

*I EVOLVED THIS WAY: EXAMINING NONMONOSEXUALITY AS AN EVOLUTIONARY
ADAPTATION*

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By

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Abstract

The main evolutionary purpose of any living creature is to pass on its genes through reproduction, also referred to as reproductive success (Dawkins, 1976). Since successful reproduction requires the copulation of a male and a female of any given species, any sexual behavior which is not exclusively heterosexual is an enigma in evolutionary theory. The *affiliation hypothesis* advocates for the concept that homosexual behavior may have evolved as a way to maintain social bonds (Muscarella, 1999, 2000). It is generally accepted that sexual behavior is not dichotomous indicating that hominins would have exhibited both homosexual and heterosexual behavior (Muscarella, 2000). This theory would allow for the maintenance of social bonds but would not hinder the possibility of heterosexual reproduction. The current study tests this hypothesis using multiple measures of reproductive success and social connection.

Introduction

One main evolutionary function of any living creature is to pass on its genes through reproduction (Dawkins, 1976). Since successful reproduction requires the copulation between a male and female member of a species, any sexual behavior which is not exclusively heterosexual is an enigma to evolutionary theory – energy is considered wasted (in terms of adaptiveness) when it is used in pursuit of attracting mates of the same sex (Apostolou, 2016). The current consensus in the field of Evolutionary Psychology is that homosexual behavior did not evolve as an inherited characteristic within humans due to natural selection, or adaptation, despite theories on the adaptive values of such behavior (Buss et al., 1998; Kirkpatrick, 2000; Muscarella, 1999, 2000). Perhaps the most well-known of these theories is Wilson’s kin-selection theory (Kirkpatrick, 2000) which suggests that homosexual men will altruistically not reproduce to assist with the care of relatives’ offspring. However, there is little to no supportive evidence of this theory (Muscarella, 2000).

Frank Muscarella has proposed an *affiliation model* which advocates for the concept that homosexual behavior may have evolved as a way to maintain social bonds (1999, 2000). In addition, it is likely that sexual behavior is not dichotomous. Therefore, early hominids would have exhibited both homosexual and heterosexual behavior (Muscarella, 2000). This theory would allow for the maintenance of social bonds but would not hinder the possibility of heterosexual reproduction.

Evolution and Human Sexuality

Adaptations evolve within a species because they benefit the reproduction of the species either directly or indirectly (Buss et al., 1998; Muscarella, 2000). A behavior is considered adaptive if it may have solved an adaptive problem in evolutionary history (Tooby & Cosmides,

1992). A reproductively inherited trait is considered to be directly advantageous when it helps an organism in terms of reproductive success, otherwise known as sexual selection, and a trait is considered indirectly constructive when it aids in an organism's survival, referred to as natural selection (Buss et al., 1998). The peacock is an animal which evolutionists often refer to in order to provide an example of direct adaptations at work. The peacock's tail is large, heavy, and colorful, which makes it easy to spot by predators and slow to escape. Though this elaborate display is a hindrance to the survival of the peacock, peahens tend to choose males with the brightest colors indicating that the peacock tail is an indicator of reproductive success.

Another famous example of an adaptation are the beaks of the Galapagos finches. Each finch has evolved a beak which is specialized for the type of food source to be found on their respective island; whether it is a long, sharp beak for fishing out larvae or a strong, thick beak for cracking nuts and seeds. The finch's beak is an adaptation for survival which indirectly affects their reproductive success.

When reproduction is prosperous, it is called *reproductive success*. The adaptive value of any human behavior can be measured through reproductive success (Camargo, Geher, Fisher & Arrabaca, 2013; Kirkpatrick, 2000). Reproductive success is difficult to measure in a post-contraceptive society as it is usually established by the number of offspring an individual has produced who have also produced children (Geher, 2013). With the invention of contraceptives, women can now choose whether they will have children which makes it difficult to assess reproductive success in the traditional sense. Therefore, in current research, qualities that would have likely corresponded with a high rate of reproductive success in the environment of evolutionary adaptedness, or EEA, are measured as a proxy (Geher, 2013; Geher, Camargo & O'Rourke, 2008).

Evolution and Non-Heterosexuality

The terminology utilized in the literature on non-heterosexual behavior has begun to make an important distinction between *homosexual orientation* and the display of *homoerotic behavior* (Kirkpatrick, 2000; Muscarella, 2000). In this way, *the motivation of the behavior (e.g., sexual orientation, exploration, lack of opposite-sex partners) is not taken into account* (Muscarella, 2000, p. 53). This differentiation of terms helps to distinguish a variety of homosexual behaviors, including those engaged in by people who do not identify as strictly homosexual, such as bisexuals, bi-curious individuals, polysexuals, etc. Those people who identify as engaging in both heterosexual and homosexual behavior can be grouped into the category known as *nonmonosexuals* (*Nonmonosexuality 101*, 2014) as opposed to those who strictly engage in heterosexual or homosexual behaviors only, or *monosexuals*. Evidence of this non-dichotomous sexual behavior can be seen throughout the animal kingdom, as well as in cross-cultural history. Alfred Kinsey found evidence that individuals who participated in homosexual behavior were actually, in practice, bisexual as the behaviors they were reporting were not exclusively homosexual (Kinsey, Pomeroy & Martin, 1948; Kinsey, Pomeroy, Martin & Gebhard, 1953). In fact, bisexuals make up the largest portion of the LGBT community (Avery, 2017) and bisexuality may be more common throughout the world than monosexuality (Kirkpatrick, 2000).

Animals and Non-Human Primates

From insects and birds, to nonhuman primates and other mammals, evidence of homosexual behavior is prevalent throughout the animal kingdom (Bailey & Zuk, 2009). It is important to note that it is impossible to know what animals actually desire therefore, *sexual orientation* is not a part of the discourse for this type of research (Bailey & Zuk, 2009). One of

the most studied nonhuman primates are bonobos who are known for their sexual behavior (Vasey, 2006; Wallen & Zehr, 2004; de Waal, 1987). Bonobo females are known to engage in *genital rubbing* with other females (de Waal, 1987; Vasey, 2006). Male bonobos exhibit homosexual behaviors as well such as fellatio and genital massage (Vasey, 2006).

Nonhuman primates, especially chimps and bonobos, are observed to infer what early hominid behavior may have been like (Diamond, 1992; Muscarella, 2000). As bisexual behavior has been apparent throughout studies of nonhuman primates, it can be inferred that early hominins would have exhibited similar behavior. This behavior would carry on throughout evolutionary history if bisexuality is indeed a benefit to survival and therefore could be indirectly adaptive.

Historical Relevance

In Ancient Greek poetry, the god Eros had an indifference to the sex of the people he hit with his bow and arrow of love, including Sappho who was known for her poetry dedicated to the loving of women. After this time, when Greece was becoming more centrally and politically focused, homosexuality was generally referred to relationships between male individuals and women were relegated to solely reproductive purposes in the culture (Cantarella, 2002). However, evidence of (nonexclusive) homosexual relationships can also be found throughout Greek mythology within the stories of Dionysus and Adonis, Hercules and Jason and Achilles and Patroclus in *The Iliad* (Cantarella, 2000).

It is commonly known that men in Ancient Greece went through an initiation process when they reached puberty (Cantarella, 2002). Older men in the city acted as mentors, and lovers, to the younger generation as a way to initiate them into society, provide protection, and

increase social status. This pederastic behavior was also well-established in the Middle East and South Asia between the 1890s and 1930s (Bernstein, 2009).

In the 18th and 19th centuries, homosexuality in Japan was *widely practiced and generally tolerated* and considered *quite natural and virtuous* (Bernstein, 2009). According to Bernstein, in the mid-seventeenth century, teenage boys would earn money as homosexual prostitutes for Buddhist monks, who were not permitted to have sexual relations with women, and Samurai who considered male sex as the purest love (2009).

Cross-Cultural Evidence

Same-sex sexual behavior is found to be quite common among co-wives of polygynous tribes in Africa and does not hinder a woman's heterosexuality nor culturally define a woman as bisexual (Bohan, 1996 as cited in Muscarella, 2000). Homosexual behavior exhibited in male adolescents has also been found to predict alliances in adults in the Nambikuara and Barasana people in South America (Hugh-Jones, 1979; Sorensen, 1984 as cited in Kirkpatrick, 2000).

Modern Statistics

Within the United States, rates of homosexuality have generally remained consistent until 2010 with 1.3% of women and 1.9% of men reporting a homosexual orientation (Storrs, 2016). However, there is evidence that the rates of bisexuality in both men and women are on the rise. According to the Centers for Disease Control's most recent national survey published in 2016, 5.5% of women and 2% of men self-identified as bisexual in comparison to 3.9% and 1.2%, respectively, in the survey from 2006-2010 (Copen, Chandra & Febo-Vazquez, 2016; Storrs, 2016). In addition, 1,000 people from multiple generations participated in a poll in Great Britain about their sexual orientation. In comparison to the respondents in the *Baby Boomer* generation (those born between 1960-1980) of which 1% reported being nonmonosexual, respondents from

Generation Z (those born between the mid-1990s to mid-2000s) 24% reported an orientation fitting with nonmonosexuality (Avery, 2017). It is important to note that these figures could be rising due to a widespread increase in cultural acceptance of nonheterosexuality which can only account for the willingness of individuals to report their identity. The argument could be made that the numbers are actually higher than reported as nonheterosexuality is not supported in every area of the world, legally, or socially (Fenton, 2016).

Many individuals who engage in homosexual behavior have children (Kirkpatrick, 2000). In fact, in a study conducted by Baker and Bellis (1995), it was found that bisexual, British women had no significant difference in lifetime fecundity compared to heterosexual women (Kirkpatrick, 2000). Some theories of the evolutionary purpose of homosexual behavior could help interpret this recent cultural development and project to other nonmonosexual identities.

Evolutionary Theory and Non-Heterosexuality

Kin Selection

Kin-selection refers to a theory that homosexual individuals will altruistically refrain from reproduction in order to help the children of their relatives (Kirkpatrick, 2000). The kin-selection hypothesis holds that homosexual men can compensate for the lack of biological children by indirectly impacting the reproductive success of their close kin, either through the provision of resources or childcare (Muscarella, 2000; Rahman & Hull, 2005; Wilson, 1975 as cited in VanderLaan, Ren & Vasey, 2013). This system would ensure that the genes were passed on, particularly with consideration to nieces and nephews, as siblings share 50% of genetic material. Significant support for this hypothesis, in relation to homosexuality, has not been found (Muscarella, 2000; Rahman & Hull, 2005). This theory may actually be more fitting with

theories of asexuality and celibacy as avoidance of sexual behavior is implied (Muscarella, 1999).

Affiliation

Affiliation, also referred to as alliance formation (Muscarella, 2006) is the motivation to make and maintain social bonds (Fleischman, Fessler & Cholakiens, 2015). The *affiliation hypothesis* proposes that same-sex social bonds, strengthened by homosexual behavior, were beneficial.

Alliance forming has been used to explain bonobo homosexual behavior in order to re-establish social bonds, particularly after instances of conflict and food competition (Vasey, 2006). This behavior is a form of survival in the way that these same-sex behaviors serve to preserve the peace within the group and increase access to food (Vasey, 2006; Wallen & Zehr, 2004), indirectly increasing reproductive opportunities.

With reference to cross-species evidence, it is likely that hominids went through a period of ostracization from the larger group, especially after puberty, as they no longer are being taken care of by their mothers and may not have the maturity to establish themselves and sufficiently protect themselves (Diamond, 1992; Muscarella, 2000). Younger, low-status males that formed alliances with higher status males of the society could move up in the hierarchy and the older male could provide protection from other high-status males and therefore the younger male can gain access to mates (Muscarella, 2000, 2006). This idea is strongly supported by the evidence found in Ancient Greece as discussed previously.

Early hominid females may have benefitted through affiliation as well by gaining access to the *inner circle* of women in the community where they would receive assistance in the form of protection and child care from other females, increasing the chances of survival of their

offspring (Muscarella, 1999, 2000). It has also been ascertained that the homoerotic behavior exhibited by female bonobos helps to form an alliance within the female group which provides protection against male harassment and abet the reconciliation between members after a conflict (Vasey, 2006). This evidence could also be projected into speculation about early hominid life and additional benefits of same-sex sexual behavior.

The Current Study

Individuals who are nonmonosexual would have both the opportunity to receive the benefits of affiliation by participating in homosexual behaviors, without losing the ability to pass on their genes through heterosexual sexual behavior. The goal of the current study is to investigate whether individuals who identify within a nonmonosexual orientation, or have engaged in sexual behavior with more than one sex, will score higher in proxies of reproductive success than monosexual individuals, or those who have only experienced sexual behavior with one sex. The current study also aims to determine whether affiliation may be a mediator in this relationship.

Hypotheses

H1: Nonmonosexuals will score higher than monosexuals on Mating Success.

H2: Nonmonosexuals will score higher than monosexuals on Mating Intelligence.

H3: Nonmonosexuals will score higher than monosexuals on Affiliation.

H4: Nonmonosexuals will score higher than monosexuals on Sociosexuality.

H5: Nonmonosexuals will score higher than monosexuals on Perceived Social Support.

H6: Affiliation will mediate the relationship between Sexual Orientation and Mating Success.

Method

Participants

A total of 448 participants (105 males, 343 females) completed an online survey through Qualtrics.com. Participants were recruited from SUNY New Paltz and social media sites, such as Facebook and were at least 18 years old. Participants identified primarily as monosexual; either gay or heterosexual (N = 339) and another 109 participants identified as nonmonosexual; bisexual or pansexual.

Measures

The Klein Sexual Orientation Grid.

The Klein Sexual Orientation Grid (KSOG; See Appendix C) analyzes an individual's sexual disposition over seven variables across the individual's lifespan. This format conceptualizes sexual orientation as an ongoing process (Klein, 2014; Klein, Sepekoff & Wolf, 1985). Participants rate each variable on a scale which ranges from 1: *Other Sex Only* to 7: *Same Sex Only* for past behavior, present behavior and anticipated future behavior. The variables include questions about to whom the participant is sexually attracted, with whom they have had sexual experiences and with whom they spend the most social time (*The Klein Grid*, 2014).

Although an individual's personal identification during the demographic questionnaire is the primary focus, participants were asked to complete the KSOG in order to examine whether there is a difference in participants' behavior versus their sexual orientation identity. The expectation was that there will be more behavioral nonmonosexuals than are originally identified from the demographics. Since the current study would like to emphasize the sexual behavior beyond sexual orientation identity, this would be a critical step in defining groups. The demographic questions were given at the beginning of the survey in order to avoid any internal

confusion that could occur after a participant has worked through the grid.

Perceived Social Support

The Scale of Perceived Social Support (See Appendix A) was utilized as an additional measure of affiliation. The participants responded to twelve statements on a 7-point Likert scale, which are not gender-specific, and measure across three subgroup support sources: Friends, Family and Significant Others (Zimet, Dahlem, Zimet, & Farley, 1988). The scale contains four statements pertaining to the level of support that a participant feels concerning each of the three subgroups including *There is a special person who is around when I am in need*, *My friends really try to help me*, and *There is a special person in my life who cares about my feelings* (Zimet, Dahlem, Zimet, & Farley, 1988). If individuals who identify as nonmonosexual are generally more affiliative, it is plausible that they may score higher on these measures of social support, particularly in variables relating to friends and significant others.

The Revised Sociosexual Orientation Inventory.

A revised version of the Sociosexual Orientation Inventory (SOI-R) was included in the online survey (See Appendix D) (Penke, 2011; Simpson & Gangestad, 1991). This inventory includes nine items related to short-term mating success such as number of sexual partners within the last year, number of one-night stands, and the importance of emotional attachment during sexual encounters (Penke & Asendorpt, 2008; Penke, 2011). The questions are rated on a 5-point Likert scale and are not gender-specific. This measure illuminates the attitude, behavior and desires for uncommitted sexual encounters. Higher SOI-R scores reflect a more unrestricted orientation and is therefore predicted to relate to measures of short-term mating success and affiliation.

Measuring Reproductive Success

Reproductive success is generally measured by the number of offspring that an individual produces (Geher, 2013). The current world is one of a post-contraceptive society wherein women can choose when and if they will have children, therefore it is difficult to traditionally measure reproductive success. Due to this limitation in evolutionary psychology research, scales have been created to measure proxies of reproductive success.

Mating Success

The Mating Success Scale (See Appendix B) developed by Camargo, Fisher, Geher, and Arrabaca (2013), measures the quality of the relationships that an individual is capable of having. Forty statements which include actions and behaviors typical of relationships which would have been indicative of reproductive success in ancestral conditions (Camargo, Fisher, Geher, & Arrabaca, 2013) are presented within the scale which are answered by selecting *Y* for *yes* or *N* for *no* in reference to participant's most recent sexual relationship lasting less than one month as well as the participant's most recent sexual relationship lasting more than one year. The scale is gender and sexual orientation specific for heterosexual and homosexual individuals. The statements were slightly modified for this study by removing the gender-specific pronouns and replacing them with the gender-neutral pronoun *their*, to more effectively measure for those who identify as nonmonosexual. If nonmonosexuals scored higher on this measure, it would support Hypothesis 1 which predicts that nonmonosexuals score higher on proxies of reproductive success overall.

Mating Intelligence

The final measure representing reproductive success distributed is the Mating Intelligence Scale, revised by Brittany Cormier of Saint Mary's University (See Appendix E). The scale

contains 24 items to which participants responded *yes* or *no*. Each item measures an individual's self-perceived mating intelligence by stating facts such as *I look younger than most women my age*, and *I am good at picking up signals of interest from men*. Higher mating intelligence has been shown to be related to sexual relations between women and their acquaintances and higher mating intelligence in men has been linked to sexual relations with both strangers and close friends (O'Brien, Geher, Gallup, Garcia, & Kaufman, 2010). Nonmonosexuals are predicted to score higher in mating intelligence which may be related to higher scores on affiliation as well due to the social connection implications.

Affiliation

An original measure of affiliation (which, specifically, examines the degree to which individuals form sexual connections vis a vis friendships) was created for the purpose of this study. Based on the expected mediational relationship of the hypotheses, questions were developed which indicated a directional relationship from sexual relations leading to strong affiliative bonds. Items meant for this path included statements such as *I am likely to develop feelings for a person with whom I have had sexual relations with, even if it was only a one-night stand* and *I am more likely to help someone with a problem or task if we have had sexual relations*. In the opposite direction, affiliative bonds leading to sexual interest, items included *I like to be friends with someone before I pursue a sexual relationship with that individual* and *I would be willing to act on sexual feelings developed toward a friend*. Participants responded to a 5-point Likert Scale ranging from *Not at all like me* to *Very much like me* in response to each statement. Cronbach's Alpha was .76. Higher scores on this measure indicate higher feelings of affiliation towards sexual partners and those who have the potential to be sexual partners.

Procedure

A survey, approved by the Human Research Ethics Board, examining Perceived Social Support, Mating Success, Mating Intelligence, Sociosexual Orientation and affiliation was administered to participants using the online survey program, Qualtrics. The survey link was provided via email to the SUNY New Paltz Psychology subject pool and through Facebook.

Results

Analysis of the collected data centered on the comparison of the scores of monosexual and nonmonosexual individuals. 2 X 2 ANOVAs were conducted for each measure with the between subjects factors being both gender (male vs. female) and sexual orientation (monosexual vs. nonmonosexual). The ANOVA results provided partial support for two out of the six hypotheses. Other analyses are demarcated as necessary.

Klein Sexual Orientation Grid Analysis

The Klein Sexual Orientation Grid was used as a categorization tool in this study. The goal of the KSOG was to identify individuals who identified as monosexual but were behaviorally bisexual. The first three items of a possible seven were utilized as relating to behavior only; *Attraction*, *Behavior*, and *Fantasy*. Furthermore, only scores within the *Past* and *Present* timelines were considered to be a part of the behavioral composite as any future intention or desire has not yet been acted upon and therefore cannot logically be considered *behavioral* in the present. Scores originally received on a scale from 1: *Other Sex Only* to 7: *Same Sex Only* were recoded into either 0, for any scores landing between and including 1-2 or 6-7 representing monosexuals, or 1, for any scores landing between and including 3-5 for nonmonosexuals. In this way, anyone scoring at least a 3 on the total orientation score would be considered behaviorally nonmonosexual as they would have to score at least a 1

(nonmonosexual) in either attraction or behavior which are key factors in the definition of sexual orientation. Cronbach's alpha for the full KSOG was .92. The past subscale consisted of 7 items ($\alpha = .71$), the present subscale also consisted of 7 items ($\alpha = .74$), and the 7-item future subscale had a Cronbach's alpha of .87.

A simple frequency analysis was completed initially to discern whether any participants, who initially defined themselves as monosexual, were actually behaviorally nonmonosexual or vice versa and therefore would change the total number of participants in each group in a significant manner. In actuality, only 1 participant *switched teams* from nonmonosexual (N = 108) to monosexual (N = 340). Since this result could not be considered a significant change in total participants for each group, the KSOG orientation was not exercised in this study.

Mating Success Analysis

The Mating Success Scale is broken into both short-term and long-term mating success. No significant main effects were found for short-term mating success and there was no significant interaction. In other words, there were not any significant differences between males vs. females or monosexuals vs. nonmonosexuals in the quality of the relationships that they are having. Cronbach's alpha was .98.

The analysis was repeated for the long-term subscale responses and the results were replicated with no significant main effects or interaction emerging from the data ($\alpha = .94$), therefore Hypothesis 1 which predicted that nonmonosexuals would score higher in mating success, was not supported.

	Short-Term MS		Long-Term MS	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sexual Orientation				
Monosexuals (<i>n</i> = 339)	15.64	11.03	16.22	12.48
Nonmonosexuals (<i>n</i> = 109)	15.98	9.41	16.81	11.65
Gender				
Males (<i>n</i> = 105)	14.85	9.72	15.63	12.34
Females (<i>n</i> = 343)	15.99	10.91	16.59	12.26
Gender*Sexual Orientation				
Monosexual Males (<i>n</i> = 93)	14.33	9.81	15.70	12.22
Nonmonosexual Males (<i>n</i> = 12)	18.83	8.31	15.08	13.83
Monosexual Females (<i>n</i> = 246)	16.13	11.43	16.42	12.59
Nonmonosexual Females (<i>n</i> = 97)	15.63	9.52	17.02	11.41

Demographic Breakdown of Descriptive Statistics of the Mating Success Scale

Note. *N* = 448. MS = Mating Success.

Mating Intelligence Analysis

A significant main effect was observed for gender with regards to mating intelligence ($F(1,448) = 15.36, p = .00$), with females scoring significantly higher ($M = 14.45, SD = 3.57$) than males ($M = 13.40, SD = 3.63$). There is also a significant interaction effect which reveals nonmonosexual females as scoring the highest in mating intelligence ($F(1,448) = 9.32, p = .00$). The analysis provides partial support for Hypothesis 2 in regard to nonmonosexual females scoring higher than monosexuals on mating intelligence which means that females, and nonmonosexual females in particular, perceive themselves to be more skilled in utilizing common mating strategies.

	Mating Intelligence	
	<i>M</i>	<i>SD</i>
Sexual Orientation		
Monosexuals (<i>n</i> = 339)	14.09	3.63
Nonmonosexuals (<i>n</i> = 109)	14.55	3.56
Gender		
Males (<i>n</i> = 105)	13.40	3.63
Females (<i>n</i> = 343)	14.45	3.57
Gender*Sexual Orientation		
Monosexual Males (<i>n</i> = 93)	13.72	3.64
Nonmonosexual Males (<i>n</i> = 12)	10.92	2.47
Monosexual Females (<i>n</i> = 246)	14.23	3.62
Nonmonosexual Females (<i>n</i> = 97)	15.00	3.42

Demographic Breakdown of Descriptive Statistics of the Mating Intelligence Scale

Note. *N* = 448.

Analysis of the Original Measure of Affiliation

When analyzing the differences in scores of affiliation, a main effect of gender was found ($F(1,448) = 4.18, p = .01$) with males scoring significantly higher ($M = 44.04, SD = 9.28$) than females ($M = 42.71, SD = 9.21$). There is also a significant interaction effect which reveals nonmonosexual males as scoring the highest in affiliation ($F(1,448) = 3.92, p = .048$). This finding provides partial support of Hypothesis 3 which suggests that nonmonosexual males maintain close bonds to their sexual partners.

Psychometric Properties of the Affiliation Scale

A factor analysis using the principal axis method of extraction was conducted to examine whether scores on thirteen affiliation-relevant items on the original affiliation scale correspond to multiple underlying factors. The analysis extracted four factors with eigenvalues that are greater

than 1.0. The first of these factors accounted for 26.99% of total variability in scores while the second factor accounted for an additional 15.92% of variability in scores. The third and fourth factor accounted for 9.12% and 8.1% of variability, respectively. The rotated factor loading table suggests that the first factor corresponds to sexual relations leading to strong affiliative bonds, or more of a *sex first* attitude, while the second factor relates to strong affiliative bonds leading to sexual interest or sexual relations; a *friends first* mentality. This result suggests that the affiliation scale is not uni-dimensional. The first two factors, which accounted for more than 42% of the variability, were utilized in forming two subscales which matched up well with the intended bi-directionality of the questionnaire. The factor analysis revealed that items 2 through 7 were indicative of the *sex first* subscale. The second subscale intended for the scale was the *friends first* mindset. The factor analysis detected that items 8, 9, 11 and 12 demonstrated this connection strongly.

Sociosexual Orientation Inventory Analysis

The fourth hypothesis stated a prediction that nonmonosexuals would score higher on global sociosexual orientation. Analysis revealed that there was no main effect of gender or sexual orientation on sociosexual orientation overall ($\alpha = .34$). However, there was a significant interaction effect of gender*sexual orientation with monosexual males scoring the highest indicating the tendency to have casual, uncommitted sexual relationships at a significantly higher rate than any other groups in the sample ($F(1, 448) = 7.50, p = .01$).

Further analyses by each subscale revealed more detailed differences. There were no main effects for gender or sexual orientation on the behavior subscale ($\alpha = .83$), however a significant interaction did appear with nonmonosexual females scoring higher than any other group ($M = 10.27, p = .00$). This result indicates that nonmonosexual females are having more

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casual sexual encounters than any other group in the sample. The attitude subscale ($\alpha = .82$) exposed a significant main effect for sexual orientation ($F(1,448) = 4.86, p = .02$) with monosexuals scoring higher ($M = 11.17, SD = 4.88$) than nonmonosexuals ($M = 8.62, SD = 4.29$). That is to say, monosexuals seem to report more comfort with having casual sex. There was also a significant interaction between gender and sexual orientation indicating monosexual *females* are the most comfortable with casual sex ($M = 11.83, p = .03$). The desire subscale also revealed a main effect for gender ($F(1,448) = 18.81, p = .00$) indicating a higher score for males ($M = 14.77, SD = 6.68$) relative to females ($M = 9.46, SD = 5.59$). Another significant interaction was found between gender and sexual orientation ($F(1,448) = 4.62, p = .03$) indicating that monosexual males experience the most desire for casual sexual encounters on a daily basis. Despite multiple significant findings in this analysis, Hypothesis 4, predicting that nonmonosexuals would score highest on overall sociosexual orientation, was not supported.

	SOI-R		Behavior		Attitude		Desire	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sexual Orientation								
Monosexuals ($n = 339$)	29.66	7.60	8.04	4.88	11.17	4.88	10.48	6.23
Nonmonosexuals ($n = 109$)	29.83	7.52	9.82	5.86	8.62	4.29	11.39	6.38
Gender								
Males ($n = 105$)	33.01	9.75	8.91	5.90	9.41	4.83	14.77	6.68
Females ($n = 343$)	28.70	6.46	8.34	4.96	10.90	4.83	9.46	5.59
Gender*Sexual Orientation								
Monosexual Males ($n = 93$)	33.56	9.84	9.27	6.05	9.42	4.95	14.97	6.71
Nonmonosexual Males ($n = 12$)	28.75	8.20	6.17	3.64	9.33	3.92	13.25	6.51
Monosexual Females ($n = 246$)	28.19	5.95	7.57	4.29	11.83	4.69	8.78	5.11
Nonmonosexual Females ($n = 97$)	29.97	7.47	10.27	5.94	8.54	4.35	11.16	6.37

Demographic Breakdown of Descriptive Statistics of the SOI-R and Subscales

Note. $N = 448$. SOI-R = Sociosexual Orientation Inventory-Revised.

Perceived Social Support

The ANOVA for perceived social support revealed a significant main effect for gender ($F(1, 448) = 10.18, p = .00$) but not for sexual orientation ($F(1, 448) = 3.03, ns$). Females scored higher on overall perceived social support ($M = 69.27, SD = 10.58$) than males ($M = 64.66, SD = 13.40$). A significant interaction effect was not observed. Cronbach's alpha was .87.

More detailed analyses were conducted on each of the three subscales for perceived social support. There was no main effect for gender on the family subscale ($\alpha = .92$), however a significant main effect for sexual orientation did appear with monosexuals scoring higher ($M = 21.75, SD = 5.47$) than nonmonosexuals ($M = 19.82, SD = 6.52$). A significant interaction was not observed. The friend subscale ($\alpha = .91$) did not reveal any significant main effects of gender or sexual orientation, nor an interaction. The significant other subscale revealed a main effect for gender ($F(1,448) = 14.17, p = .00$) indicating a higher score for females ($M = 23.82, SD = 5.44$) relative to males ($M = 21.40, SD = 7.10$). A significant interaction was not observed.

Overall, the perceived social support analysis reported that females feel significantly more support overall and specifically from their significant others and monosexuals tend to feel more support from their families than nonmonosexuals. This analysis did not provide support for Hypothesis 5 which predicted higher levels of perceived social support for nonmonosexuals.

	PSS		Family		Friends		Significant Other	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sexual Orientation								
Monosexuals (<i>n</i> = 339)	68.55	11.47	21.75	5.47	23.79	4.14	23.01	6.14
Nonmonosexuals (<i>n</i> = 109)	67.07	11.37	19.82	6.52	23.25	4.55	24.01	5.28
Gender								
Males (<i>n</i> = 105)	64.66	13.40	20.27	6.02	23.00	4.33	21.40	7.10
Females (<i>n</i> = 343)	69.27	10.58	21.59	5.69	23.87	4.21	23.82	5.44
Gender*Sexual Orientation								
Monosexual Males (<i>n</i> = 93)	65.17	13.32	20.54	5.85	22.95	4.46	21.69	6.99
Nonmonosexual Males (<i>n</i> = 12)	60.67	13.88	18.17	7.11	23.33	3.26	19.17	7.91
Monosexual Females (<i>n</i> = 246)	69.82	10.44	22.20	5.25	24.11	3.98	23.50	5.72
Nonmonosexual Females (<i>n</i> = 97)	67.87	10.85	20.02	6.45	23.24	4.69	24.61	4.57

Demographic Breakdown of Descriptive Statistics of Perceived Social Support Scale and Subscales

Note. *N* = 448. PSS = Perceived Social Support Scale.

Mediational Analysis of Sexual Orientation, Affiliation, and Mating Success

Through Hayes' (2013) mediation-assessment process, I sought to see if sexual orientation has an indirect effect on mating success that is mediated through affiliation. The analysis revealed only a marginally significant relationship between affiliation and short-term mating success ($b = -.09, p = .08$). Additionally, there was no significant relationship between affiliation and sexual orientation ($b = -.91, ns$). There was not a significant direct path found between sexual orientation and short-term reproductive success ($b = .34, ns$), which confirms the results from the ANOVA of short-term mating success which was found earlier.

A bootstrapping procedure was conducted to see if there was an indirect effect of sexual orientation on short-term mating success mediated through affiliation. No evidence was found for such an indirect path ($b = .08, CI = -.11, .47$).

The mediation was repeated for long-term mating success scores. The analysis did reveal a significant direct effect of affiliation on long-term mating success ($b = -.27, p = .01$). However, there was not a significant direct link between affiliation and sexual orientation ($b = -.91, ns$).

Further, there was no evidence of a direct path between sexual orientation and short-term reproductive success ($b = .58, ns$). Again, this finding is consistent with the ANOVA results of long-term mating success established previously.

Overall, the data did not provide support for Hypothesis 6 which predicted that affiliation would act as a mediator between sexual orientation and mating success.

Discussion

The purpose of this study was to investigate whether nonmonosexuals scored higher on proxies of mating success, and further as a function of affiliation, as described by the affiliation hypothesis. Nonmonosexual males score the highest on the original measure of affiliation suggesting that they feel the most socially bonded to their sexual partners. This finding is not surprising when we consider the history of male homosexual behavior, such as the pederastic mentorships known of Ancient Greek society which relied on the social bonds between men during initiation into adult society and during times of war (Cantarella, 2002). Significant effects for females or monosexuals were not found. We expected to see a pattern of higher scores in proxies of mating success overall in nonmonosexual-identified individuals. The affiliation hypothesis was marginally supported, but only for nonmonosexual males and this finding was not related to mating success.

In addition, there were not any differences between groups found within the Mating Success Scale. Although this outcome does not support the initial hypotheses, it may be indicative that, despite the assumed reproductive disadvantage, individuals with a

nonmonosexual orientation are not any less reproductively successful than monosexual individuals.

Whereas the affiliation hypothesis may partially help to explain the adaptiveness of nonmonosexual behavior in men by showing a link between social bonds and their sexual behavior, the data do not indicate that this idea is extended to reproductive success or results in similar effects in women. Overall, the affiliation hypothesis is not generalizable enough to fulfill the goal of interpreting the adaptiveness of non-heteronormative sexual behavior. However, this new data will add to the literature which did not contain prior empirical testing of the affiliation hypothesis and may inspire new directions in which researchers can explore nonheterosexual behavior.

Future Directions & Limitations

Future studies should expand on these and other findings related to evolutionary theory and sexual orientation. One consideration would be to investigate the breakdown of relationships that nonmonosexual men are having; how do their bonds with female partners compare to those with male partners? Are there any differences in the quality of these relationships with other men vs. women? What about strictly homosexual behavior? As was previously stated, the results of the current study indicate that individuals with a nonmonosexual orientation are not any less reproductively successful than monosexual individuals. However, the basis of this study is rooted in the categorization of monosexuals and nonmonosexuals in which the monosexual group includes both heterosexual and homosexual participants and there may be significant differences between these two groups, particularly from an evolutionary viewpoint, as discussed. Specifically, the lack of support for predictors of mating success in regard to sexual orientation should be considered. When researching the reproductive success of different groups dependent

on sexual orientation, a longitudinal approach may be more beneficial in order to truly measure reproductive success in a more traditional fashion.

Conclusion

There is much more investigation to be done on the intersection of nonheterosexuality and evolution, but for now it can at least be said that we are scratching the surface of an understanding of why nonmonosexuality (and related sexual orientations) may have remained in play throughout evolution, how this behavior may have been adaptive and how homosexual behavior may not be as much of an enigma as previously thought. This research will hopefully encourage the evolutionary science community to perform more research involving the LGBT community with evolutionary theory thus providing more insight and encouraging general social acceptance of nonmonosexuality.

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Appendix

A.

Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988)

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
 Circle the "2" if you **Strongly Disagree**
 Circle the "3" if you **Mildly Disagree**
 Circle the "4" if you are **Neutral**
 Circle the "5" if you **Mildly Agree**
 Circle the "6" if you **Strongly Agree**
 Circle the "7" if you **Very Strongly Agree**

1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7	SO
2.	There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	SO
3.	My family really tries to help me.	1	2	3	4	5	6	7	Fam
4.	I get the emotional help and support I need from my family.	1	2	3	4	5	6	7	Fam
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7	SO
6.	My friends really try to help me.	1	2	3	4	5	6	7	Fri
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7	Fri
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7	Fam
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	Fri
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7	SO
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7	Fam
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7	Fri

The items tended to divide into factor groups relating to the source of the social support, namely family (Fam), friends (Fri) or significant other (SO).

B.

The Mating Success Scale (MSS)

1. Please think of your *most recent* sexual relationship with a male lasting *LESS* than one month.
Is this a current relationship?

Yes No

2. Please think of your *most recent* sexual relationship with a male lasting *MORE* than one year.
Is this a current relationship?

Yes No

Below is a list of actions one might perform while in a sexual relationship.
Please indicate whether or not (Yes or No) the person in your most recent sexual relationship lasting less than one month (1-Month) and your most recent sexual relationship lasting more than one year (1-Year) has EVER done any of the following:

	1-Month		1-Year	
1. Let you in on a secret not many other people knew	Y	N	Y	N
2. Made you feel like you two were a team	Y	N	Y	N
3. Initiated sex with you	Y	N	Y	N
4. Enjoyed sex with you	Y	N	Y	N
5. Did what you wanted him/her to do in bed	Y	N	Y	N
6. Fulfilled your sexual desires	Y	N	Y	N
7. Cooked for you	Y	N	Y	N
8. *Listened to the music you wanted to, but he/she didn't want to	Y	N	Y	N
9. *Saw a movie that you wanted to see, but he/she didn't want to	Y	N	Y	N
10. Went somewhere with you that he/she really didn't want to go	Y	N	Y	N

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	1-Month		1-Year	
11. Took care of you when you were sick, hurt, etc.	Y	N	Y	N
12. Hit you	Y	N	Y	N
13. Insulted you	Y	N	Y	N
14. Made you laugh	Y	N	Y	N
15. Gave in to a serious demand of yours	Y	N	Y	N
16. Saved you when you were in a jam	Y	N	Y	N
17. Gave you his/her undivided attention for a significant length of time	Y	N	Y	N
18. Gave you advice about a serious problem	Y	N	Y	N
19. Hung out with you and your friends	Y	N	Y	N
20. Left you to be with his/her friends	Y	N	Y	N
21. Left his/her friends to be with you	Y	N	Y	N
22. *Spontaneously called, IMed or text messaged you	Y	N	Y	N
23. Told you he/she loved you almost everyday	Y	N	Y	N
24. Wrote you "Love notes"	Y	N	Y	N
25. Traveled long distances to see you	Y	N	Y	N
26. Taken you to meet his/her mother	Y	N	Y	N

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	1-Month		1-Year	
	Y	N	Y	N
27. Taken you to meet his/her father	Y	N	Y	N
28. Introduced you to his/her best-friend(s)	Y	N	Y	N
29. Lied to you	Y	N	Y	N
30. Was able to empathize with you	Y	N	Y	N
31. Showed you that he/she cared about you	Y	N	Y	N
32. *Took you out to eat at a fancy restaurant	Y	N	Y	N
33. Spent a lot of money on you	Y	N	Y	N
34. *Spent more than \$100 on a luxury item for you	Y	N	Y	N
35. Bought you a gift "just because"	Y	N	Y	N
36. Treated you specially when you two were alone	Y	N	Y	N
37. Gave you his/her sweater if you were cold	Y	N	Y	N
38. *Tipped well at a restaurant	Y	N	Y	N
39. Fought to "defend your honor"	Y	N	Y	N
40. Protected you when you were in trouble	Y	N	Y	N

* Highly culturally specific item

C.

The Klein Sexuality Grid

	Variable	Past	Present	Ideal
A	Sexual Attraction			
B	Sexual Behavior			
C	Sexual Fantasies			
D	Emotional Preference			
E	Social Preference			
F	Heterosexual/Homosexual Lifestyle			
G	Self Identification			

For Variables A to E:

- 1 = Other sex only
- 2 = Other sex mostly
- 3 = Other sex somewhat more
- 4 = Both sexes
- 5 = Same sex somewhat more
- 6 = Same sex mostly
- 7 = Same sex only

For Variables F and G:

- 1 = Heterosexual only
- 2 = Heterosexual mostly
- 3 = Heterosexual somewhat more
- 4 = Hetero/Gay-Lesbian equally
- 5 = Gay/Lesbian somewhat more
- 6 = Gay/Lesbian mostly
- 7 = Gay/Lesbian only

Definitions helpful in using the Klein scale:

Past: Your life up to 12 months ago.

Present: The most recent 12 months

Ideal: What do you think you would eventually like?

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7. How often do you have fantasies about having sex with someone you are *not* in a committed romantic relationship with?
- 1 – never
 - 2 – very seldom
 - 3 – about once every two or three months
 - 4 – about once a month
 - 5 – about once every two weeks
 - 6 – about once a week
 - 7 – several times per week
 - 8 – nearly every day
 - 9 – at least once a day
8. How often do you experience sexual arousal when you are in contact with someone you are *not* in a committed romantic relationship with?
- 1 – never
 - 2 – very seldom
 - 3 – about once every two or three months
 - 4 – about once a month
 - 5 – about once every two weeks
 - 6 – about once a week
 - 7 – several times per week
 - 8 – nearly every day
 - 9 – at least once a day
9. In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?
- 1 – never
 - 2 – very seldom
 - 3 – about once every two or three months
 - 4 – about once a month
 - 5 – about once every two weeks
 - 6 – about once a week
 - 7 – several times per week
 - 8 – nearly every day
 - 9 – at least once a day

E.

Mating Intelligence Scale (Heterosexual)

1. ___ I can tell when a man is being genuine and sincere in his affection toward me.
2. ___ I doubt I could ever pull off cheating on my beau.
3. ___ I look younger than most women my age.
4. ___ When a guy doesn't seem interested in me, I take it personally and assume something is wrong with me.
5. ___ Good looking guys never seem into me.
6. ___ I have a sense of style and wear clothes that make me look sexy.
7. ___ I attract many wealthy, successful men.
8. ___ Honestly, I don't think I understand men at all!
9. ___ With me, a guy gets what he sees—no pretenses here.
10. ___ If I wanted to make my current guy jealous, I could easily get the attention of other guys.
11. ___ Men don't tend to be interested in my mind.
12. ___ I'm definitely more creative than most people.
13. ___ I hardly ever know when a guy likes me romantically.
14. ___ I laugh a lot at men's jokes.
15. ___ If a guy doesn't want to date me, I figure he doesn't know what he's missing!
16. ___ I am not very artistic.
17. ___ My current beau spends a lot of money on material items for me (such as jewelry).
18. ___ I am usually right on the money about a man's intentions toward me.
19. ___ I really don't have a great body compared with other women I know.

20. ___ Intelligent guys never seem interested in dating me.
21. ___ I believe that most men are actually more interested in long-term relationships than they're given credit for.
22. ___ Most guys who are nice to me are just trying to get into my pants.
23. ___ When it comes down to it, I think most men want to get married and have children.
24. ___ If I have sex with a man too soon, I know he will leave me.