offspring for a short or long amount of time with the woman.

Results

Participants were asked about the enjoyment of their same-sex sexual experience. For example, they were asked, “To what degree have you enjoyed (or would enjoy) moderate intimate behaviour with a woman?” There were seven possible answers, ranging from 1, “not at all,” to 7, “extremely.” They were asked about the degree of enjoyment of lightly intimate behaviour (kissing on the cheek, holding hands, and hugging), moderately intimate behaviour (kissing without tongue, touching each others bodies with clothes on), and very intimate behaviour (kissing with tongue, oral-genital sex, touching genitals). The hypothesis was that the more women enjoyed light intimate

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behaviour, moderate intimate behaviour, and very intimate behaviour, the higher they would rate the woman with whom they had had their last same-sex experience as having the traits of a good mother, and the more likely they would be to leave their offspring with that person for a short or long duration of time. A question was included that addressed whether women would leave offspring for a short amount of time and for a long amount of time with the woman with whom they had had a same-sex experience. The answers ranged from 1, “extremely unlikely,” to 7, “extremely likely.” Women who would leave their children for a long period of time answered similarly to those who would leave their children for a short amount of time; therefore, the short-term answers and the long-term answers were combined to give one value. Combining the answers meant that there would be one less correlation, thus reducing the risk of type I errors.

Pearson’s correlation test was used to measure the relationships of this data. There was no significant correlation between light intimate behaviour ($M = 4.17$, $SD = 1.57$) and ratings of a good mother ($r = .107$ $p = .256$, $R^2 = 1.14$). When it comes to moderately intimate behaviour ($M = 4.50$, $SD = 1.56$), however, there was a significant correlation for rating a same-sex partner as having the traits of a good mother ($r = .271$, $p = .004$, $R^2 = 7.34$), and there was a significant correlation for leaving offspring ($r = .275$ $p = .003$ $R^2 = 7.56$) with the woman with whom the participant had had the same-sex experience. As for the degree of enjoyment of very intimate behaviour ($M = 4.30$, $SD = 1.84$), there was a significant correlation to perceived mothering abilities ($r = .280$ $p = .003$, $R^2 = 7.84$) and leaving offspring with the individual ($r = .338$ $p < .001$, $R^2 = 11.42$).

Women were asked to what degree they had been emotionally attracted to another woman. The answers ranged from 1, “not at all attracted,” to 7, “extremely attracted.”

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The degree of emotional attractiveness to another woman was compared with perceived qualities of a good mother and also leaving offspring with the person. The hypothesis was that women who were emotionally attracted (desired romantic love, emotional closeness, and intimacy) to women would rate their last same-sex partner as having the traits of a good mother and would leave offspring with that particular woman for a short or long duration of time. There was not a significant correlation between emotional attraction ($M = 4.10$, $SD = 1.70$) and the perceived ability be a good mother ($r = .171$, $p = .069$, $R^2 = 17.1$), and so the hypothesis was not supported. However, when compared to the likelihood of women leaving their offspring for a short or long amount of time with their last same-sex partner, there was a significant correlation ($r = .185$, $p = .048$, $R^2 = 3.42$).

Women were asked about the degree of physical attraction (desired sexual activity) they have had toward other women, using the usual seven-point Likert scale. The hypothesis was that the higher the degree of physical attraction, the higher a woman would rate their last same-sex sexual partner as having the traits of a good mother. A significant relationship was found between physical attraction ($M = 4.50$, $SD = 1.63$) and perceived mothering skills ($r = .259$, $p = .005$, $R^2 = 6.70$). The next hypothesis was that the higher the physical attraction, the more likely the participant would leave her offspring with her last same-sex sexual partner. This hypothesis was supported ($r = 0.309$, $p = .001$, $R^2 = 9.54$).

Participants were also asked about having an emotional fantasy or a sexual fantasy about a woman and how often such a fantasy occurred. Sexual fantasy was an important factor to take into account when exploring same-sex sexual behaviour, since it is an important element of the study conducted on pornography, which involves sexual

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fantasy to a significant degree. Therefore, it is vital to measure sexual fantasy in relation to the ratings of perceived mothering qualities and abilities, as well as in relation to the likelihood of the participant's leaving their offspring with the woman with whom they had last engaged in intimate sexual acts. The hypothesis was that women who frequently fantasized about physical (sexual) attraction to the same-sex would be more likely to rate a same-sex sexual partner as having the traits of a good mother. It was also hypothesized that women would be likely to leave offspring for a long or short duration of time with a same-sex sexual partner.

Participants answered the question on a nine-point Likert scale, where 1 stood for "never/very rarely," and 9 stood for "more than once per day." When physical sexual fantasy was assessed ($M = 3.85$, $SD = 1.85$), there was a positive correlation regarding physical sexual fantasy and the perception of the partner as having the traits of a good mother ($r = .263$, $p = .005$, $R^2 = 7.0$). There was a significant correlation with physical sexual fantasy and women being comfortable leaving offspring for a long and short amount of time with the woman with whom they had had a same-sex encounter ($r = .30$, $p = .002$, $R^2 = 9.0$).

In addition to physical sexual fantasy, having an emotional fantasy was explored. An emotional fantasy consisted of "engaging in romantic love, emotional closeness, and intimacy," and was measured on the same nine-point Likert scale as a physical sexual fantasy. The hypothesis was that the more women engaged in same-sex emotional fantasy, the more likely they would be to rate the woman with whom they had had a same-sex sexual experience as having the traits of a good mother, and the more likely they would be feeling comfortable leaving their offspring with that woman for long or

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short duration of time. The hypothesis was supported in both cases. There was a positive correlation of engaging in fantasies of romantic love, emotional closeness, and intimacy about the same sex ($M = 3.00$, $SD = 1.77$) and the perception that this partner had the traits of a good mother ($r = 2.68$, $p = .004$, $R^2 = 7.18$). There was a positive correlation for emotional fantasy about intimacy and romantic love and the likelihood of leaving offspring with the woman with whom they had had a same-sex sexual encounter ($r = .321$, $p < .001$, $R^2 = 10.30$).

Women were asked to rate how much they agreed or disagreed about how open they were to the idea of engaging in same-sex sexual behaviour. Answers were measured on a seven-point Likert scale, where 1 meant “strongly disagree” and 7 meant “strongly agree.” The hypothesis was that the more a woman was open to the idea of same-sex sexual behaviour, the higher she would rate her last same-sex partner as having the traits of a good mother, and the more likely she would be to leave offspring with that woman for a short or long amount of time. Heterosexual women who were open to the idea of same-sex sexual behaviour ($M = 5.44$, $SD = 1.675$) were more likely to be comfortable with leaving their offspring with the last woman with whom they had had a same-sex sexual experience ($r = .389$, $p < .001$, $R^2 = 15.13$), and they were also more likely to rate their last same-sex partner as having the traits and ability to effectively raise their offspring ($r = .295$, $p = .001$, $R^2 = 8.70$).

Women were asked about the degree of love and emotional attraction they have *felt* for other women. Answers were measured on a seven-point scale where 1 stood for “not at all” and 7 stood for “extremely.” The hypothesis was that women who often felt love and emotional attraction ($M = 3.46$, $SD = 1.66$) to other women would rate their last

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same-sex partner as having the traits of a good mother and would leave their offspring with that woman for a long or short period of time. This hypothesis was supported, as there was a positive correlation between the perception of the partner as having the traits of a good mother ($r = .321, p = .001, R^2 = 10.3$), and the likelihood of the participant leaving her offspring with that woman for a short or long period of time ($r = .348, p < .001, R^2 = 12.1$).

Participants were asked to what degree they sought emotional support and romantic love from women. Answers were once again measured on a seven-point scale where 1 meant “not at all” and 7 meant “extremely.” The hypothesis was that the more emotional support and romantic love women sought from other women, the more likely they would be to rate their same-sex sexual partner as having traits associated with being a good mother, and also as someone they would leave their offspring with for a short or long amount of time. Both hypotheses were supported. There was a significant positive correlation between those women who sought more emotional support and romantic love from other women ($M = 3.09, SD = 1.58$) and their rating of their same-sex partner as having the traits of a good mother ($r = .425, p < .001, R^2 = 18.0$). They would also leave their children with that person for a long or short duration of time ($r = .467, p < .001, R^2 = 21.8$).

Pearson’s correlation test was used to measure the relationship between the reasons that women engaged in same-sex sexual behaviour, their ratings of good mothering traits, and whether they would leave offspring with the woman with whom they had had a same-sex sexual experience, either for a short or long duration of time. The goal for this section was to assess if engaging in same-sex sexual behaviour was due

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to outside forces such as media pressure, or if engagement in same-sex sexual behaviour occurred as a result of more internal circumstances and feelings. If women engaged in same-sex sexual behaviour for reasons that were more internal rather than external, that would indicate that women were engaging in same-sex sexual behaviour due to a possible evolutionary reason and not as a result of environmental factors such as peer pressure or being influenced by the media.

The answers to the questions were measured on a seven-point Likert scale where 1 represented “extremely unlikely” and 7 meant “extremely likely.” The first hypothesis was women who engaged in same-sex sexual behaviour for reasons that were internal and more intimate (e.g., it felt pleasurable, or it felt like it was the right thing to do) would rate the person they had had a same-sex sexual experience with as having the traits of a good mother, and they would be more likely to leave their offspring with that person for a short or long time period.

The next hypothesis was that women who engaged in same-sex sexual behaviour for other reasons that were more superficial (media, peer pressure, the “cool” thing to do) would not produce a significant correlation when rating their same-sex partner as having the traits of a good mother and or deciding whether they would leave their offspring with that person for a long or short amount of time.

The most frequently cited reasons that women engaged in same-sex sexual behaviour can be seen in table 10. These questions were designed to decipher the reasons why straight women engage in same-sex sexual behaviour. There were seven possible responses with 1 being “extremely unlikely” and 7 being “extremely likely.”

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Table 10: Reasons that heterosexual women engaged in same-sex sexual behaviour measured by frequency

Reason engaged in Same-Sex Behaviour	Extremely unlikely	Very unlikely	Unlikely	Somewhat	Likely	Very Likely	Extremely likely
You wanted to attract a man or get a man's attention	40	28	23	15	5	3	1
You were Curious	8	0	0	14	29	42	22
Lack of opportunity to engage in intimate behaviour with men	56	29	22	5	2	1	0
You felt it was right	7	4	3	23	24	32	21
Felt fed up with men	50	27	18	12	4	3	1
Felt like the right thing to do	11	3	4	21	22	33	20
Felt pleasurable	6	0	1	11	19	40	38
Cool thing to do	39	28	19	19	7	2	1
Make parent angry	95	14	6	0	0	0	0
Paid to do it	88	19	6	1	1	0	0
Peer pressure	62	27	11	11	1	2	1
Felt love or romantic affection toward a woman	14	11	14	15	23	30	7

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Woman initiated contact	6	5	8	30	35	19	12
Mimic a celebrity	96	15	1	0	1	1	0

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The answers as to why women engage in same-sex sexual behaviour were then compared to the ratings of the qualities of a good mother exhibited by the woman with whom the participant had had a same-sex sexual encounter. Answers that garnered the most responses were first to be correlated with ratings pertaining to the traits of a good mother and the ability to raise offspring, as well as the likelihood of leaving offspring with the person with whom they had had their last same-sex sexual experience. Women who said they would be likely to leave their offspring with their last same-sex sexual partner answered both long- and short-term in the same manner; that is, if they scored high on one answer, they scored high on the other, and thus answers were combined giving one value.

There was a significant relationship between women feeling that their same-sex experience “felt right” ($M = 5.04$, $SD = 1.62$) and the feeling that their last same-sex female partner had the traits of a good mother and had the ability to raise their offspring ($r = .287$ $p = .002$ $R^2 = 8.23$), and their own likelihood to leave their own offspring with that woman ($r = .373$ $p < .001$, $R^2 = 14.0$). There was also a significant correlation between the response “It felt right to do” ($M = 4.92$, $SD = 1.76$), the perception that the same-sex partner had the traits of a good mother ($r = .361$, $p < .001$ $R^2 = 13.03$), and the likelihood that the participants would leave their offspring with their last female partner ($r = .373$ $p < .001$ $R^2 = 14.0$). A relationship existed between the response “It felt pleasurable” ($M = 5.69$, $SD = 1.46$) and the partner’s perceived ability to raise their child ($r = .255$, $p = .006$, $R^2 = 6.50$). Women who felt love and romantic affection ($M = 4.23$, $SD = 1.84$) toward their last female sexual partner were likely to rate that partner as having the traits of a good mother and the ability to raise offspring effectively ($r = .336$, p

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$< .001$, $R^2 = 11.2$). There was not a significant relationship for curiosity ($M = 5.35$, $SD = 1.5$) and rating a same-sex sexual partner as having the traits of a good mother ($r = .133$ $p = .157$ $R^2 = 1.76$), although there was a significant relationship between curiosity and the likelihood of leaving offspring with the last same-sex partner ($r = .224$ $p = .016$ $R^2 = 5.0$).

There was no significant relationship between rating a partner as having the traits of a good mother and leaving offspring with that person for a short or long amount of time where the following reasons were given for same-sex behaviour: “Attracting a man, or getting a man’s attention,” “lack of opportunity to engage in intimate behaviour with men,” “felt fed up with men,” “it was a cool thing to do,” “make parents angry,” “paid to do it,” “peer pressure,” “a woman initiated contact,” and “to mimic a celebrity.” Although there was no significant correlation for “a woman initiated contact” and “curiosity” and rating a same-sex sex partner as having good mothering traits and being someone they could leave offspring with, both these answers did garner a large number of responses.

Thematic Analysis

Thematic analysis is a research technique that is used to define themes in the data. This can be done, for example, in qualitative responses. This analysis was used to examine potential commonalities among responses to a question asking about same-sex sexual behaviour experiences. The question on the survey asked women to describe, if they wished, a little about their same-sex sexual experience. The question was open-ended: “Please describe the context or situation in which you experienced physical or emotional attraction to a woman.”

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The question was administered to get an idea of why females engaged in same-sex sexual behaviour. Both physical and emotional components were included in the question to see if physical and emotional attractions occurred separately or together. Further, to get a richer understanding of why heterosexual women engaged in same-sex sexual behaviour, context was included in the question. “Context” can include school, work, bars, and so on. Sixty-eight women did not write a response to this question, and 44 women did. A thematic analysis was conducted on these 44 answers. Complete answers can be seen in appendix I. Five themes were found, with the fifth theme designated as “other,” as there were a mixture of responses.

Nineteen out of the 44 answers included the word “friend,” and so this was by far the most common theme. The second most common theme was “alcohol, at a bar or party”; seven answers included those words. The third and fourth theme both had five answers each that included the words “college” and “being around a gay/lesbian/bisexual person.” Eight answers were designated in the “other” category (an example of such an answer is one involving a “one-night stand”).

Theme 1: Friendship

The most common theme emerged in those responses that included the word(s) “friend” or “friendship.” No less than 44.2% of the responses included a reference to a friend. For example, these answers included “being at home with a friend,” “friends around me,” and “I have engaged in intimate sexual behavior with a female friend. I do not desire emotional connections with women, I have no interest in dating women, but the female body is extremely attractive. That’s a major turn-on.”

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Theme 2: Alcohol/Bars/Parties

The second most common theme was “alcohol/bar/party,” since 16.2% of women included one of these words in their answers. Responses include “at college parties, at bars, in situations where there is alcohol and people are truly enjoying themselves”; “physical attraction occurred in social situations, i.e. party or vacation, usually involved slight intoxication, most of these contacts were not taking place in public, only the girl and me knew about it”; and “met a few woman casually at a bar or party and I found them attractive physically and liked their personalities.”

Theme 3: College

The next theme involved the word “college,” with 11.6% of women mentioning a college experience. Examples include, “she was a friend of mine in College,” and “A woman I knew in College and we kissed and touched each other, we were good friends but we talked about guys all the time.”

Theme 4: Being around Lesbian/Gay/Bisexual Individuals

The next theme was “being around bisexual/gay/lesbian people.” A large number of participants—11.6% of women—cited being around gay or lesbian individuals in their responses. Some of the answers include “met a lesbian at Pride Celebrations many years ago and became very close with her on every level,” and “around friends that are bisexual or gay and they have propositioned me.”

Theme 5: Other

The fifth theme was designated as “other” and included various responses. No less than 18.6% of women fell into this category. Some examples of “other” include “nothing specific, just general”; “I find female form beautiful and sexual. There’s no one

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particular context or experience. Just women”; and “I have dated 2 women in my life. Ultimately both connections went from sexually charged to ‘room mate’ in a very short time. I am now happily married and my husband and I engage in sexual fantasies that involve me and other women but they do not extend to real world application.”

Discussion

Enjoyment of Same-Sex Sexual Behaviour and Allomothering

The heterosexual (mostly straight) women in the study engaged in sexual (intimate) behaviours with other women. To test whether there may be a component of allomothering in relation to same-sex sexual behaviour, various aspects of same-sex sexual intimacy and actual behaviour (instead of only attraction, whether physical or emotional, or fantasy) were analyzed. As the degree of enjoyment of the same-sex sexual behaviour increases, so too does the rating of the same-sex sexual partner in terms of having the traits of a good mother and the ability to raise the participant’s offspring. The finding thus connects actual sexual behaviour with perceived mothering abilities. One explanation for this correlation is that sexual activity makes individuals feel closer to one another (Crenshaw, 1996; Fletcher et al., 2015; Kirshenbaum, 2011), thus inducing more feelings that are positive. Sexual and intimate behaviour is used not only for reproduction, but also to pair-bond individuals (Wilson, 1978). The pair-bonding mechanism seems to be operating between the female dyads in the sample. The more the women enjoyed the same-sex sexual encounter, the higher they rated the woman they had the encounter with as having the traits of a good mother, and the more likely they would be to leave their own offspring with that individual. Results indicated that self-identified heterosexual women who feel or have felt love and romantic attraction for other women

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rated their female sexual partner as better (potential) mothers than they would based purely on physical attraction.

Allomothering is a cooperative strategy between heterosexual women to ensure the survival of their offspring (and potential offspring). It also helps to ensure the survival of the self, as humans have a lengthy childhood relative to other species and are in need of parents (and alloparents) for an extended amount of time (Hrdy, 2008). There is evidence that, during the female's reproductive cycle, women show a homoerotic motivation during the period when progesterone is high (Fleischman et al., 2014). This is interesting since progesterone promotes attachment and occurs during the non-conceptive phase of a female's cycle, thus not interfering with reproduction (Fleischman et al., 2014). More studies that analyze hormones and hormone homoerotic motivation would shed light on sexual fluidity; for example, do females watch more pornography featuring women when progesterone is high in their cycle (which would indicate an openness to same-sex sexual behaviour)? Another avenue to explore is whether women during this time in their cycle actually engage in same-sex sexual behaviour as opposed to other times in their ovulatory cycle when conception is more likely to take place.

In sum, the ultimate purpose of female same-sex sexual behaviour is perhaps related to allomothering, which helps to ensure the survival of offspring, or of the self, by cooperating with other females. The cooperative approach is optimal even as a back-up strategy that could lead to survival; even if a female does not have a child and engages in same-sex sexual behaviour, the ultimate cause of such behaviour could be related to allomothering.

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Sexual Fantasy and Allomothering

Comparing the rates of sexual fantasy to the likelihood of leaving one's offspring with one's most recent same-sex sexual partner produced strong results, and reflects the nature of female sexual fantasy, perhaps explaining why the pornography industry is including depictions of female same-sex sexual behaviour in pornography made for self-identified heterosexual women. It seems that heterosexual women are prepared for same-sex sexual behaviour, and one way the proximate cause of allomothering is highlighted is in the pornographic movies made for heterosexual (and largely directed by heterosexual) women. The strategy of sexually pair-bonding with another woman is in the heterosexual female survival strategy of the self and her offspring, particularly if a male partner is a deserter, dies, or leaves. All these underlying survival strategies may induce heterosexual women to engage in same-sex sexual behaviour.

Perhaps sexual fantasy provides a sort of safety net for females in case a male partner leaves. The proximate reason for the high amount of same-sex fantasy may be related to assurance. If we look at the women with whom participants have had a same-sex sexual encounter, we will see that many of them are (or were) friends of the participants. In an ancestral environment, any strategy that would help a female's offspring survive would be beneficial. In the current environment, sexual fantasy and its prevalence, as well as its correlation with one's willingness to leave a child with, and the perceived mothering skills of, past same-sex partners may really say a lot about the allomothering hypothesis and its merit.

Findings that are fantasy-based, and ones involving a person who is open to same-sex experience, suggest the existence of a subconscious mechanism that is ready to be

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activated in a condition-dependent circumstance. The ignited same-sex sexual behaviour in the modern environment may be brought about, for instance, in a nightclub, an environment where there are many women, or simply a close female friendship (Sincero, 2005), which was observed in the thematic analysis. The shadows of the human evolutionary heritage can be detected in such circumstances and possible subsequent behaviour.

Reasons for Engaging in Same-Sex Sexual Behaviour

Regarding the reasons that women engage in same-sex sexual behaviour, this study has found that, in general, they do not do it as a result of peer pressure, to emulate celebrities, because it is a cool thing to do, or to attract attention. These findings go against Baumeister (2000), who suggests that women are susceptible to environmental circumstances. If that were the case, it would be expected that more woman would engage in same-sex sexual behaviour because it is a cool thing to do, as a result of peer pressure, or to emulate celebrities, but that was not found. Women are engaging in same-sex sexual behaviour for their own personal reasons, not because of a trend or fad of same-sex sexual behaviour being accepted in Western culture (Sincero, 2005).

Allomothering with another female may also reduce the risks of a male harming the non-related offspring. There are many instances in which human fathers and stepfathers are abusive and sometimes kill their female partners' offspring (Anderson, Kaplan, & Lancaster, 1999; Stamos, 2008). Similarly, chimpanzees (*Pan troglodytes*) are notorious for engaging in infanticide; they periodically kill a non-related offspring or even their own offspring (Goodall, 1971). Infanticide has yet to be observed in bonobos (Furuichi, 2013), who, unlike chimpanzees, are involved in strong female pair-bonding

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relationships (Kano, 1992). When male bonobos become unruly around offspring, female bonobos will gang up on the male, at times severely injuring him, sending the other male(s) a warning that such behaviour will not be tolerated (Furuichi, 1989, 2013; Kano, 1980, 1992). Strong female pair-bonds, then, save lives. For human females living in the EEA, unruly males were roaming (as they are currently), and attempts at infanticide took place (human skulls, for instance, have been found that had injuries consistent with typical infanticide killing, such as a bashed skull plate; see, for instance, Hart & Sussman (2005). At least for a certain period of time until the offspring was able to fend for itself, it may have been adaptive enough to engage in a same-sex pair-bond, if only fleetingly, until the offspring was not so immensely vulnerable.

With regards to why women engage in same-sexual behaviour, answers that were provided that described internal reasons (e.g., “it felt right) for engaging in same-sex sexual behaviour yielded more positive correlations than reasons such as “it was a cool thing to do” or “peer pressure.” Further, the curiosity rate of heterosexual women was high with respect to engaging in same-sex sexual behaviour. However, curiosity and rating a former same-sex sexual partner as having good mothering traits did not reach significance, although curiosity and leaving offspring with a past same-sex sexual partner did. The frequency of such behaviour “feeling right” or “feeling like the right thing to do” suggests that there is an ultimate purpose to female same-sex sexual behaviour in heterosexual women, such as those related to allomothering benefits. There seems to be a covert mechanism operating, as was seen in study 1, in which many women self-identified as heterosexual but purported being physically and emotionally attracted to women at some point in time (Sincero, 2005; Waxman, 2007).

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Thematic Analysis

A thematic analysis was performed a question asking about women's same-sex sexual experience. Women were asked: "Describe the context or situation in which you experienced physical or emotional attraction to a woman." A thematic analysis was conducted on the answers. The most common theme related to same-sex sexual behaviour involved responses including the word "friend." A friend is someone who is usually close, and is someone who is a person that can be depended upon (Goodman & O'Brien, 2000). As noted by Goodman and O'Brien (2000), close female friendships are often as important to women as relationships with a husband or a significant other. Often, in fact, women seek emotional support from a friend more than their husbands or primary partner (Goodman & O'Brien, 2000). Furthermore, pair-bonding via sexual or intimate contact can increase the strength of a bond (Crenshaw, 1996; Fleischman et al., 2014; Kirshenbaum, 2011). It is not surprising that same-sex sexual behaviour would take place between friends, as far as the allomothering hypothesis is concerned. If a female friend is in need, and the situation is a case of survival of offspring or the self, two women may pair-bond sexually to increase emotional ties between them and therefore increase their chances of survival. Intoxication was another common theme; it may simply be that when women are drunk, either a little or very much, their capacity for same-sex sexual behaviour emerges as a result of feeling less constricted when consuming alcohol.

"College" was another popular answer as to where and with whom a same-sex sexual experience took place. College and friends sometimes overlapped, and in college women are often in dorms together with many women. The label "Lesbian Until Graduation," or LUG, may be picking up on a tendency for women to experiment in

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same-sex sexual behaviour in college, an environment rife with female friends and an environment that often does involve alcohol. It is interesting to note that generally women who are in college are also in their peak fertile years (Buss, 2004). Perhaps females have a readiness to experiment in the College years, as this would be a time where women would most likely become pregnant. In the EEA, if a male deserted a female, that female would then perhaps seek out an allomother to help survive and to raise potential offspring. However, there are women who are deemed “Late Bloomers” meaning that they discovered that they were attracted to the same-sex until mid-life (McCoy, 2000; Strock, 2008). The realization usually happens after marriage to man, and after having children, and after their reproductive years (McCoy, 2000; Strock, 2008). Late bloomers are interesting in how they relate to the allomothering hypothesis. Why would same-sex sexual behaviour occur for example, after the age of forty or fifty? One explanation may be that in the EEA, humans generally died earlier, both the female and male lifespan was shorter (Hart & Sussman, 2008). It would be difficult to assess if “late bloomers” were present in the EEA. But late bloomers are observed in the current environment where women generally live longer, and may engage in same-sex sexual behaviour at an older age because of the propensity of same-sex sexual behaviour at an earlier age. The sexual behaviour may be a residual behaviour from the younger years that may spill over so to speak into the midlife years. It is a difficult question to research but if more women reveal themselves to be late bloomers, more investigation can take place as to why the behaviour occurs. As was stated, it could be a spillover from a predisposition or perhaps it has something to do with culture or the environment.

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Women indicated that being around lesbian, bisexual, or gay people sparked an interest to engage in same-sex sexual behaviour. Being exposed to this behaviour in others could ignite an ancestral mechanism that makes women curious about same-sex sexual behaviour; as mentioned, curiosity is a major reason why many females engage in same-sex sexual behaviour.

The thematic analysis also had a category designated as “other.” Several answers in this category did involve men, and also casual sex. The “other” category indicates that women are engaging in same-sex sexual behaviour for a myriad of reasons.

Human Female Pair-Bonding

Researchers such as Ghiglieri (2000) argue that women do not pair-bond as frequently as men do. However, women do pair-bond cross-culturally (Hrdy, 1999), sometimes in a sexual way, according to the data found in this dissertation. The reason may be to help each other raise infants. If women who had a sexual experience with another woman are rating them as having the traits of a good mother, and if they are willing to leave their offspring with them for a long or short amount of time, this highlights the connection between a sexual pair-bond and the likelihood of allomothering occurring in that dyad. More research is needed on female bonding in general, and assumptions that females are weaker than, or obliged to, men must be challenged if there is going to be sufficient study on female bonding.

Human males compete with one another but also bond with one another, and the same goes for human females; they compete with one another, but they also pair-bond with one another (Buss, 1994; Hrdy 2008). Ghiglieri (2000) espouses that females do not bond often, but the evidence for this claim is lacking. Ghiglieri (2000) disagrees with

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Hrdy (1999) and maintains that females generally cooperate less than males, but ignores her research on female cooperation (Hrdy, 1999, 2008). The lack of female bonding does not seem to be a reality. O'Brien and Goodman (2000) document the importance of human female pair-bonding where many women value their friendships as much as romantic relationships. Females compete with each other for mates, but they also bond with each other; the two are not mutually exclusive.

The findings that women may have an inherent capacity for same-sex sexual behaviour can be seen in much of the literature that is geared toward heterosexual women who are intrigued or curious (or not), or perhaps fantasize, about same-sex sexual behaviour. The study showed that women who were curious about a same-sex sexual experience would be willing to leave their offspring with the woman with whom they had had a sexual encounter. Sexual fantasy also led to higher ratings of the woman with whom they had had a sexual experience as having the traits of a good mother, and a higher likelihood that the participant would leave their own offspring with the woman. The book *The Straight Girl's Guide to Sleeping with Chicks* (Sincero, 2005) is one example of such inherent mechanisms being exploited. Further, the book *Married Women who Love Women* (Strock, 2008) is yet another example of a plethora of testimonials of straight women who have sex with women and enjoy it. Another book is *Women Loving Women: Appreciating and Exploring the Beauty of Erotic Female Encounters* (Waxman, 2007). These books are not directed toward a lesbian audience but rather toward those women who identify as heterosexual (mostly straight) and who may engage in same-sex sexual behaviour.

It is interesting to note that women who identify as heterosexual and mostly

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straight often engage in same-sex sexual behaviour in their early twenties, the time when women are most fertile (Savin-Williams & Vrungla, 2013). Perhaps that is the best time for a female to be open to same-sex sexual behaviour in case of abandonment by a male or some other stressor in the environment, and to be ready for allomothering with another woman. Although self-identified heterosexual (mostly straight) women may not be as sexually attracted to women during ovulation, but at times other than conception (Fleischman et al., 2014), the openness to the behaviour is what is key. Women who are not in the crucial fertile period are, for some reason, more open to same-sex sexual attraction. I propose that the reason for this is that allomothering is considered a back-up system for increasing chances of survival. Allomothering may also be beneficial for males. If a male in the EEA for example, had casual sex encounters and did not remain with the female, he may subconsciously not worry if the female becomes pregnant, as she could engage in allomothering behaviour with another woman.

Studies on hunter-gatherer groups could be beneficial, as humans lived as hunter-gatherers for most of the species' history (Marlowe, 2005). However, there is some evidence that so-called modern hunter-gatherers are not the same as the human hunter-gatherers that existed approximately 200,000 years ago (Bird-David, 1992; Marlowe, 2005). Modern troops may be influenced by outside environments and societal mores (especially religious) that could impact how same-sex sexual behaviour is expressed. Further, female sexuality in general is more difficult to study, as it was (and is) often ignored or thought to be of less importance than male sexuality (Barash & Lipton, 2001; Gowaty, 2001; Rupp, 2009). This is especially true of female same-sex sexual behaviour (Rupp, 2009). As a result of the bias toward male sexual behaviour, female sexual

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behaviour in general may remain a more difficult subject of study. There is some evidence that certain hunter-gatherer groups engage in cooperative breeding, but whether they engage in the allomothering behaviour discussed above is unknown (Hill & Hurtado, 2009; Hrdy, 2008). Conducting studies on humans' closest genetic primate relatives (for example, the bonobo) is useful because they may serve to generate a less biased study source, as they are not as influenced by exploitive social mores or outside forces as humans are.

Diamond (2014) has since proclaimed that she was wrong and that men are also sexually fluid based on a study she conducted on sexual fluidity in men. One study, however, is not generally capable of rendering a whole body of research "wrong." Studies conducted for this dissertation do not support the hypothesis that males are also sexually fluid; in fact, the data suggests that sexual fluidity is rather a sex-specific trait. However, there needs to be much more research into male sexual fluidity and also female sexual fluidity. Even if, in future studies, men are found to be sexually fluid at rates comparable to females, the evolutionary reasons for male sexual fluidity are probably vastly different from those with respect to female sexual fluidity. Men and women face different challenges, especially in the realm of parenting and parental investment (Buss, 1989; Trivers, 1972), making it doubtful that men would be sexually fluid for the same benefits associated with pair-bonding and alloparenting behaviour in women.

Visibility of same-sex sexual behaviour has increased dramatically in Western society over the past century (Pinker, 2011). The stigmatization associated with engaging in same-sex sexual behaviour has decreased to the point that women and men are not as afraid to express their same-sex sexual behaviour tendencies (Pinker, 2011). Negative

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attitudes toward gay men and lesbians have decreased (Gallup, 2001, 2001). Generally, men and women who engage in same-sex sexual behaviour and identify as gay, lesbian or bisexual are likely to be viewed as individuals who deserve the same rights and freedoms as those who identify as heterosexual (Gallup, 2001, 2002). The survey regarding attitudes toward men and women who engage in same-sex sexual behaviour were from Western nations where tolerance for gay, lesbian, and bisexual people have increased (Gallup, 2001, 2002; Pinker, 2011).

In a more recent study on genital arousal, results are similar to earlier studies in that men who identify as heterosexual respond genitally to sexually explicit films of females, whereas if men state they are gay, they will respond to images or depictions of males (Bossio, Suschinsky, Puts, & Chivers, 2014). However, women are not responding the same way as men, especially heterosexual women who, even though they declare that they are heterosexual, become aroused by sexual depictions of men and women irrespective of where they are in their ovulatory cycle (Bossio et al., 2014). Bossio et al. (2014) hypothesized that during ovulation, when females have the greatest opportunity to become pregnant, women would have a greater response to male sexually explicit films; however, that was not the case. The response pattern was similar no matter where women were in their ovulatory cycles (Bossio et al., 2014). The major issue, then, is self-identified heterosexual women and their genital arousal to various depictions of female and male sexual behaviour. That is the population that has been studied in this dissertation.

This dissertation is one of the first to study the connection between same-sex sexual behaviour and allomothering behaviour in human females. It suggests an ultimate

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cause as to why sexual fluidity is pervasive in self-identified heterosexual women. Women have developed a propensity to be sexually fluid in condition-dependent circumstances. Traditionally, in the EEA these circumstances were most likely environmental stressors (lack of resources from males, male desertion, or any kind of stressor that could impact raising offspring). The findings support that many women who self-identify as heterosexual or mostly straight continue to engage in same-sex sexual behaviour. Environmental stressors for females that are similar to circumstances in the EEA are still present in the more modern environment (women are abandoned by mates, they are subjected to abuse, mates leave). The issue in deciphering if the same circumstances trigger same-sex sexual behaviour is that culture, religion, and social mores, impact the expression of behaviour as cultural evolution takes place much quicker compared to genetic evolution (Redmond, 2008). I would think that the same circumstances that were present approximately 200,000 years ago have not become a residual trait, as the timeframe of 200,000 years is short when considering evolutionary history (Redmond, 2008).

It would be very difficult to collect data cross-culturally, which would be representative of the population and how individuals conduct themselves in regards to topics such as sexual behaviour. Same-sex sexual behaviour among females and the need for allomothering may not be the only reason the behaviour evolved. There may be other reasons for the behaviour; one factor is perhaps mate attraction. Attracting a mate and female same-sex sexual behaviour is one area that I intend to study further as research is lacking on the topic. There may be a myriad of reasons as to why heterosexual women

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engage in same-sex sexual behaviour that have not been considered, only further research on the topic will potentially provide some of the answers as to why the behaviour occurs.

Sociocultural Explanations and Female Same-Sex Sexual Behaviour

There are two fairly prominent theories that espouse that female same-sex sexual behaviour is learned or heavily influenced by societal factors alone, they are social learning theory, and the social constructionist theory or sociocultural theory (Hamer & Copeland, 1994; Stein, 1998). Baumeister (2000) and Bindel, (2014) contend that women are more or solely influenced by society in terms of same-sex sexual behaviour thereby supporting to some extent, social learning theory and social constructionism. Baumeister (2000) used the term “erotic plasticity,” to describe female sexuality, but it was not evident if he was discussing lesbians, who for example identified as a 6 on the Kinsey Scale, or women who scored a 0 or 1 indicating a heterosexual or mostly heterosexual orientation, and whether those groups experienced erotic plasticity. Diamond (2008) later coined the term “sexual fluidity,” which has been discussed throughout the dissertation. Depending on what culture an individual is raised contributes to the expression of same-sex sexual behaviour making it an acceptable activity to openly engage or behaviour that individuals must repress (Pinker, 2011).

The notion that culture and society alone (without any biological predispositions) can propel women to engage in same-sex sexual behaviour is fairly prominent (Baumeister, 2000; Burr, 1996; Stein, 1998). There is some evidence that support the social cultural influence of female same-sex sexual behaviour (Burr, 1996; Roughgarden, 2004; Stamos, 2008). Twin studies have shown that if one monozygotic twin is lesbian, the other twin most often is not lesbian exemplifying that sociocultural factors contribute

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to female same-sex sexual behaviour (Burr, 1996; Stamos, 2008). There is also evidence that daughters of lesbians have a higher chance of identifying as lesbian, which suggests that they could be learning or having the behaviour modeled for them (Stamos, 2008).

In an extreme explanation of the expression of same-sex sexual behaviour in women, Bindel (2014) argues that women choose to engage in same-sex sexual behaviour. She advocates that same-sex sexual behaviour is governed by a male-dominated political system and that biology does not play a role regarding sexual orientation. One example of women choosing their sexual orientation are women who label themselves as political lesbians (Baumeister, 2000; Bindel, 2014). Baumeister (2000) and Bindel (2014) hold the position that heterosexual women are not predisposed to engage in same-sex sexual behaviour, and that lesbianism or any kind of same-sex sexual attraction is not something that is innate or genetic. However, there are numerous studies that provide evidence that lesbianism is at least partially heritable (Bailey, Pillard, Neale, & Agyei, 1993). Differences in finger length (known as the 4D:2D ratio) among masculine lesbians and more feminine lesbians indicated that women who were more masculine had differing finger lengths compared to more feminine looking lesbians, suggesting hormones play a role in sexual orientation development among some women (Bailey et al., 1993; Brown, Finn, Cooke, & Breedlove, 2002).

Another argument that discredits same-sex sexual behaviour being influenced solely by socio-cultural factors is that many non-human animal species engage in same-sex sexual behaviour (Bagemhil, 1999; Kano, 1992). If the socio-cultural argument were based only on culture, why would non-human animals that do not have elaborate culture engage in same-sex sexual behaviour? A few examples of female animals that engage in

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same-sex sexual behaviour (not exclusive homosexual behaviour) includes Japanese macaques (*Macaca fuscata*), hyenas (*Crocuta, crocuta*), the New Mexico whip tailed lizard (*Cnemidophorus neomexicanus*) and various types of gulls (Bagemhil, 1999). Biological and innate factors, not culture, influence these non-human animals and the expression of same-sex sexual behaviour.

Many women who self-identify as lesbian and bisexual or some kind of same-sex attraction express that they knew of their attraction to women at a very early age (Diamond, 2008; LeVay, 2011). Should those who purport a purely socio-cultural explanation of same-sex sexual behaviour ignore the self-reporting of the awareness of attraction to women? However, those who espouse a purely biological explanation for same-sex sexual behaviour also need to acknowledge women who self report that they have some choice regarding sexual behaviour.

As was stated earlier, there are many different ways that females end up engaging in same-sex sexual behaviour. There are women who advocate that they were born lesbian or bisexual, and others do not realize their same-sex attractions until later in life. The socio-cultural explanation of same-sex sexual behaviour as being the lone factor that influences sexual orientation turns into a weaker argument once biological factors are examined in further detail.

If same-sex sexual behaviour is learned or socially constructed, it would be expected that some cultures (such as Sambian people of New Guinea) where young boys are encouraged to engage in oral sex with older men would have higher rates of same-sex sexual behaviour, however that is not the case (Hamer & Copeland, 1994). In a society that readily accepts same-sex sexual behaviour, it would be expected from the point of

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view of social learning and social constructionist explanations that the rate of homosexual activity would be higher in a society such as the Sambian culture in New Guinea (Hamer & Copeland, 1994). However, there is no difference in rates of homosexual activity in a society that encourages and accepts the behaviour compared to Western cultures that are tolerant of same-sex sexual behaviour (Hamer & Copeland, 1994). Therefore, a mechanism besides social learning and social construction seems to be operating.

There is evidence that both biological and socio-cultural factors influence same-sex sexual behaviour among women (Kirkpatrick, 2000; LeVay, 2011; Sincero, 2011). An interactionist viewpoint is sounder, and does not disregard biology or socio-cultural factors. Instead, the two factors are examined in unison to better understand same-sex sexual behaviour in women. The explanation for any kind of female same-sex sexual behaviour needs to be studied in much greater detail (Radtke, 2013).

The allomothering hypothesis does not ignore culture and the environment in the explanation of female same-sex sexual behaviour and it certainly does not ignore biological reasons for same-sex sexual behaviour. The hypothesis is not trying to explain women who are lesbian or bisexual (however studies on bisexual and lesbians and allomothering is an issue I would like to delve in to further) but rather women who are heterosexual, and it hypothesizes that heterosexual women are able to engage in same-sex sexual behaviour if certain circumstances occur. The hypothesis predicts that many heterosexual women have a predisposition to engage in same-sex sexual behaviour, thus making the allomothering hypothesis a biological theory, although environmental circumstances and stressors need to be elicited to allow the predisposition to be expressed. There are some studies that could be performed to investigate allomothering

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and sexual fluidity currently. For example, does sexual fluidity and allomothering increase among women who are single mothers? A cross cultural study regarding sexual fluidity and allomothering would be a great way to explore the idea, however, various cultures adhere to different religions and social mores and that would impact the investigation of female same-sex sexual behaviour and allomothering. There may be more than one reason that allomothering evolved. Further studies regarding what other benefits same-sex sexual behaviour provided women with increased chances of survival and reproduction need to be investigated. If sexual fluidity and allomothering is a vestigial trait, more studies regarding the behaviour will support or refute the belief that the behaviour is a function that once was adaptive, but now is no longer needed.

Limitations and General Conclusions

The demographics of the population indicated that most individuals were not very religious, suggesting a more liberal rather than a conservative mindset. Many of the women did not answer the question where they had to describe or talk about their same-sex sexual experience. As a result, the thematic analysis that took place was not as robust as it could have been. It is imperative to hear what people have to say in their own words instead of only having them click on numbers or words on a Likert scale. Asking individuals to describe their experiences and how they understood them contributes a wealth of information that sometimes quantitative techniques alone cannot reveal. Future studies on sexual fluidity and allomothering could include more qualitative aspects and ideally interview individuals from different cultures and even from different countries.

As with any study, participants may not have answered honestly, even though they were assured of the study's strict confidentiality and that no connection could ever

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be made between their responses and their identity. Further, participants may have answered what they think they should have answered. Another limitation regarding participants is that they were recruited on Facebook (participants were also recruited from Facebook for Study one thus same limitations apply). The limitations of recruiting on Facebook is that perhaps individuals have a more liberal attitude toward same-sex sexual behaviour. Another issue is there is no way of knowing who is really taking the survey; for example, men, lesbian women, and bisexual women may have completed the survey even if the recruitment statement explicitly specified that women who identified as heterosexual (mostly straight) and had engaged in a same-sex sexual behaviour experience were needed for the study, thus selection bias was a limitation to the study. It is difficult to avoid these limitations in any study. Statistically, as a result of the numerous correlations, chances of a type I error are increased. The measure used needs to be tested for discriminant and construct validity. I plan to do these tests in the future as I refine the measure.

Even though modern hunter-gatherer groups may not be exactly the same as they were before, it would be of particular interest to investigate cooperative breeding and allomothering in modern humans. The goal would be to investigate if same-sex sexual behaviour takes place between women who allomother and to examine the circumstances surrounding women who do allomother. As stated earlier, modern hunter-gatherer groups may be influenced by the world beyond them thus perhaps interfering with what they practice and believe (Marlowe, 2005). They may also be weary of outsiders who want to research them and may not act as they would in their natural setting (Freeman, 1996; Marlowe, 2005).

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The findings that the more heterosexual women, who enjoyed same-sex sexual behaviour, rated the same-sex sexual partner as having traits of a good mother could potentially be explained using Contact Theory (Allport, 1958). The theory espouses that having positive contact with another individual for an extended period of time engenders a sense of trust. Positive contact may have resulted from sharing the same goals, cooperating with each other, and viewing each other as equals (Pettigrew & Tropp, 2008). Another explanation that could account for women rating their same-sex sexual partner as having good mothering traits is the “Halo Effect.”

The “Halo Effect” could have accounted for positive ratings of good mothering traits. An example of the Halo Effect is that people who are deemed attractive are also thought to have positive personality traits such as being nice or generous (Schneider, Gruman, & Coutts, 2012). Therefore women in the study may be attesting that the person they had a same-sex sexual experience would have good mothering traits because they like the person and as stated attribute positive traits regarding the individual.

A future goal is to refine the scale *Same-Sex Sexual Behaviour in Relation to Self-Identified Heterosexual Women in Relation to Allomothering*. Although the scale worked for this dissertation and its purposes, adding more variables to all sections of the scale and conducting a factor analysis on those variables could further advance the scale. Making the scale more robust in general will allow for similar tests to be conducted, perhaps more precisely, and more individuals could use the scale to try to replicate the findings from the current study. Further, discriminant and construct validity need to be considered in greater detail as I continue to refine the scale.

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A limitation to the study is that heterosexual women and mostly straight women perhaps should not have been put in one category and tested which occurred in this study. More information may have been gained if women were put in different categories. In future studies when I will try to replicate findings from the current study and refine the measure, I may separate women who consider themselves “completely heterosexual” from those that proclaim to be “mostly straight.” More women labeled themselves as mostly straight in my sample and it may have been more prudent if I only tested women who deemed themselves as “completely heterosexual.” I did not do this for the study as I did want to include “mostly straight” women to indicate the variation of female same-sex sexual behaviour and I wanted to get a fairly large sample. In retrospect and in looking to the future, I may conduct a study only on self-identified heterosexual women and allomothering.

Unfortunately women were not consistent in answering questions such as “do you have a biological child,” (where they could answer yes or no) and “do you want children,” (with the answers being yes, no, and unsure). As a result of the inconsistency, correlations were not performed for women who wanted children and those that did not and how they would rate the person they had a same-sex sexual experience in terms of mothering traits and leaving offspring. A future study could examine women who do have children and those that do not, and those that want children and women who do not. The recruiting criteria for such a study would be adamant in that participants had to either have a child, not want a child, or wanted children, or did not want children. Another study that would be interesting to conduct is to compare females whose relationship is platonic (which would be the control group) to self-identified females who have engaged

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in a same-sex sexual experience. Each group would be given the question regarding mothering traits and leaving offspring with that person for a long or short amount of time. If women who had a same-sexual sexual experience rated the person higher on mothering traits compared to women who are just friends would add further support for the allomothering hypothesis.

This chapter has demonstrated that self-identified heterosexual females sometimes engage in a sexual relationship with another female. They often find it enjoyable, and the more enjoyable the intimate or sexual experience, the more likely they are to rate their female partner as having the traits of a good mother, and the more willing they are to leave offspring with her for either a short or long period of time. Results demonstrated that women engage in same-sex sexual behaviour for reasons such as feeling like it is “the right thing to do,” “because it feels pleasurable,” and because they felt romantic love for the woman with whom they engaged in same-sex sexual behaviour, rather than reasons such as pressure from society or attention-seeking. The reasons thus stem from within themselves, rather than from outer influences. The study supports the allomothering hypothesis as it shows that self-identified heterosexual (mostly straight females) women who have engaged in same-sex sexual behaviour generally rate their female partners as having the traits of a good mother and feel confident about leaving their own offspring with the partners for a long or short amount of time. However, more studies are needed to amplify these findings.

Chapter 6:
**An Exploration of Female Same-Sex Behaviour in Relation to Allomothering,
Genito-Genital Rubbing, and Grooming in a Group of Captive Bonobos**

Introduction

One way to study humans from an evolutionary perspective is to investigate humans' closest living relatives (Nunn, 2011; Prufer et al., 2012), which are the common chimpanzee (*Pan troglodytes*) and the bonobo (*Pan paniscus*). Bonobos are a great ape endemic to the Democratic Republic of the Congo. Humans share a common ancestor with chimpanzees and bonobos going back six million years (Rowe, 1996). The *Pan* split occurred approximately 2 million years ago (Rowe, 1996).

Chimpanzees have been studied in much greater detail compared to the bonobo (Kano, 1992). Bonobos have not been observed as readily as a result of war and instability that has plagued the Democratic Republic of the Congo, which is the only area on earth where bonobos reside (Sandin, 2010). Humans and chimpanzees are often compared to each other with respect to expressing similar behaviours such as engaging in warfare, tool making, hunting, dominance, and culture (de Waal & Lanting, 1997). However, humans are just as related genetically to bonobos as they are to chimpanzees, yet bonobos are often overlooked in comparative studies with humans (de Waal & Lanting, 1997).

Bonobos are female-dominated, and prominent female alliances are formed in their communities (Furuichi, 1989; Kano, 1980, 1992; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978). These female alliances allow females to dominate over males, but more importantly, bonobo females form strong pair-bonds with each other (Kano, 1980; Parish, 1996). A unique behaviour that female bonobos engage in is genito-genital

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rubbing (GG rubbing) (Bagemihl, 1999; de Waal & Lanting, 197; Furuichi, 1989; Kano, 1980, 1992; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978; Woods, 2010; Woods & Hare, 2011). GG rubbing is when two female bonobos rub their genitals together, often reaching orgasm (Furuichi, 1989; Kano, 1980, 1992). GG rubbing often occurs in a face-to-face position where eye gazing is prominent; however, it also occurs in various other positions as well (Furuichi, 1989; Kano, 1980, 1992). Every female in a bonobo group, whether in captivity or in the wild, has been observed as engaging in same-sex behaviour via GG rubbing (Kano, 1992; Furuichi, 1989; Savage-Rumbaugh & Wilkerson, 1978).

Chimpanzees are often used in comparative studies on humans (de Waal, 2007). Goodall (1971) demonstrated that chimpanzees share behaviours with humans such as tool making, friendships, and engaging in warfare; but less is known about bonobos (Kano, 1992). As the region becomes more stable, research is taking place on bonobos in their natural habitat and also in captivity (de Waal, 2013). Bonobos have also been observed to make tools and engage in friendships. Unlike the common chimpanzee, however, bonobos engage in much less warfare, and form a society that is mostly dominated by a female hierarchy, which is the opposite of chimpanzee society (de Waal, 2013; Redmond, 2008). Bonobo females leave their natal troop when they become adolescents to join another group (Hohmann & Fruth, 2000; Idani, 1991). When a female enters a new group, she will engage in GG rubbing and grooming with the dominant female and lower-ranking females (Hohmann & Fruth, 2000; Idani, 1991). In doing so, females are solidifying bonds and the new troop member is appeasing the dominant female(s) and becoming familiar with her new troop.

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Comparative studies of humans and other primates can illuminate common behaviours that humans share with other great apes (de Waal, 2013; Nunn, 2011). Several areas of research explore the parallels between humans and great apes. There are comparative studies, for example, on sexual behaviour, problem solving, cognition, fairness, altruism, and many other domains (de Waal, 2013; Nunn, 2011; Redmond, 2008). When trying to understand human behaviour, comparative psychology is thus often utilized. For example, if a researcher is studying altruism, and why it exists, one can investigate other primates who also engage in the behaviour (de Waal, 2013; Nunn, 2011). If humans share behaviours with other primates, researchers can trace the evolutionary split of the species (for example, bonobos and chimpanzees split 2 million years ago, and humans, bonobos, and chimpanzees split approximately six million years ago) and then extrapolate the reason for why certain behaviours continue to exist in the gene pool of the species. For example, why does behaviour such as altruism exist in bonobos and humans? Since the behaviour occurs in both species, it can be reasoned that this behaviour likely aided the survival of the adults and the offspring of both species (Nunn, 2011).

While the majority of bonobo females engage in same-sex sexual behaviour, where as only some human females engage in same-sex sexual behaviour, the comparison between the two species is still important. Bonobo behaviour may be an exaggerated form of what is occurring in human females, for example, and may shine light on why some women engage in same-sex sexual behaviour.

Why Compare Humans and Bonobos?

Bonobos share many behavioural similarities with humans. For example, human females form strong pair-bonds with each other (Goodman & O'Brien, 2000) and bonobos females deeply bond with one another (Kano, 1992; Furuichi, 1989; Savage-Rumbaugh & Wilkerson, 1978). Also similar to humans, bonobos engage in sexual activity across the ovulatory cycle engaging in sociosexual behaviour on a regular basis (Kano, 1992). One way to assess bonding is through grooming behaviour and sexual behaviour (Kano, 1992). Like humans, bonobos go through a long developmental process, and so bonobo allomothering may take place across various stages of development, from infancy into adolescence. Bonobos engage in a great deal of sexual behaviour throughout the ovulatory cycle, including male/female and female/female encounters (de Waal, 1997; Furuichi, 1989; Kano, 1980, 1992). The behaviours most relevant to the current study are female same-sex sexual behaviour (which does not impede reproduction in either species), female bonding, and allomothering behaviour.

There have been minimal (if any) studies that exclusively examine allomothering and bonobos, either in captivity or in their natural habitat, even though this phenomenon is alluded to by prominent researchers and individuals who work with bonobos (B. Bell, personal communication, July 18, 2012; de Waal & Lanting, 1997; Furuichi, 2011; Kano, 1992). Kano (1992) asserts that the most important relationship in bonobo society is that between mothers. It is surprising, then, that no direct allomothering studies have taken place on this female-bonded primate who lives with non-related females, particularly since researchers have indicated the importance of the relationship between bonobo mothers (Kano, 1992).

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I postulate that allomothering exists in bonobos just as it does in humans. As was observed in chapter 3 and chapter 5, self-identified heterosexual women often engage in same-sex sexual behaviour. Female same-sex sexual behaviour and bonding is thought to serve several purposes for female bonobos (Kano, 1980, 1992). For example, it is used to solidify pair-bonds and to reduce tension and generally used to keep group members settled.

Human females also engage in same-sex sexual behaviour. The questions, then, become the following: Is there a purpose as to why heterosexual females engage in same-sex sexual behaviour? Does human female same-sex sexual behaviour have a function? I propose that one of the functions (there may be more) of heterosexual or mostly straight women engaging in same-sex sexual behaviour is to secure allomothering help, thus increasing the chances of survival of the self and of offspring. Bonobos are a good candidate to explore this allomothering behaviour, as non-related female bonobos live together and have been observed to interact with bonobos that are at various stages of growth, from infancy to adolescence (Kano, 1992; Furuichi, 1989; Savage-Rumbaugh & Wilkerson, 1978).

Although there is scant research on bonobos and allomothering, it may be that same-sex sexual behaviour is present in bonobos for the purpose of allomothering along with the aforementioned benefits. For example, do bonobos have sexual encounters with certain individual bonobos more than others, which may lead to allomothering? Does grooming impact who a bonobo will engage in sexual behaviour with, and are bonobos trying to secure allomothering help through sexual contact and grooming with particular members of their troop? In chapter 5, the thematic analysis examined with whom straight

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or mostly straight women were engaging in same-sex sexual behaviour. The results indicated that most women in the sample engaged in same-sex sexual behaviour with friends. Friends are not random people, and bonobos may also engage in more same-sex sexual behaviour with an individual they like and who they think may be a good allomother.

The study focuses on female bonobos and the bonobos with whom they engage in same-sex sexual behaviour, examining the frequency of sex between females, grooming rates, and also play behaviour. Grooming is an essential survival mechanism for primates and is paramount in bonobo society (de Waal & Lanting, 1997; Dunbar, 1991; Rowe, 1996). Grooming allows for ticks and other pathogens to be removed from each animal, lessening the chances of disease (Redmond, 2008). Perhaps more importantly, grooming allows members of a group to become closer, thus forming pair-bonds (Keverne, Martenz, & Tuite, 1989; Redmond, 2008). Bonobos sometimes groom in groups of three or four; however, this study focuses on grooming in female dyads.

Bonobos are often portrayed to engage in any kind of sexual behaviour with any bonobo that is present (Kano, 1994). However, bonobos have not been readily examined to see if they engage in more grooming, play, and GG rubbing with specific bonobos more than others. The study will examine which female dyads engage in the most female sexual behaviour and compare their grooming time and their “play” time. Further, the dyads will be assessed to investigate if they are involved in some sort of allomothering dynamic. Bonobos may be engaging in increased sexual behaviour with other females who they think may be a suitable allomother.

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Bonobos are a playful species in that they play games with each other. For example, they chase each other as if playing tag, swing on branches and throw objects to one another, and are often heard “laughing” when engaging in play behaviour (Kano, 1992; Furuichi, 1989; Sandin, 2011). There is some suggestion that play is a type of allomothering behaviour (Keverne, 2005). During play, learning can occur. For example, when bonobos are playing, the younger of the dyad may be watching how the older bonobo will swing from a branch and not get hurt, or how she quickly scurries up a tree as a way of demonstrating escape from potential predators. In sum, this chapter will add to the study of bonobos and explore behaviours that humans may share with them.

There are several hypotheses in the study, which will be conducted using Pearson’s correlation test. First, bonobo dyads that engage in more GG rubbing will groom each other for a longer duration of time compared to bonobos who do not GG rub as frequently. Also, bonobo dyads that engage in more play activity with each other will also engage in more GG rubbing compared to other dyads. Further, bonobos who play more with each other will also groom each other more.

Finally, bonobo dyads that do engage in the most grooming, GG rubbing, and play activity will be involved in an allomothering dynamic. For example, certain bonobos who frequently GG rub or play will engage in that activity with a member of the troop who may require allomothering help (for example, a bonobo who has offspring or a bonobo who is young and may need assistance with raising offspring). There is no statistical analysis for this hypothesis; rather, bonobos will be examined in terms of involvement in an allomothering dynamic.

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The Milwaukee Zoo has the most successful rate of captive bonobo breeding (Sandin, 2011). The zoo was thus a good candidate for the purpose of the study as it housed a large number of female bonobos, whose ages ranged from infant, child, to adolescent and adult. I sent a proposal to the Milwaukee Zoo (see appendix J) describing my study; it was accepted and I was allowed to conduct the study (see appendix K). Further, the Ryerson University ethics board granted permission for the study involving bonobos (see appendix L)

Method

Participants

The study was conducted at the Milwaukee Zoo. At the time of the study, 16 bonobos were living at the zoo. One bonobo, named Kitty, who was 60 years old, was not included due to illness. Although some of the participants were male, the study focused mainly on female bonobos. There were eight females and eight males who resided at the Milwaukee Zoo (see table 11).

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Table 11: Bonobo participants.

Name	Sex	Birth Year	Age During Study in Years (2011)
Laura	Female	1967	43
Lody	Male	1974	37
Viaje	Male	1981	30
Brian	Male	1989	22
Murphy	Male	1990	21
Makanza	Male	1995	16
Ricky	Male	1995	16
Tamia	Female	1996	14
Zuri	Male	1999	12
Zomi	Female	1999	11
Claudine	Female	2002	8
Deidre (DD)	Female	2003	8
Faith	Female	2005	6
Hanna	Female	2007	3
Kitoko	Female	2010	1
K2	Male	2010	0.5

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Procedure

Bonobos were observed from 8:30am to approximately 2:00pm, Monday to Friday. Weekends were excluded (except for two Saturdays) because of excessive crowds. A hand-held video camera was used to record the bonobos. Filming was conducted for 40-minute intervals, and when this was not possible, opportunistic focal-point sampling was used. Notes were made along with the video, in order to calibrate observed behaviour between the two. Bonobos were either inside an enclosure or outside on specially designed chutes, depending on what the keeper felt was best for the troop on a specific day. Further, the amount of females and males varied day to day, and there was no set schedule. Access was granted beside the chutes (see figures 8, 9, 10, and 11), allowing for more detailed observations. Wherever unrelated females were placed each day was where the majority of the observations were conducted. After filming and taking notes each day, the data was examined and behaviours and individual bonobos were coded. See table 12 for examples of codes used for the names and actions of the bonobos.

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Table 12: Codes used and their meanings.

Code	Meaning
GR	Grooming
GRS	Groom Self
GRO	Groom Other
GRM	Grooming Mutual
GG	Genito-Genital Rubbing
F	Feeding
M/F	Male and Female Sex
AG	Aggression
HH	Holding Hands
P	Play
CL	Claudine
CK2	Claudine and Infant
C	Carry
SH	Sharing
REL	Related

Figure 8: Bonobo Laura outside in the chutes.

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Figure 9: Bonobo Deidre (“DD”) outside in the chutes.

Figure 10: Bonobo Deidre (“DD”) outside in the chutes.

Figure 11: Bonobo Laura in an outside chute.

Results

The first hypothesis was that bonobos who engaged in more grooming with one another would GG rub more frequently than those who groomed each other less. The hypothesis was supported. Since the distribution was not normal, it was more bimodal, Spearman's rho correlation was used to test the hypotheses and the test was one-tailed. There was a significant positive correlation between the frequency of grooming and GG rubbing in females, the more that female dyads engaged in grooming, the more they GG rubbed ($r_s = .47$, $p < .05$) $\alpha = .05$ (see figure 12). Overall, there were 274 GG rubs observed between females, where 49 out of the 274 took place during feeding, either in the morning or afternoon. The total observed male/female copulations was 25, where 24 took place during feeding. Generally female bonobos engaged in GG rubbing more than any other sexual activity.

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Figure 12: Correlation of grooming and GG rubbing among female bonobo dyads.

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Another goal of the study was to explore play behaviour in relation to GG rubbing as well as grooming. Play was explored because of its relationship to allomothering (Keverne, 2005). The time of play for bonobo dyads was recorded (similar to the way grooming was calculated) and then compared to GG rubbing. The hypothesis was that the more bonobos played together, the more they would GG rub. The hypothesis was supported ($r_s = .52$, $p < .05$) significant $\alpha = .01$ (see figure 13 for play and GG rubbing).

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Figure 13: Correlation of play and GG rubbing among bonobo dyads.

Discussion

More GG rubbing was observed than male/female copulations. Male/female dyads copulated most during feeding. Excitement during feeding and tension regulation is often cited as a major impetus for GG rubbing (Hohmann & Fruth, 2000; Parish, 1994, 1996). However, the current study found that GG rubbing occurred at times other than feeding and tension regulation. GG rubbing did take place during feeding and in excitable situations, such as hearing a loud bang, but the behaviour also occurred in various other contexts, suggesting that GG rubbing was used for more than appeasing excitement at mealtimes and regulating tension in stressful contexts, as has been suggested by numerous researchers, including Hohmann and Fruth (2000) and Idani (1991). Examples of such situations included simply lying beside each other, during play situations, and during other normal activities such as drinking water, walking around the chutes, making a nest, and food sharing.

One aspect of allomothering that is often overlooked is play behaviour (Keverne, 2005). As noted earlier, play behaviour can allow older animals (even if only a few years older) to teach younger animals while they are enjoying themselves. It is interesting to note that bonobos love to play (Kano, 1992), and that there was a significant correlation between both play and GG rubbing and grooming and GG. Play and grooming also yielded similar results. An example of play and teaching behaviour is nest-making for bonobos, where one older and one younger bonobo play while building a nest; ultimately, the older bonobo will demonstrate how a nest is constructed so that they may sleep on it. It is the older bonobos (even if older by only one or two years) who take the lead in showing the younger bonobos what to do.

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Although all non-related females do groom and GG rub, some females groom and GG rub more often than others. Bonobos who groomed each other for the longest amounts of time also GG rubbed more frequently than those who groomed each other less. The dyads who did groom and GG rub most frequently were involved in an allomothering relationship (see table 13). The most frequent groomers were mutual groomers, who would take turns grooming each other. There was no dominant groomer in the frequent groomer dyads.

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Table 13: Female bonobo dyads in relation to GG rubbing and allomothering.

Dyads – Highest Amount of Grooming and GG Rubbing	Relation to Allomothering
Deidre “DD”/Tamia	DD engages in allomothering behaviour with Tamia’s child, Hanna.
DD/Claudine	Claudine has young infant, and DD is known for allomothering. Does Claudine engage in grooming and GG rubbing so DD will more likely allomother her child, K2?
DD/Faith	Faith’s mother died, thus DD acts as allomother to her. For example, when scared, Faith will leap on the back of DD, and DD shares food with Faith regularly.
DD/Hanna	Hanna is the daughter of Tamia, and also DD’s half-sister.
DD/Laura	Laura is mother to Claudine, and DD is very involved with Claudine in terms of GG rubbing and grooming.
Hanna/Faith	Both are young and often looked after by allomothers. At times, Faith, who is older, will share food and carry Hanna when scared.

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The current study is one of the first to suggest that bonobos favour grooming certain members of the troop over others. Further, it is the first to explore if bonobos use grooming and GG rubbing to cement pair-bonds, thus securing allomothering benefits from each other. As is seen in table 13, the highest-frequency grooming and GG rubbing bonobos were also involved in an allomothering dynamic. A prominent allomother, for example, was DD, and she was grooming and GG rubbing with various members of the troop. Perhaps bonobos were soliciting her help (or she was soliciting their help for when she has offspring). Further research is needed to answer these questions.

Sex and Bonding

Sex is not used solely for reproduction in humans and bonobos; sex is also a powerful tool used to pair-bond individuals (Wilson, 1978). Sexual contact increases bonding hormones, such as oxytocin, more so than non-sexual intimate contact (Crenshaw, 1996; Raffaele, 2010). Bonobos are bisexual in that they mate with males and females frequently, and their same-sex behaviour does not interfere with reproduction. However, they engage in copious amounts of “sociosex” to facilitate bonding between females. Bonobo female genitalia, specifically the clitoris, are very large compared to those of other primates (de Waal & Lanting, 1997; Kano, 1992; Savage-Rumbaugh & Wilkerson, 1978; Woods, 2010). The bonobo clitoris seems to have evolved for the purpose of GG rubbing between females. Kano, for instance, states that he can think of no other reason why the bonobo clitoris would be so enlarged: “I am convinced that this evolved for GG rubbing rather than for ventral copulation” (Kano, 1992, p. 196). The large bonobo clitoris suggests that pair-bonding via sexual behaviour in females is paramount to the survival of the species.

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Bonobos and Humans

In the human studies, the more a heterosexual same-sex sexual behaviour was enjoyed, the higher the degree of intimacy, and the higher the partner was rated in terms of mothering traits and abilities. Pair-bonding through intimate activity thus seems to be a key factor in keeping dyads close to one another. The higher the amount of intimacy between a human female (or even a bonobo female) sexual dyad, the more bonded those dyads become. What is interesting is that bonobo society is saturated in sexual activity; it takes place very frequently. The current study indicates that sexual relationships are not absolutely random, but rather that there are preferred partners. Although human sexual activity is not as frequent as in bonobo society, it seems that sex also plays a role in the interplay of bonding and allomothering care in humans. Same-sex sexual behaviour need not be a lifelong activity in which heterosexual women engage; this is precisely why the definition of “sexual fluidity” includes the word “fleeting.” There are parallels between human and bonobo females (for example, the strong pair-bonding that occurs, the link between allomothering and sexual behaviour, etc.), although human females do not engage in the copious amounts of same-sex sexual behaviour that bonobos do. Bonobo society uses sex for many reasons, and this study shows that one of these is for accruing allomothering benefits from other female bonobos. In this way, female humans and female bonobos are similar. It is difficult to know how the ancestors of both humans and bonobos acted in terms of allomothering, but it seems plausible that this common behaviour between humans and bonobos may serve as a clue.

Limitations and Conclusion

Captive animals are not always representative of the workings of their natural environment, as being in captivity may impact their behaviour. The Milwaukee Zoo tries its best to mimic the natural conditions of the bonobo environment by arranging them in groups, which would normally be observed in their natural habitat (for example, non-related females are grouped together, and young males are housed with their biological mothers). Bonobos in Zoos in the Midwest may not be representative of other captive populations, there may have been a selection bias regarding the zoos in the Midwest. The Milwaukee Zoo houses the largest number of bonobos in captivity in all of North America, and also has the most successful bonobo breeding program (Sandin, 2010). Even though this zoo is an excellent imitation of the natural bonobo environment, however, it cannot fully replicate natural conditions. Therefore, bridging observed behaviour in captive animals to behaviour that might be observed in the wild is always a contentious issue in captive primate studies. Bonobos in the wild, for instance, generally live in groups that are larger than those at the Milwaukee Zoo. Therefore, females may have had less of a selection of allomothers to choose from, and this may have skewed the results. Further studies of bonobos and allomothering in their natural environment are therefore needed.

Operationally defining allomothering in bonobos was difficult (except in terms of play constituting a form of allomothering). The reason may be that there are very few studies on allomothering and bonobos. Therefore, a statistical test on behaviours (other than play and GG rubbing) that could test if bonobos were allomothering was not performed. Instead, video recordings and notes that were taken during the study were

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examined to assess allomothering behaviour in the female bonobo. For example, when the bonobo known as Hanna was startled, she did not jump on the back of her mother (who was in close proximity), but instead leaped onto the bonobo known as Deidre. As more studies are completed regarding what allomothering constitutes in bonobos, an operational definition of what allomother constitutes will be constructed and can be tested further. That is one future goal that I intend to achieve.

This study explored the connections between grooming, GG rubbing, play behaviour, and allomothering in a group of captive bonobos, particularly females, at the Milwaukee Zoo. It was hypothesized that female bonobos who groomed more would engage in more GG rubbing, and the results supported this hypothesis. Female bonobos who groom each other more also GG rub more frequently than those who groom each other less. Further, bonobos who engaged in more play behaviour (which is related to allomothering), GG rubbed each other more than they did with other bonobos. The study also explored allomothering in bonobos. Female bonobos who were frequent groomers and GG rubbers were also more likely to be involved in an allomothering dynamic. The study shows some support for allomothering and sexual behaviour among female bonobos, however the evidence is inconclusive and more studies need to be conducted on bonobos and partner preference in relation to GG rubbing, grooming, play, and allomothering.

Chapter 7

Summary and General Conclusion

Women and men faced differing struggles in the Environment of Evolutionary Adaptedness (EEA). One of the realms where women and men differ most is mating and reproduction (Buss, 1999). Females have much more to lose if they mate with a male who is not suitable or who will perhaps leave them and their offspring to engage in other pursuits (Buss, 2004). Males do not have to invest as much time and energy in the reproductive process, and sometimes do not stay with the female they have impregnated (Buss, 1989). Therefore, women who became pregnant and had to invest nine months of their lives in nurturing the fetus did not always have the help or the aid of the man who impregnated her. Further, kin were not always present to assist women in raising offspring (Hrdy, 2008). Thus, other women who may have experienced the same predicament and who were empathetic to the situation may have played a key role in one of the survival mechanisms that ancestral women used if needed. The dissertation proposed that allomothering was a survival mechanism that women may have used for survival, and 4 studies were conducted to lend support to this hypothesis.

The main goal of the dissertation was to test the allomothering hypothesis as an explanation for some of the sexual fluidity found in self-identified heterosexual and mostly straight women. There was some merit for the allomothering hypothesis. Of the four studies conducted, three supported the allomothering hypothesis and one directly tested the hypothesis. The allomothering hypothesis espouses that female sexual fluidity evolved as a result of the need for allomothering as a way to increase the chance of survival of a female and her biological offspring. Further, allomothering is hypothesized

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to also increase survival of the self, which in turn will help offspring survive to an age where they have a better chance of fending for themselves.

The first study, *Examining Same-Sex Sexual Attraction, Emotional Attraction, Fantasy, and Behaviour Among Self-Identified Heterosexual Women and Men*, showed that sexual fluidity seems to be a sex-specific trait. More women than men are sexually fluid, regardless of sexual orientation. The more interesting finding in study 1 is that self-identified heterosexual women indicate physical and emotional attraction to other women, while self-identified heterosexual men do not follow the same pattern. Self-identified heterosexual women but not men also engage in more sexual fantasies regarding the same sex. Further, general homosexual experience is higher in self-identified heterosexual women, but not in heterosexual men. Study one laid out the foundation for the dissertation by exemplifying that sexual fluidity is present in self-identified (mostly straight) heterosexual women. It also examined differences in mating strategies between women and men. Highlighting the different mating mechanisms presents a reason why sexual fluidity and allomothering may take place in a condition dependent circumstance. One limiting factor in the study was that there were more women than men in the sample, which could bias the results. Another study with a larger sample of men would contribute to the allomothering hypothesis and its predictions.

The second study, *Differences between Same-Sex Sexual Behaviour in Pornography Made for Heterosexual Women and Heterosexual Men*, examined the pornography industry, an industry that exploits the mating strategies and preferences of women and men (Buss, 1994; Glascock, 2005; Traeen & Daneback, 2013). Although men may still be the primary viewers and makers of pornography, a growing number of

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women are also starting to partake in the industry, both making and watching pornographic films (Lust, 2010). Similar to the male pornography industry, films being made for heterosexual women are using the mechanism of exploiting what women would like to watch. Of particular interest was the content that was included in the sexually explicit films made for heterosexual women. Analyzing the best-selling films geared toward heterosexual men and those geared toward heterosexual women allowed for a content analysis. A common theme found was that female same-sex sexual behaviour figured prominently in pornography made for both a female audience and a male audience. Heterosexual females, then, were inclined to watch same-sex sexual behaviour in pornographic films. Male heterosexual pornography, however, did not include any male same-sex sexual behaviour. The discrepancy highlights once again that sexual fluidity is a sex-specific trait, which generally occurs in women more than men. This discrepancy is highlighted by what pornography heterosexual women and men prefer to watch. A limitation to the study on pornography is who is actually watching the films, men or women? However, the pornography study was not intended to examine who was watching the sexually explicit material but instead why directors were including in the films made for heterosexual women and those made for heterosexual men.

The third study conducted was *Same-Sex Sexual Behaviour and Allomothering: Testing the Allomothering Hypothesis*. The allomothering hypothesis in relation to sexual fluidity is an evolutionary theory, and it can be difficult to test. However, this can be offset somewhat with some creativity. For this dissertation, a scale was devised to measure if women who self-identify as heterosexual or mostly straight (and have had a same-sex sexual encounter with another woman) would rate the last woman with whom

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they had had a same-sex sexual experience as having the traits of a good mother and asking them if they would leave their offspring with that woman. This scale allowed the allomothering hypothesis to be tested indirectly and perhaps garnered support for the hypothesis. First, if women enjoyed intimate behaviour with the women with whom they had had a same-sex sexual encounter, they rated those partners as having the traits of a good mother and someone with whom they would leave their offspring for a long or short period of time. This finding connects the enjoyment of a sexual encounter and the bonding that goes along with it to how women feel about the mothering traits of the women with whom they had had sex. Further, a thematic analysis revealed that most of the women in the sample engaged in a same-sex sexual encounter with a friend, indicating that many self-identified heterosexual women consider a female friend to be an integral part of their lives (Diamond, 2008; Goodman & O'Brien, 2000).

Results from study 3 revealed that self-identified heterosexual women do not seem to be engaging in same-sex sexual behaviour as a result of social pressure, or because it is a fad, or because it is a “cool thing to do.” Reasons given for same-sex sexual expressions are more internal, such as “it felt right.” More studies are needed with samples from various cultures on heterosexual women. Some cultures more than others are vehemently against same-sex sexual behaviour and therefore studying an array of cultures may become troublesome. More samples from various cultures are required to allow a comparison with the current sample of heterosexual (mostly straight) women regarding same-sex sexual behaviour. Perhaps the sample used in the dissertation was an anomaly. Only more studies similar to this set up will be able to generate more support for the allomothering hypothesis.

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The final study was *An Exploration of Female Same-Sex Behaviour in Relation to Allomothering, Genito-Genital Rubbing, and Grooming in a Group of Captive Bonobos*.

It is imperative to study species that are genetically related to humans. Learning about bonobos who share 98% of their genes with humans and who engage in prominent female same-sex sexual behaviour is crucial (Kano, 1992; Nunn, 2011; Prufer et al., 2012).

Traces to humans' ancestral past can be postulated when researching the behaviour of a species such as the bonobo (de Waal, 2001, 2013). Bonobos society is female centered; it is the female who leaves the natal troop to find another one to live with, and thus unrelated females dwell together, which is why there is a greater chance of allomothering taking place among this species. However, many more studies are needed to see if that is indeed the case. There are different interpretations of allomothering that also make the topic difficult to study. It is a newer branch of research that would greatly benefit from studies of bonobos in their natural environment in the Democratic Republic of the Congo.

The research conducted tried to show how same-sex sexual behaviour can take place in heterosexual (mostly straight) women with the impetus being allomothering. As was found, there is support for the allomothering hypothesis; however, other factors may also be contributing to same-sex sexual behaviour in women. More research is needed as to what other factors propel women to engage in same-sex sexual behaviour. One somewhat controversial example is that women, who are abused by males when they are children, or at any point in life, engage in same-sex sexual behaviour (Brannock & Chapman, 1990). Some women who experience abuse may rescind relationships with men but instead turn to women for long-term companionship. However, this is not true of all women who are abused (Brannock & Chapman, 1990). It is important to study

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questions that are controversial, and that are not easy to answer, as that is the only way to get a clearer understanding of important topics such as sexual orientation development among women and men.

The four studies lend some support to the allomothering hypothesis in relation to female sexual fluidity. Sexual orientation is a massive area of research; however, causes for same-sex sexual behaviour from an evolutionary viewpoint while intriguing are, at times, difficult to study. Same-sex sexual behaviour can occur in a species without thwarting reproductive success, which has been established among the bonobos. The same type of thing may occur in human females. Heterosexual women may engage in same-sex sexual behaviour during a stressor event such as the death of a male mate or being abandoned by a mate. An important survival mechanism is allomothering, which allows women to help each other and their offspring survive and an excellent way to cement the pair-bond would be through sexual behaviour.

More research is needed regarding the differing expressions of same-sex sexual behaviour among women and men. Research will likely be conducted from many areas of study and will hopefully provide insight on sexual orientation and the differences that are observed between women and men and why some of the differences exist. The evolutionary perspective that the same-sex sexual behaviour expressed in heterosexual women has an adaptive function, such as the allomothering hypothesis, may solve some of the mystery of why there is such a discrepancy. More studies are needed to bolster the argument. Further, there may be more than one evolutionary function that contributes to heterosexual women and mostly straight women engaging in same-sex sexual behaviour,

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such as the mate attraction hypothesis, which is an area that will be explored in future research.

Female same-sex sexual behaviour has often been assumed to share developmental similarities with male same-sex sexual behaviour; that is, sexual development according to “the default male model” (Diamond, 2008; LeVay, 2011). It seems, however, that this assumption has been based on misinformed science. Female same-sex sexual behaviour has often been projected to operate as male same-sex sexual behaviour development. The notion that female same-sex sexual behaviour developed in the same way as men “the default male model” has often occurred when conducting research on women and same-sex sexual behaviour (Diamond, 2008; LeVay, 2011). Assuming that women develop analogous to men is not bounded only to the field of evolutionary psychology but in many areas of study. One example comes from health research. Women were thought to experience symptoms of a heart attack in the same way as men (Angier, 1999). However many women experience heart attack symptoms that are dissimilar compared to men (Angier, 1999). As a result of the assumption that women are like men may have caused unnecessary death among women who were under the impression that symptoms of a heart attack were analogous to men. A similar trend occurred when researchers examined same-sex sexual behaviour among women, assuming women were like men. Perhaps now and, in the future, researchers will not assume that women fall into their only category of research instead of the “default male model” of sexual orientation and in many other areas of scientific research.

Trying to study a topic such as female sexual orientation and allomothering from an evolutionary perspective can be difficult. However, by using novel methods that are

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varied in nature, such as those used in this dissertation, information on tough topics of study can be illuminated. This dissertation has an overarching theory of allomothering that is deserving of more research. The findings in this dissertation hold promise for the allomothering hypothesis as an explanation as to why many self-identified heterosexual females engage in same-sex sexual behaviour at some point in life.

APPENDICES

Appendix A

REB Approval Form For Dissertation

To: Sarah Radtke
Psychology
Re: REB 2012-284: A Bio-Social Examination of Sexual Fluidity
Date: January 22, 2013

Dear Sarah Radtke,
The review of your protocol REB File REB 2012-284 is now complete. The project has been approved for a one year period. Please note that before proceeding with your project, compliance with other required University approvals/certifications, institutional requirements, or governmental authorizations may be required.

This approval may be extended after one year upon request. Please be advised that if the project is not renewed, approval will expire and no more research involving humans may take place. If this is a funded project, access to research funds may also be affected.

Please note that REB approval policies require that you adhere strictly to the protocol as last reviewed by the REB and that any modifications must be approved by the Board before they can be implemented.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication from the Principal Investigator as to how, in the view of the Principal Investigator, these events affect the continuation of the protocol.

Finally, if research subjects are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research.

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Please quote your REB file number (REB 2012-284) on future correspondence.
Congratulations and best of luck in conducting your research.

A handwritten signature in black ink, appearing to read 'Nancy Walton', with a stylized flourish extending to the right.

Nancy Walton, Ph.D.
Chair, Research Ethics Board

Appendix B

REB Approval Form for Continuation of Studies

To: Sarah Radtke
Psychology
Re: REB 2012-284: A Bio-Social Examination of Sexual Fluidity
Date: January 6, 2014

Dear Sarah Radtke,
The review of your protocol REB File REB 2012-284 is now complete. This is a renewal for REB File . The project has been approved for a one year period.

Please note that before proceeding with your project, compliance with other required University approvals/certifications, institutional requirements, or governmental authorizations may be required.

This approval may be extended after one year upon request. Please be advised that if the project is not renewed, approval will expire and no more research involving humans may take place. If this is a funded project, access to research funds may also be affected.

Please note that REB approval policies require that you adhere strictly to the protocol as last reviewed by the REB and that any modifications must be approved by the Board before they can be implemented.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication from the Principal Investigator as to how, in the view of the Principal Investigator, these events affect the continuation of the protocol.

Finally, if research subjects are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research.

Please quote your REB file number (REB 2012-284) on future correspondence.
Congratulations and best of luck in conducting your research.

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A handwritten signature in cursive script, appearing to read 'Lynn Lavallée'.

Lynn Lavallée, Ph.D.
Chair, Research Ethics Board

Appendix C

REB Approval Form For Continuation of Studies

To: Sarah Radtke
Psychology
Re: REB 2012-284: A Bio-Social Examination of Sexual Fluidity
Date: January 6, 2015

Dear Sarah Radtke,

The review of your protocol REB File REB 2012-284 is now complete. This is a renewal for REB File . The project has been approved for a one year period. Please note that before proceeding with your project, compliance with other required University approvals/certifications, institutional requirements, or governmental authorizations may be required.

This approval may be extended after one year upon request. Please be advised that if the project is not renewed, approval will expire and no more research involving humans may take place. If this is a funded project, access to research funds may also be affected.

Please note that REB approval policies require that you adhere strictly to the protocol as last reviewed by the REB and that any modifications must be approved by the Board before they can be implemented. Adverse or unexpected events must be reported to the REB as soon as possible with an indication from the Principal Investigator as to how, in the view of the Principal Investigator, these events affect the continuation of the protocol.

Finally, if research subjects are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research.

Please quote your REB file number (REB 2012-284) on future correspondence.
Congratulations and best of luck in conducting your research.

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A handwritten signature in black ink, appearing to read 'Lynn Lavallée', written in a cursive style.

Lynn Lavallée, Ph.D.
Chair, Research Ethics Board

Appendix D

Recruitment Forms

Study 1

Study on Sexuality from an Evolutionary Perspective

Female and male participants of all sexual orientations are needed for a study on human sexuality from an evolutionary perspective. The study requires that four questionnaires be completed including demographic information. The time it takes to complete the questionnaires range from 30-60 minutes. The questionnaires that will be administered will ask questions regarding sexual orientation, sexual history, sexual activity, masturbation, familiarity with sexual identification terms, and sexual fantasy. No monetary compensation will be given for filling out the questionnaires. If you are interested, please take a closer look by clicking the link and reading the consent form. Thank you for your time. If anyone would like to distribute this survey, please feel free to do so. If you have any questions, please contact me, at sradtke@ryerson.ca and I will get back to you. My email and contact number are at the bottom of this form. This research is being conducted to complete my PhD dissertation in psychological science at Ryerson University. The Ryerson University Research Ethics Board has approved it. A consent form will need to be filled out. Confidentiality is assured.

Primary Investigator:

Sarah Radtke
PhD Candidate Ryerson University
Email: sradtke@ryerson.ca
Phone: 416-979-5000 ext. 3235

Supervisor:

Dr. Maryanne Fisher
Adjunct Professor Ryerson University
Email: mlfisher@smu.ca
Phone: 902-491-6275

Study 3

Study on Female Sexuality

Women's sexual fluidity is talked about but there has been no empirical study. Help me change this! I am conducting a study for my dissertation on female same-sex sexual behavior. I am looking for women over the age of 18 who consider themselves predominantly heterosexual (straight). If you are interested, please take a closer look by clicking the link and reading the consent form. The survey takes about 10-15 minutes and is totally anonymous. Thank you for your time. If anyone would like to distribute this survey, please feel free to do so. We need to start to better understand, scientifically, what is going on with female sexual behaviour!

If you have any questions, please contact me, at sradtke@ryerson.ca and I will get back to you. My email and contact number are at the bottom of this form. This research is being conducted to complete my PhD dissertation in psychological science at Ryerson University. The Ryerson University Research Ethics Board has approved it. A consent form will need to be filled out. Confidentiality is assured.

Primary Investigator:

Sarah Radtke
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Email: sradtke@ryerson.ca
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Supervisor:

Dr. Maryanne Fisher
Adjunct Professor Ryerson University
Email: mlfisher@smu.ca
Phone: 902-491-6275

Appendix E

Consent Form Study One

Consent

A Bio-Social Examination of Sexuality and Sexual Fluidity in Women and Men

You are being asked to participate in a research study. Before you give your consent to be a volunteer, it is important that you read the following information to understand what you will be requested to do. This work is for my dissertation.

Purpose of the study: The study is on sexual orientation from an evolutionary perspective. Several aspects of sexuality will be explored including sexual orientation (heterosexual, homosexual, and bisexual) sexual fluidity, sexual fantasies, casual sex, sexual attitudes and sexual behaviour. Demographic information will also be collected. The purpose of the study is to investigate the idea that sexual fluidity (and bisexuality) is adaptive in human females and is more prominent in females than males. However, the study will explore bisexuality and sexual fluidity in males. This study is for my PhD dissertation work. Only females and males **18 years of age or older** can participate in the study.

Description of the Study: If you decide to participate in the research study, you will be asked to do the following: You will complete **FIVE** questionnaires (Five Parts) including demographic information. The questionnaires will take approximately 15-35 minutes to complete. The study uses a survey software called Qualtrics. Qualtrics is used in many fields of study from business to psychology. Qualtrics collects responses, it is anonymous and confidential. There will be no tracking of IP addresses or any tracking of geographical location.

What is Experimental in this Study: The study will be comparing answers on the completed questionnaires and comparing whether there is a statistical difference between answers given by women and men.

Risks or Discomforts: Occasionally people feel uncomfortable when answering questions about sexuality and this may cause some psychological discomfort. The risk is minimal and if you feel uncomfortable and do not want to answer a particular question, you may skip the question or discontinue participation at any time.

Benefits of the Study: Benefits include a greater understanding of sexual fluidity and bisexuality in women and men to researchers and the scientific community. Further, differences in various aspects of sexuality (if any are found) between women and men will contribute to the understanding of sexuality. Understanding these differences can help in romantic relationships whether long term or short term. The research hopes to contribute to a more accurate understanding of human sexuality. Your participation will allow this knowledge to grow. I cannot guarantee, however, that you will receive any

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benefits from participating in this study.

Confidentiality: The researcher will maintain confidentiality. You do not put your name on any part of the survey, it is confidential.

Incentives to Participate: You will not be paid to participate in this study.

Voluntary Nature of Participation: Participation in this study is voluntary. Your choice of whether or not to participate will not influence your future relations with Ryerson University. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time without penalty or loss of benefits to which you are allowed.

At any particular point in the study, you may refuse to answer any particular question or stop participation altogether.

if you have questions about the research you may contact:

Primary Investigator:

Sarah Radtke M.A.

PhD Candidate Ryerson University

Email: sradtke@ryerson.ca

Phone: 416-979-4000 ex 3235

Supervisor

Dr. Maryanne Fisher

Adjunct Faculty Ryerson University

Email: mlfisher.99@gmail.com

Phone: 902-491-6275

If you have any questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information

Research Ethics Board

c/office of the Vice President, Research and Innovation

Ryerson University

350 Victoria Street

Toronto, ON M5B 2K3

416-979-5042

A Bio-Social Examination of Sexuality and Sexual Fluidity in Women and Men

I have read the consent form and have had time to think about the study and have had the opportunity to ask questions. I understand what the study is about and am aware of the risks and benefits. I understand that my participation is voluntary and I can end my participation at any time.

By clicking agree you have read the consent form and are aware of the content and will start the survey.

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By clicking do not agree, you will exit the survey.
Please click Agree or Do not Agree

Agree
Do not Agree

Appendix F

Survey Study 1:

Demographics, Assessing Multiple Facets of Attraction to Women and
Men, The Human Sexuality Questionnaire and The Revised Sociosexual Orientation
Inventory

Part 1

Please indicate if you are:

Male
Female
Other

What is your age?

What is your ethnicity?

If you ascribe to a religion (or do not) please click the box that applies.

Christian
Muslim
Jewish
Buddhist
Atheist
Agnostic
Other

Please click on what orientation term you best identify with. Check ALL that apply

Straight
Gay
Lesbian
Bisexual
Homosexual
Heterosexual
Fluid
Unlabeled
Queer
Pan-sexual
Asexual
Bi-Curious
None of the terms apply to you

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Other

If you had to pick one of the above words to describe your sexual orientation, what would it be?

Please indicate if any of the terms apply to you, you may select more than one item, check ALL that apply.

Married

Committed Relationship

Single

Monogamous

Non-Monogamous

Open Relationship

Dating one Person

Dating Casually

Dating Multiple Persons

If you are married or in a committed relationship is your partner a:

Woman

Man

Other

Part 2

Please indicate which statement you best identify with

Entirely heterosexual

Largely heterosexual but with incidental homosexual history

Largely heterosexual but with a distinct homosexual history

Equally heterosexual and homosexual

Largely homosexual with a distinct heterosexual history

Largely homosexual with incidental heterosexual history

Entirely homosexual

Part 3

The first few questions below ask about how OFTEN you are attracted to women versus men. It does not matter if the attractions are strong or weak; we are just trying to get a sense of how often they occur. The first question focuses on physical attractions and the second question focuses on emotional attractions. By “physical” we mean the type of attraction that you would associate with a desire for sexual activity. By “emotional,” we mean the type of attraction that is usually associated with romantic love, including strong desires for emotional closeness and intimacy. Physical and emotional attractions often occur together, but not always. This is why we are asking about them separately.

1) Please provide a number between 0 and 100 to represent the percentage of your day-to-day PHYSICAL attractions which have been directed toward women versus men over the past year. For example, 0% would mean that you have NEVER experienced attractions

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for women during the past year. 100% would mean that you have ONLY experienced attractions for women during the past year, and 50% would mean that you have been physically attracted to women about as often as you have been physically attracted to men during the past year. You can provide any number between 1 and 100 (for example 20%, 83%, 99%). Please Indicate the percentage of physical attraction toward women

Percentage of physical attraction toward women_____

2) Now provide a number from 0% to 100% for the percentage of your EMOTIONAL attractions which are directed to women versus men.

Percentage of emotional attractions directed towards women_____

3) In general, what percentage of your sexual fantasies have been about women versus men over the past year?

Percentage of sexual fantasies about women versus men_____

4) How often have you experienced a physical attraction for a woman during the past year?

Almost never

Less than once a month

Once or twice a month

About once a week

More than once a week

About every day

5) About how many different women have you been physically attracted to in the past year?

6) If you answered "1" on the last question indicating you have been attracted physically to one woman in the past year, is this someone that you are currently sexually or romantically involved with?

Yes

No

7) How often have you experienced an emotional attraction for a woman during the past year?

Almost Never

Less than once a month

Once or twice a week

About once a month

More than once a week

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About every day

8) About how many different women have you been emotionally attracted to in the past year?

9) If you answered "1" on the last question, is this someone that you are currently sexually or romantically involved with?

Yes

No

10) How often have you had sexual fantasies about a woman, or women in general, in the past MONTH?

Almost never

Less than once a month

Once or twice a month

About once a week

More than once a week

About every day

11) The next question concerns the intensity of your attractions for women. This is on a 1 to 5 scale, so that 1 is "no attraction," 3 is a moderate attraction (right in the middle of the scale), and 5 is the most intense attraction you can experience. Thinking about ALL of the attractions to women you have experienced in the past year, how would you rate the AVERAGE intensity of those attractions

1 2 3 4 5

12) How would you rate the intensity of the STRONGEST attraction to a woman that you've experienced in the past year? This is on a 1 to 5 scale where 1 is "not very intense," 3 "is moderately intense" and 5 is "intense."

1 2 3 4 5

13) When you have sexual thoughts about a woman, or women in general, how strong is your desire to engage in sexual activity? Use the same 1 to 5 scale, so 1 is basically "no desire for sexual activity," 3 is in the middle, and 5 is maximum desire for sexual activity

1 2 3 4 5

ALLOMOTHERING

The next set of questions focus on MEN

14) How often have you experienced a physical attraction for a man during the past year?

Almost never

Less than once a month

Once or twice a month

About once a week

More than once a week

About every day

15) About how many different men have you been physically attracted to in the past year?

16) If you answered “1” on the last question, is this someone that you are currently sexually or romantically involved with?

Yes

No

17) How often have you experienced an emotional attraction for a man during the past year?

Almost never

Less than once a month

Once or twice a week

About once a month

More than once a week

About every day

18) About how many different men have you been emotionally attracted to in the past year?

19) If you answered “1” on the last question, is this someone that you are currently sexually or romantically involved with?

Yes

No

ALLOMOTHERING

20) How often have you had sexual fantasies about a man, or men in general, in the past MONTH?

- Almost never
- Less than once a month
- Once or twice a week
- About once a month
- More than once a week
- About every day

21) Thinking about ALL of the attractions to men you have experienced in the past year, how would you rate the AVERAGE intensity of those attractions? As before, this is on a 1 to 5 scale, so that 1 is “no attraction,” 3 is a moderate attraction (right in the middle of the scale), and 5 is the most intense attraction you experience.

1 2 3 4 5

22) How would you rate the intensity of the STRONGEST attraction to a man that you’ve experienced in the past year? As before, this is on a 1 to 5 scale, so that 1 is “no attraction,” 3 is a moderate attraction (right in the middle of the scale), and 5 is the most intense attraction you experience.

1 2 3 4 5

23) When you have sexual thoughts about a woman, or women in general, how strong is your desire to engage in sexual activity? Use the same 1 to 5 scale, so 1 is basically “no desire for sexual activity,” 3 is in the middle, and 5 is maximum desire for sexual activity

1 2 3 4 5

Part 4

Instructions: Heterosexual experience (with persons of the opposite sex). If you are male, substitute yourself for “male” in the item; if you are female, substitute yourself for “female” in the item (e.g., for a female, Item 4 is “having your nude breast felt by a male.”)

Response options for all items are:

- A) Never
- B) Once or twice
- C) Several times
- D) More than several times, less than ten times
- E) Ten times or more

Scoring: A = 1; B = 2; C = 3; D = 4; E = 5.

ALLOMOTHERING

How many times have you done the following? Please click on the answer.

Kissing without tongue contact

- Never
- Once or Twice
- Several Times
- More Than Several Times, Less than Ten Times
- Ten Times or More

Kissing with tongue contact

- Never
- Once or Twice
- Several Times
- More Than Several Times, Less than Ten Times
- Ten Times or More

Male feeling covered female breasts

- Never
- Once or Twice
- Several Times
- More Than Several Times, Less than Ten Times
- Ten Times or More

Male feeling nude female breasts

- Never
- Once or Twice
- Several Times
- More Than Several Times, Less than Ten Times
- Ten Times or More

Male lying prone on the female, petting without penetration of her vagina

- Never
- Once or Twice
- Several Times
- More Than Several Times, Less than Ten Times
- Ten Times or More

ALLOMOTHERING

Male mouth contact with female breast

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Female manipulation of male's penis

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Male manipulation of female genitalia (vaginal and clitoral areas)

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Sexual intercourse in face to face position with the male on top

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Female mouth contact with male's penis

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

ALLOMOTHERING

Male mouth contact with female genitalia

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Sexual intercourse, face to face with female on top

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Sexual Intercourse, face to face in side position

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Sexual intercourse, entering vagina from the rear

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

Homosexual Experience (with a person of your own sex).

Response options for all items are:

Never
Once or Twice
Several Times
More Than Several Times, Less than Ten Times
Ten Times or More

ALLOMOTHERING

How many times have you done the following? Please click on the answer.

Kissing without tongue contact

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Kissing with tongue contact

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Manipulating the genitals of a person of your own sex

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Having your genitals manipulated by a person of your own sex

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Performing mouth-genital contact on a person of your own sex

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

ALLOMOTHERING

Having mouth-genital contact performed on you by a person of your own sex

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

With how many different persons of the opposite sex have you had sexual intercourse within your lifetime?

- None
- One
- Two
- Three
- Four or more

With how many different persons of your own sex have you had sexual relations in your lifetime?

- None
- One
- Two
- Three
- Four or more

How many times have you engaged in manipulation of your own genitals?

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Orgasmic experience (orgasm = sudden spasmodic discharge of sexual tension usually accompanied by ejaculation in the male).

Response options for all items are:

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

ALLOMOTHERING

How many times have you experienced orgasm through:

Masturbation

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Petting, or body contact without manipulation of the genitals

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Manipulation of your own genitals by someone else

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Heterosexual intercourse

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

Homosexual relations

- Never
- Once or twice
- Several times
- More than several times, less than ten times
- Ten times or more

ALLOMOTHERING

Oral stimulation by another

Never
Once or twice
Several times
More than several times, less than ten times
Ten times or more
Dreams (nocturnal emissions)

Never
Once or twice
Several times
More than several times, less than ten times
Ten times or more

Fantasy alone

Never
Once or twice
Several times
More than several times, less than ten times
Ten times or more

Part 5.

Please respond honestly to all of the following questions. Your responses will be treated confidentially and anonymously.

1 With how many different partners have you had sex within the past 12 months?

0
1
2
3
4
5-6
7-9
10-19
20 or More

Referring to the question directly above, how many of the partners (who you had sex with in the past year) were women and men? Please write down a number for each, you can estimate the number and if the number is zero, please type "0"

Women
Men

ALLOMOTHERING

2) With how many different partners have you had sexual intercourse on one and only one occasion?

0
1
2
3
4
5-6
7-9
10-19
20 or More

Referring to the question directly above, how many of the partners (who you had sex with in the past year) were women and men? Please write down a number for each, you can estimate the number and if the number is zero, please type "0"

Women

Men

3) With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?

0
1
2
3
4
5-6
7-9
10-19
20 or More

Referring to the question directly above, how many of the partners (who you had sex with in the past year) were women and men? Please write down a number for each, you can estimate the number and if the number is zero, please type "0"

Women

Men

ALLOMOTHERING

4) Sex without love is OK

1 Strongly Disagree

2

3

4

5

6

7

8

9 Strongly Agree

5) I can imagine myself being comfortable and enjoying "casual" sex with different partners

1 Strongly Disagree

2

3

4

5

6

7

8

9 Strongly Agree

6) I do not want to have sex with a person until I am sure that we will have a long-term serious relationship

1 Strongly Disagree

2

3

4

5

6

7

8

9 Strongly Agree

ALLOMOTHERING

7) How often do you fantasize about having sex with someone you are not in a committed relationship with?

Never
Very Seldom
About Once Every Two or Three Months
About Once a Month
About Once Every Two Weeks
About Once a Week
Several Times per Week
Nearly Every Day
At Least Once a Day

Referring to the question directly above, are your fantasy partners mostly

Women
Men
Equally women and men
Some women but mostly men
Some men but mostly women

8) How often do you experience sexual arousal when you are in contact with someone you are not in a committed relationship with?

Never
Very Seldom
About Once Every Two or Three Months
About Once a Month
About Once Every Two Weeks
About Once a Week
Several Times per Week
Nearly Every Day
At Least Once a Day

Referring to the question directly above, Is this person most often a

Woman
Man
Both women and men

ALLOMOTHERING

9) In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?

Never
Very Seldom
About Once Every Two or Three Months
About Once a Month
About Once Every Two Weeks
About Once a Week
Several Times per Week
Nearly Every Day
At Least Once a Day

Referring to the question directly above, Is this person most often a

Woman
Man
Equally women and men
Some women but mostly men
Some men but mostly women

Appendix G

Consent Form Study 3

Consent

A Bio-Social Examination of Sexuality and Sexual Fluidity in Women and Men

You are being asked to participate in a research study. Before you give your consent to be a volunteer, it is important that you read the following information to understand what you will be requested to do. This research is being conducted by doctoral student, Sarah Radtke. This project is in partial fulfillment of her doctoral work.

Purpose of the study: The study is on same-sex behaviour from an evolutionary perspective. The purpose of the study is to measure same-sex behaviour in individuals who self identify or mostly identify as heterosexual or straight and reasons why the behaviour occurs. This is an online study. If you choose to participate then do not want to do the survey anymore, you may stop at anytime and your partial answers will not be used in the data analysis, they will be deleted.

Description of the Study: If you decide to participate in the research study, you will be asked to do the following: You complete **THREE** parts to the survey entitled Heterosexual Females in Relation to Same-Sex Sexual Behaviour and Allomothering, including demographic information. The survey contains questions about same-sex behaviour, and about mothering. The average time it takes to complete the survey ranges from 10 to 30 minutes. The study uses a survey software called Qualtrics. Qualtrics is used in many fields of study from business to psychology. Qualtrics collects responses, it is anonymous and confidential. There will be no tracking of IP addresses or any tracking of geographical location.

What is Experimental in this Study: The study will be comparing answers on the completed surveys using statistical measures.

Risks or Discomforts: Occasionally people feel uncomfortable when answering questions about sexuality and this may cause some psychological discomfort. The risk is minimal and if you feel uncomfortable and do not want to answer a particular question, you may skip the question or discontinue participation at any time.

Benefits of the Study: Benefits include a greater understanding of same-sex behaviour from an evolutionary perspective. The research hopes to contribute to a more accurate understanding of human sexuality. Your participation will allow this knowledge to grow. I cannot guarantee, however, that you will receive any benefits from participating in this study.

Confidentiality: The researcher will maintain confidentiality. You do not put your name on any part of the survey, it is confidential.

ALLOMOTHERING

Incentives to Participate: You will not be paid to participate in this study.

Voluntary Nature of Participation: Participation in this study is voluntary. Your choice of whether or not to participate will not influence your future relations with Ryerson University. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time without penalty or loss of benefits to which you are allowed.

At any particular point in the study, you may refuse to answer any particular question, or stop participation altogether.

If you have questions about the research you may contact:

Primary Investigator:

Sarah Radtke M.A.

PhD Candidate Ryerson University

Email: sradtke@psych.ryerson.ca

Phone: 416-979-4000 ex 3235

Supervisor

Dr. Maryanne Fisher

Adjunct Faculty Ryerson University

Email: mlfisher.99@gmail.com

Phone: 902-491-6275

If you have any questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information

Research Ethics Board

c/office of the Vice President, Research and Innovation

Ryerson University

350 Victoria Street

Toronto, ON M5B 2K3

416-979-5042

rebchair@ryerson.ca

A Bio-Social Examination of Sexuality and Sexual Fluidity in Women and Men

I have read the consent form and have had time to think about the study and have had the opportunity to ask questions. I understand what the study is about and am aware of the risks and benefits. I understand that my participation is voluntary and I can end my participation at any time.

By clicking agree you have read the consent form and are aware of the content and will start the survey and can stop if you decide you do not want to participate. By clicking do not agree, you will exit the survey.

Please click Agree or Do not Agree.

ALLOMOTHERING

Appendix H

Survey Self-Identified Heterosexual Females in Relation to Same-Sex Sexual Behaviour and Allomothering

Part 1

Please tell us a little information about yourself?

What is your age? _____

What is your present romantic relationship status? Check all that apply

Single_____

Dating one person casually_____

Dating multiple people _____

Dating one person in a committed relationship _____

Common-law or married relationship _____

Divorced or separated _____

Other (specify)_____

If you are in a romantic relationship, for approximately how long? ____ (qualtrics choices about time period).

If you are not in a relationship, are you currently seeking one? Yes____No____

How many biological children do you have?

How many adopted children do you have?

If you don't have a child, do you want to have one? Yes____No____Unsure____

How religious are you?

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

ALLOMOTHERING

Please circle the number beside the statement that most applies to you?

0- Exclusively Heterosexual

1- Predominantly heterosexual, only incidentally homosexual

2- Predominantly heterosexual, but more than incidentally homosexual

3- Equally heterosexual and homosexual

4- Predominantly homosexual, but more than incidentally heterosexual

5- Predominantly homosexual, only incidentally heterosexual

6- Exclusively homosexual

Part 2

Please answer the questions as honestly as you can. There are not right or wrong answers

Do you typically consider yourself heterosexual (straight) Yes____ No____

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

To what degree have you been physically attracted to a woman? (e.g. desired sexual activity)?

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

To what degree have you enjoyed (or would enjoy) **lightly intimate** physical behaviour with a woman? For example, kissing on the cheek, holding hands or hugging.

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

To what degree have you enjoyed (or would enjoy) **moderately intimate** physical behaviour with a woman? Some examples are kissing without tongue, touching each other's body with clothes on.

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

ALLOMOTHERING

To what degree have you enjoyed (or would enjoy) **very intimate** physical behaviour with a woman? Some examples include kissing with tongue, oral sex, touching genitals, using sexual toys.

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

To what degree have you felt romantic love and emotional attraction to another woman?

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

To what degree do you seek emotional support and romantic love from women?

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

How often do you have sexual fantasies about engaging in a physical (sexual) relationship with women?

1	2	3	4	5	6	7	8	9
Never/rarely			Once a Month					More than once per day

How often do you have emotional fantasies about engaging in romantic love, or emotional closeness and intimacy, with women?

1	2	3	4	5	6	7	8	9
Never/rarely			Once a month					More than once per day

For the following questions please indicate how much you agree with each statement

To what degree are you open to the idea of engaging in intimate sexual contact with women.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

ALLOMOTHERING

I have felt a deep physical intimate attraction to a woman but did expect an emotional connection.

1 2 3 4 5 6 7
Strongly disagree Strongly agree

I have felt a strong sexual connection with women but have been prohibited from acting on it.

1 2 3 4 5 6 7
Strongly disagree Strongly agree

Please describe the context or situation in which you experienced physical or emotional attraction to a woman_____

Part 3

Please answer the questions as honestly as you can.

Have you ever engaged in same-sex behaviour? Yes or No? _____

If you engage in same sex behaviour, have engaged in same sex behaviour, or may engage in same sex behaviour, how likely are the following reasons for engaging in the behaviour?

You wanted to attract a man or get a man's attention

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

You were curious

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

There was a lack of opportunities to engage in intimate behaviour with men

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

You felt fed up with men

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

ALLOMOTHERING

It felt like the right thing to do

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

It felt pleasurable

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

It was a cool thing to do

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

You wanted to make your parents angry

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

You were paid to do it

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Peer pressure from friends (for example Truth or Dare)

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

You felt love or romantic affection toward a woman

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

A woman initiated intimate contact with you

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

To mimic a celebrity who has engaged in same sex behaviour

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

ALLOMOTHERING

Imagine you are a mother of a young child and facing a serious illness. You are trying to plan for your child's future in the event of your death. Thinking about the woman you had the most recent same-sex sexual behaviour, please rate her ability to care for your child by how **likely** she is to do the following

Raise your child?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Protect your child?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Provide shelter for your child?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Provide food for your child?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Teach your child appropriate hygiene behaviour?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Do her best to take care of your child?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Be patient with your child?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Be calm and relaxed with your child?

ALLOMOTHERING

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Spend an adequate amount of time with your child?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Foster emotional development in your child?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Be understanding and sensitive toward your child?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Always be there when your child needed her?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Discipline your child in an appropriate manner?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Be a responsible person?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Care for your child while also attending to various demands of life?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Be a good listener to your child?

ALLOMOTHERING

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Be able to help your child cope with problems?

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

Be sensitive to your child's needs?

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

Be able to protect your child from dangerous situations?

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

Spend quality time with your child?

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

Not lose her temper with your child?

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

Be consistent with your child?

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

Not abandon your child?

1 2 3 4 5 6 7

Extremely unlikely Extremely likely

Leave your child or children in this woman's care for a short-term amount of time?

1 2 3 4 5 6 7
Extremely unlikely Extremely likely

Leave your child or children in this woman's care for a long-term amount of time?

ALLOMOTHERING

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

Appendix I

All the answers to the question “Please describe the context or situation in which you experienced physical or emotional attraction to a woman.”

Responses from self-identified heterosexual (mostly straight) women:

“Nothing specific, just general.”

“She was a friend of mine in College.”

“I have a strong attraction to a female friend of mine and we have recently talked about possibly going further.”

“In my early 20’s, my best friend was bisexual. We engaged in kissing but I felt more sisterly love for her.”

“In a bar in New York in my 20s – she was the bartender, we ended up making out and to this day I could recognize her perfume if I smelled it.”

“Seeing or knowing a woman I found attractive, fantasizing.”

“One night stand, was great, but we didn’t fit together for anything long term.”

“My friend.”

“Strong friendships, moderate physical attraction.”

“Lesbian co-worker asked me on a date once.”

“There was a woman in an off- Broadway play who I was strongly attracted to.”

“Physical attraction occurred in social situations, i.e. party or vacation, usually involved slight intoxication, most of these contacts were not taking place in public, only the girl and me knew about it.”

“The two prominent contexts include close friends that I admire or strangers.”

“I find female form beautiful and sexual. There’s no one particular context or experience. Just women.”

“One of my bisexual friends and I were getting very close and, for a week it so had a loving emotional relationship. We would cuddle and watch movies in bed. When she expressed her love for me, we kissed, but I felt zero attraction. One of the greatest lost loves of my life.”

ALLOMOTHERING

“Playing truth or dare with a group of friends and being dared to kiss a girl who I found extremely attractive – I found myself wanting to kiss her more.”

“I have engaged in intimate sexual behavior with a female friend. I do not desire emotional connections with women, I have no interest in dating women, but the female body is extremely attractive. That's a major turn-on.”

“Several female friends or co-workers.”

“Being at home with a friend.”

“Friends around me.”

“Looked up to her, admired her strength and was curious about exploring her.”

“Short-term fantasy based.”

“At college parties, at bars, in situations where there is alcohol and people are truly enjoying themselves.”

“Friends.”

“In school.”

“Attracted to a few women for some reason.”

“When drinking.”

“A friend.”

“Met a few woman casually at a bar or party and I found them attractive physically and like their personalities.”

“Emotional intimacy is easy, physically only when alcohol or drugs are involved.”

“I have dated 2 women in my life. Ultimately both connections went from sexually charged to “room mate” in a very short time. I am now happily married and my husband and I engage in sexual fantasies that involve me and other women but they do not extend to real world application.”

“Around friends that are bi-sexual or gay and they have propositioned me.”

ALLOMOTHERING

“Often prefer the company of women to men.”

“Friendships.”

“Met a lesbian at Pride Celebrations many years ago and became very close with her on every level.”

“Passing crushes and infatuation with beautiful personalities. Too shy to ever actually act upon feelings and always pretty sure feelings would be unrequited.”

“Usually with women I had known.”

“Attracted women physically and emotionally.”

“A woman I knew in College and we kissed and touched each other, we were good friends but we talked about guys all the time.”

“I had one romantic and sexual relationship with someone.”

“Close friend.”

“Have had threesome with a woman and a man.”

“Friend and I met in University, we spent time together often. We were always dating men.”

“Before my marriage I did experiment and I liked it.”

Appendix J

Proposal for permission to conduct a study on Bonobos at the Milwaukee Zoo

Proposal for Research Study on Bonobos (*Pan paniscus*) at the Milwaukee Zoo in 2011

To Jan Raefart

First, I would like to say that I have been to the Milwaukee zoo before and I was so impressed with the bonobos and the birth rates of your bonobos in captivity. In fact, this is one of the reasons that I would like to conduct a research study at this zoo. I am in my second year of my PhD degree at Ryerson University. For my PhD dissertation, I plan on examining human female same sex behavior from an evolutionary perspective. Aside from handing out questionnaires to human females and collecting data, I would really like to conduct a comparative study on bonobos. There have been several studies on bonobos in captivity that have led to some very striking research (see de Waal, 2005; Gold, 2002 & Toth et al, 1993). From my perspective, it seems that the inhabitants of the Milwaukee Zoo have an excellent environment enclosure and therefore this makes them a great group to use as study subjects. I am well versed in bonobos activity, I have read all the books I can find on bonobos and have read an extensive amount of journal articles on bonobos. However, I believe just because you have read about something, you may have a good understanding but to actually see the bonobos would give me a much greater understanding of the species.

This piece of research will be integral to my PhD dissertation. I will be as stated earlier, exploring human female same sex behavior from an evolutionary perspective, and an integral part of the dissertation is writing a comparative piece on bonobo female same-

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sex behavior. There are many reasons as to why bonobo females engage in frequent genito-genital (GG) rubbing, kissing, and forming strong bonds. Reasons include mate attraction, tension regulation, social bonding to name a few (de Waal, 1995; 2005; de Waal & Lanting, 1997; Furuichi, 1989; Hohmann & Fruth, 2000; Kano, 1980; Parish, 1996; Savage-Rumbaugh & Wilkerson, 1978). I wanted to conduct a study on allomothering among bonobos. Hrdy (2008) suggests that alloparental care was essential for humans to survive and to reproduce. For this study, as there are a range of young bonobos from infant to adolescent in the troop, I would like to examine the interactions of the mothers and their sexual behaviour toward other female bonobos and interactions between female bonobos in general. The study will investigate who bonobo offspring interacts with (besides the mother). I will also be studying grooming behaviour (which is related to social bonding) and its connection to GG rubbing, I would like to see if bonobos have preferred grooming partners and if that relates to who they engage in sexual behaviour and if there is any connection to an allomothering dynamic.

There have not been many studies on bonobos and alloparenting and by conducting a study that looks for this will be beneficial to further examining the impact that alloparenting had in human evolution. Further, I am immensely interested in the same sex behavior of bonobo females, and I would like to do a field study for myself and for my PhD to further understanding of not just bonobos themselves, but also human female same sex sexuality that seems to be fluid or flexible (Chivers, 2007; Diamond, 2008). Further, I am interested in bonobos and in many dimensions of their behavior, I would consider it a true honor to be able to watch this under studied species and take notes on their behavior. I will be using notebooks and coding behavior, the basic tools for

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field research. I am not sure if I will be using a camera (or if this is permitted) but I do not mind watching and coding.

The time that I would like to conduct the study would be next year 2011, in the months of May, June, or July. I think I would at least need at minimum one month, however, I think two months might be more sufficient. I will take what I can get, so if you can have me for only one month that would be fantastic. Also, these months are flexible, if another time is better, please let me know. I really do not want to disturb the zoo workers and I am good at working on my own. I would appreciate some biographies of the bonobos at the zoo, although I have read the book by Jo Sandin (2010), and will do so several times over if I am accepted to conduct this study at the Milwaukee zoo. I am not sure if I can get free admission, but a discounted pass would be great. I would not need parking. I could help in some cleaning chores as I have worked at a primate sanctuary before (there were no great apes there but there were baboons, ring tailed lemurs, macaques and several other monkeys). I have experience shoveling and cleaning primate waste, if you would need help with that, I would be happy to do so.

I know what the limitations for access are, I will observe from the public areas. If I am allowed to pursue this study, please let me know if I need to get any kinds of vaccines just to be sure that I do not infect the bonobos from the outside of the enclosure, better to be more precautionous. I thank you very much for considering this research endeavor. Please let me know what you think, or if you have any questions, please ask me.

I look forward to hearing from you.

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Sincerely,

Sarah Radtke M.A.
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Appendix K

Acceptance to conduct research study on bonobos at The Milwaukee Zoo

Re: Bonobo Research Proposal

Jan.Rafert@milwcnty.com

Tue 12/7/2010 4:50 PM

To: Sarah Radtke <sradtke@psych.ryerson.ca>;

Hi Sarah:

Your proposal has been received, and approved. We can waive admission charges on the condition that we be recognized in any papers, publications and/or presentations stemming from this study. We would also like a copy of your paper upon completion. As the time gets closer, I shall write a waiver letter for admission for you to produce if questioned at the gate. Since your observations will be from the visitor viewing area, your study should have little impact on our staff and their routine. We do appreciate your offer to assist, however. Regarding any vaccinations, none should be required. A TB test would be required if you were to be within the same air space as the bonobos. This may well be an interesting study as we now have a young female who has been raising her infant sister since the death of their mother. Also the group will have a new outdoor enclosure with some public viewing this year. Other than that, I think I covered the main issues in my original email. Do you have any questions for us? Just let me know.

Take Care & Be Well,

Jan

PS. Am I correct in assuming that you will not be handing out questionnaires to our visitors?

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Appendix L

Approval to conduct bonobo study at the Milwaukee Zoo from the Ryerson Ethics Board

From: Nancy Walton [nwalton@ryerson.ca]
Sent: Tuesday, January 04, 2011 8:12 PM
To: Sarah Radtke
Subject: Research ethics question

Hi Sarah,
Alex Karabanow forwarded me your email regarding your doctoral studies.
Alex is no longer working at Ryerson and as Chair of the REB, I am responsible for most research ethics activities at the University. You should forward any questions you have to me. I have one question: Who is your supervisor?

It sounds like, if you got approval for observation of the bonobos from the Milwaukee Zoo, that that is sufficient for this phase of the study.

Once you decide to start the human phase of the study, you should make sure to allow sufficient time to go through the human ethics REB H i.e. our REB. Typically you will get a first response in ~ 6 weeks or so to a proposal you submit.
Let me know, at that point, if you have more questions. For now, I feel that it's just fine to go ahead with the permission of the Milwaukee Zoo and start this phase.
Best of luck with the research. It sounds interesting!

Nancy
Nancy Walton, PhD
Chair, Research Ethics Board
Associate Professor
Ryerson University POD470B
350 Victoria St., Toronto, ON
j416k979H5000 ext. 6300
nwalton@ryerson.ca
rebchair@ryerson.ca

RE: Research ethics question
Sarah Radtke
Tue 1/4/2011 8:35 PM
To: Nancy Walton <nwalton@ryerson.ca>;

Hello Nancy,
Thank you for the fast response. My supervisor is Dr. Wade Pickren. I am very excited to conduct this research. Once I have the human phase figured out, I will submit to the ethics board.
Take care,
Sarah

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