ALTERNATIVE EXPLANATIONS FOR SEXUAL STRATEGIES THEORY

by

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DEDICATION

I dedicate this to my girls, Olive & Mia.

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No considerable achievement is accomplished alone, and there are many to thank. First, my husband, who offered both the emotional and financial support needed to pursue this dream. My family, whose continuous questioning of “Are you done yet?” and “When will you start seeing patients?” (soon and never), was motivating in itself. To my fellow classmates in the trenches, your support and commiseration were invaluable. Thank you to everyone above for believing in me.

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ABSTRACT

Sexual strategies theory (SST) has been one of the most popular evolutionary-based theories to explain sex-specific differences in the mating behavior of men and women. More specifically, SST states that men prefer short-term (ST) mating and higher numbers of ST partners than women, and that these differences evolved to optimize the reproductive success specific to each sex. However, research into SST has relied on a very narrow age range in most of the samples used to test its hypotheses, which calls into question the generalizability of key findings to older adult populations. Further, other psychosocial factors may significantly influence men and women's ST sexual behavior, meaning sex differences in mating preferences might result from these other factors rather than evolved sex differences in mating strategies. I tested these ideas in two samples: one in a college-convenience sample using regression analyses, and one in nationally and age-diverse sample of adults using structural equation modeling. These studies revealed that the social acceptance of women engaging in ST sexual behavior (Studies 1 & 2) and concern for personal safety when engaging with a ST partner (Study 2) were more powerful predictors of ST mating behavior than biological sex. Thus, these findings offer evidence to suggest that social and personal factors are more important drivers of human sexual behavior and cast doubt on sex differences that evolved to optimize reproduction according to SST.

INTRODUCTION

> "Nothing lies closer to differential reproduction, the engine of evolution, than mating"
> -David M. Buss, 2003

The evolution of human behavior has been shaped and selected for over millennia, with adaptations benefitting the survival and success of the species. Whereas evolution in general describes how species pass on genes related to survival, sexual selection describes the adaptive behaviors that evolved specifically to advance sexual reproduction (Buss &Schmitt, 2018; Darwin, 1871). In fact, Buss (2003) reasoned that "nothing lies closer to differential reproduction, the engine of evolution, than mating" (p. 222). That is, those who were not successful in procuring mates simply did not have the opportunity to pass along their traits. Modern mating behavior, therefore, is a window into the sexual selection that shaped the mating strategies of men and women in the past.

According to sexual strategies theory (SST), first introduced by Buss and Schmitt (1993), men and women faced different reproductive constraints and opportunities—such as a significant difference in parental investment and access to fertile mates—that shaped the mating preferences of each sex we observe today. Males were constrained by access to fertile females and paternal certainty, whereas females were constrained by reproductive costs and the ability to secure resources for themselves and their offspring. As a result, men and women choose from a menu of mixed mating strategies, with men orienting towards short-term (ST) mating opportunities (e.g., engaging in one-night stands) over long-term (LT), and women orienting towards LT mating opportunities (e.g., sex with one committed partner) over ST in order to solve these sex-specific problems and optimize reproductive potential (Buss & Schmitt, 1993).

However, other explanations could account for the differences in mating strategies that Buss and colleagues have observed between men and women. For example, neurodevelopmental sex differences in emerging adults likely relates to risky sexual behavior, which in turn may relate to short-term sexual behavior, and thus explain divergent mating preferences in men and women. Likewise, social factors, such as the differing social acceptability of men and women to engage in short-term sexual behavior, could influence sex differences in mating preferences as opposed to evolved differences. The purpose of this dissertation is to determine if the evolutionary account of SST continues to predict sex differences in mating preferences and behavior when accounting for other factors, or if these differences stem instead from psychosocial and/or neurodevelopmental differences between the sexes.

Sexual Strategies Theory

Differences in Parental Investment Guide Differences in Mating Strategy

There are significant differences between men and women in the minimal contribution of time and resources needed to produce an offspring, and these differences may have resulted in the natural selection of different mating strategies between the sexes (Trivers, 1972). Although it is common for men to contribute a significant amount of time and resources to their offspring (not being limited to resources, time, and energy at the exclusion of other potential offspring), reproductive costs are overall higher for females. At minimum, men need only to contribute sperm to produce offspring, whereas women must invest considerable time to produce each offspring given 9 months of gestation and up to an additional two years considering nursing/lactation (Trivers, 1972). Further, women possess a limited timeframe of fertility (puberty to about 45 years of age) in which they can produce viable offspring. In contrast, men

are fertile for most of their lives (puberty to death) and are not tied to a gestation period—men can produce as many offspring as women they can impregnate. As a result of this fundamental difference in minimal obligatory reproductive cost and the constraint on women's ability to produce as many offspring as men, STT hypothesizes that women would benefit more from a long-term mating strategy in which her partner provides resources over the long-term to increase the survivability of her offspring. Alternatively, men would produce the most offspring by pursuing a short-term mating strategy in which multiple offspring could be produced in a shorter period and with multiple women (Buss & Schmitt, 1993; Frederick et al., 2013; Trivers, 1972).

Considering a single day of sexual intercourse can highlight the advantages of different sexual strategies for men and women. If a man has sexual intercourse with 2 women in one day, he could potentially produce 2 offspring. However, if a woman engages in sexual intercourse with 2 men in the same day, she could produce only one offspring from these encounters. Further, she will be unable to produce any other offspring for the 9-month period of gestation that follows, whereas a man could repeat this pattern and continue to produce offspring daily. Assuming the "goal" is to produce the greatest number of viable offspring who would live long enough to produce their own offspring, the different sex-specific challenges and opportunities should favor the acquisition of greater short-term mating strategies (preferences) for men but greater long-term mating strategies (preferences) for women (Buss & Schmitt, 1993; Frederick et al., 2013; Trivers, 1972).

Evidence to Support SST

The evidence supporting SST is impressive, with data spanning the globe in a collection of cross-cultural and multi-continent findings of mate selection and behavior (e.g., Buss, 1989;

Schmitt et al., 2003). For instance, in an extensive study of 52 different countries and over 16,000 participants, men consistently desired a higher number of partners, greater partner variety, and sought out more opportunities for short-term mating compared to women (regardless of relationship status or sexual orientation; Schmitt et al., 2003). In another study, men also preferred short-term partners more than did women and more than long-term partners, whereas women preferred long-term partners more than short-term partners (Buss & Schmitt, 1993).

Men and women also differ with regards to mate selection. According to Trivers (1972), whichever sex invests more heavily in an individual offspring tends to be the most selective regarding mates. In humans, women are the more heavily invested sex and are therefore more selective in choosing potential mates. For instance, women require more time to pass before consenting to engage in sexual intercourse relative to men, indicating they typically evaluate a potential mate carefully before consenting (Clark & Hatfield, 1989; Schmitt & Pilcher, 2004). Exemplifying this, Clark and Hatfield (1989) conducted research in which a male or female confederate approached participants of the alternative sex and asked whether the person would date the confederate, go to the confederate's apartment, or have casual sex with the confederate.

The findings demonstrated that women agreed far less often with these requests relative to men. Specifically, women responded with the following decreasing levels of agreement: to go on a date (56%), to go to their apartment (6%), and have casual sex with the confederate (0%), whereas men responded with the following increasing levels of agreement: to go on a date (50%), to go to their apartment (69%), and to have causal sex with the confederate (75%). Men showed the most agreement to have causal sex with a stranger, and in fact showed more agreement to having causal sex with a stranger than to going on a date with a stranger, whereas

no woman agreed to have causal sex with a stranger. Although demographic data was not collected from participants, confederates were on average 22-years-old and targeted similar-aged college students (Clark & Hatfield, 1989). A second follow-up experiment replicated these results with 69% of men agreeing to have causal sex with a stranger compared to, again, no agreement among women to do so (Clark & Hatfield, 1989).

Summary of SST

From partner variety to seeking sexual opportunities, humans have seemingly evolved psychological adaptations (e.g., mating strategies) that influence the selection of mates and the ways in which they engage in mating behavior (Buss & Schmitt, 1993; Schmitt, 2014). These mate preferences differ significantly for men and women when pursuing short-term or long-term mating strategies due to a fundamental imbalance in parental investment and differences in reproductive constraints (e.g., access to mates for men, access to resources for women). That is, women prefer long-term mating (relative to short-term), whereas men prefer short-term mating (relative to women and relative to long-term) as sex-specific adaptations arguably evolved to optimize offspring potential. If true, these evolved behaviors should still be observable in samples of adults today.

Limitations of SST Research

Narrow Age Range Used in SST Samples

The work of Buss and other researchers have provided substantial evidence for the predictions made by SST, including support from an impressive assortment of cross-cultural samples (Buss, 1989; Schmitt et al., 2003). However, even in samples collected from over 50

countries, the generalizability of Buss and his colleagues' work is limited severely by reliance on a very narrow age range of participants sourced from convenience samples. For instance, in Buss' (1989) study of over 37 cultures and 10,000 participants, the average age was only 23.05 with a range of 16.96 to 28.71, so it is not clear if these findings would replicate with older adults. Further, the average age was not reported in many of the studies (e.g., Buss & Schmitt, 1993; Clark & Hatfield, 1989; Schmitt et al., 2003 to name a few), but the research was conducted using samples of college students. Given this information, we can assume that the average age of for samples using undergraduate college students is 21.8 years (Education Data Initiative, 2019), with most between 18-24 years of age (approximately 90% and 87% are under the age of 25 for 4-year public and private institutions, respectively; NCES, 2017).

Although the ideas forwarded by SST should apply to human mating behavior in general, the research supporting this theory used emerging-adult college samples or people within the age range of traditional college students, and this represents a limitation that even the authors acknowledge (see Buss & Schmitt, 1993, Schmitt et al., 2001a). The sex differences in sexual strategies and preferences observed in emerging adults might not generalize to the larger adult population for several reasons, including neurodevelopmental differences between the sexes that relate to increased risky behavior in younger adults (particularly in men) and period effects related to the college years. Furthermore, other key factors have been fundamentally overlooked, such as one's concern for safety when engaging with novel, short-term sexual partners, and social norms that dictate what is considered acceptable sexual behavior for men and women (and importantly, what to report); the last two factors being of particular importance to women's report of sexual behavior. In sum, differences between men and women related to developmental

and/or psychosocial factors could explain sex differences in the preference for short-term or long-term strategies rather than resulting from evolved differences.

Alternative Explanations to SST

Neurodevelopment Related to Sexual Behavior

College-aged emerging adult men tend to be riskier than same-aged women due to differences in frontal lobe development (Arain et al., 2013; Feldstein Ewing et al., 2016). More specifically, during adolescence and emerging adulthood, there is significant brain development including intensive neurological reorganization and construction within the prefrontal cortex and limbic system, both of which are responsible for sexual risk-taking, impulsivity, inhibitory control, and assessing consequences (Feldstein Ewing et al., 2016). Further, the prefrontal cortex and limbic system tend to develop and mature more rapidly in women than in men (Arain et al., 2013; Hammerslag & Gulley, 2016). Indeed, the neurodevelopment required to make safer sexual decisions is still under considerable development until the age of 25 for men, and up to 4 years earlier for women (Arain et al., 2013).

This difference in neurodevelopment, which may be pronounced in emerging adult samples between 18-24 years of age, could explain men's preference for riskier, short-term mating opportunities compared to women. For women, this neurodevelopmental advantage could translate to an inclination towards less risky, long-term mating strategies. Incomplete development is also related to amplified reward seeking behavior and riskier decision-making, and this could relate to engaging in riskier sexual behavior (such as short-term mating opportunities) and failing to consider fully the consequences of such behavior (such as contracting an STI), particularly in emerging adult men. Men in prior research samples could be

exhibiting greater sensation seeking, and perhaps more short-term mating opportunities, due to neurodevelopmental differences during emerging adulthood rather than the presumed evolved preferences outlined in SST. Likewise, women in prior research samples could have demonstrated greater inhibitory control, therefore preferring long-term mating opportunities resulting from neurodevelopmental advantages over men during emerging adulthood and not the evolved preferences proposed by SST. The current studies investigated this possibility by measuring general risk and age as proxies for neurodevelopment.

Psychosocial Factors Related to Sexual Behavior

Period Effects of College on Sexual Behavior.

College represents a unique context and time-period regarding sexual behavior and social influence. Named the "college effect," first-year college students exhibit increased risky behavior, increased alcohol consumption, and increased sexual exploration paired with less adult supervision and increased personal freedoms (Dejong, 2016; Fromme et al., 2008; Scott-Sheldon et al., 2010; Thorpe et al., 2019). For instance, college students had moderate levels of sex (oral and vaginal), but low levels of safe sex practices (e.g., condom use), with males reporting higher numbers of sexual partners (M = 2.03, SD = 4.00) compared to females (M = 1.39, SD = 1.48) and greater reports of unsafe sexual practices, again suggesting that males orient towards riskier, short-term mating behavior during this time period and context (Wyatt & Oswalt, 2012). In fact, relative to older adults, emerging adults participate in exceptionally high rates of unsafe sex, with approximately 40% of American youth engaging in unprotected sex and half of all new sexually transmitted infections (STIs) occurring within this age group (15-24-year-olds; CDC, 2013; CDC, 2017; Feldstein Ewing et

al., 2016). In addition, college students are more likely to have short-lived romantic relationships and high partner turnover compared to adults (Carver et al., 2003; Fergus et al., 2007).

Indeed, casual sex is a ubiquitous (and even expected) part of the college experience, with most reports of casual sex following alcohol consumption (Fielder & Carey, 2010). In fact, being in college increased the likelihood of engaging in risky sexual behaviors when under the influence of alcohol compared to no alcohol use. Further, alcohol increased the likelihood of sex without contraception or protection and with multiple casual partners, which also increased the chances of becoming infected with an STI or unplanned pregnancy (Fielder & Carey, 2010). College students—especially men—drink more than non-college students of the same age and were more likely to drink and drive, suggesting that men's propensity for short-term mating could be amplified, or explained, by sex differences in drinking alcohol (Feldstein Ewing et al., 2016; LaBrie et al., 2011; Paschall, 2003; Slutske, 2005). This unique combination of increased peer influence, social influence, sexual socialization, and alcohol use during emerging adulthood, especially within college contexts, shape sexual behavior in powerful ways that often result in pressures to engage in riskier sexual relationships (Potard et al., 2008; Suleiman & Deardorff, 2015). That is, these factors could promote sex differences in college samples in which college men are pursuing ST sexual opportunities more than women due to the social norms, peer pressure, and high levels of alcohol use that encourage this behavior in men more than women, and are further enhanced by alcohol's influence.

Women's Concern for Safety and Sexual Behavior. Traditional college women are at an additional, heightened risk for sexual violence relative to same-aged women (18-24) who are not in college, women of other ages, or men, with approximately 1 in 4 experiencing rape or sexual

assault (i.e., 24.6%; DOJ, 2014). In fact, women in college are twice as likely to be victims of sexual assault than victims of robberies (DOJ, 2014). Notably, the beginning of college is considered the most dangerous time for women, with more than 50% of all sexual assaults occurring in the first 4 months of the academic year (Kimble et al., 2008). Given this, it stands to reason that young women, and college-aged women especially, would be highly concerned for their own safety when it comes to potential sexual activity, and more concerned than other adult women. Further, this heightened concern for safety may deter women from wanting to engage with short-term sexual partners and multiple partners. Men, on the other hand, may not be deterred by the potential risk to their safety in engaging with short-term partners or multiple partners. Therefore, sex differences in concern for safety could be an alternative explanation in explaining sex difference in selecting short-term or long-term sexual strategies as opposed to evolved differences, especially given safety concerns were never tested in previous SST research. That is, college-aged women's likely greater concern for safety than men's, rather than evolved preferences, may explain why these women are relatively reluctant to engage in ST mating and prefer safer LT mating strategies. However, non-college women, or women past this age period, might experience less concern for safety, freeing them to prefer or consider more ST mating behavior relative to younger, college women.

Socially Acceptable and Sexual Behavior. Along with the above factors, it is also plausible that women report less desire for short-term partners and preferring fewer partners overall compared to men because expressing these preferences is not perceived as socially acceptable for women. In many societies, it is less socially acceptable for women to engage in one-night stands and other forms of short-term sexual activity, or have many sextual partners,

relative to men. Further, the double standard, which socially penalizes women for having many sexual partners and engaging in premarital sex, yet rewards men for identical behavior, has persisted as a societal norm in many Western cultures for decades (Reiss, 1960; Milhausen & Herold, 1999). Even in more recent samples, college students endorse the heterosexual script that men are eager to have sex whereas it is the woman's "responsibility to keep the relationship from moving too fast sexually," demonstrating that the double-standard remains a steadfast, gender-based sexual (Seabrook et al., 2016, p. 347). Thus, women may report more socially acceptable sexual behaviors, such as reporting half as many sexual partners as their same-age male counterparts (as was reported by the CDC, 2011) or less desire for ST mating not because they have fewer partners or less desire for ST mating, but because they are reluctant to volunteer that "socially unacceptable" information. These differences due to biased reporting have not been investigated in SST research and could reflect the social acceptance of such behavior rather than actual desire or behavior of men and women to engage with short-term partners as SST suggests.

Purpose of the Current Research

The bulk of STT research relies heavily on samples of emerging adults who are neurodevelopmentally and socially different from other adults. For instance, sex differences in underdeveloped frontal lobes (i.e., prefrontal cortex, specifically) are connected to risky behavior and increased impulsivity among young men relative to same-aged women and older adults, which may relate to risky sexual behavior (e.g., short-term mating, unprotected sex), an avenue this paper will examine (Arain et al., 2013; Feldstein Ewing et al., 2016). In other words, the differences between men and women's preference for short-term mating behavior could reflect neurodevelopmental sex differences in emerging adult samples and not evolved differences. If

true, sex differences for ST strategies should decrease looking at progressively older adults as men's prefrontal cortexes becomes comparably developed to those of same aged women.

Additionally, psychosocial factors further compound the limitation of (almost exclusively) using college and college-aged samples to test theories regarding sexual behavior. Taken together, period effects and neurodevelopment contribute to a sample that is disproportionately prone to risk (likely including increased sexually risky behavior), high partner turnover, and increased engagement in short-term mating opportunities such as casual sex, particularly for college men (e.g., Feldstein Ewing et al., 2016 or Fielder & Carey, 2010). These factors could explain or exaggerate key findings supporting SST, such as women exhibiting more inhibitory control and orienting toward long-term opportunities (e.g., Feldstein Ewing, et al., 2016; Wyatt & Oswalt, 2012). Finally, women's concern for safety and established sex differences in the social acceptability of ST sexual behavior favoring more relaxed standards for men relative to women, could promote sex differences in reporting that have been misinterpreted as evolved differences in mating strategies.

The purpose of the current research was to determine whether the alternative explanations discussed above may account for sex differences in ST mating preferences which were previously interpreted as supporting the evolved strategies proposed by SST. Previous findings that women prefer long-term over short-term mating, and men prefer short-term over long-term mating, could have resulted from different evolved strategies, neurodevelopmental sex differences among emerging adults, or psychosocial features, either alone or in combination. The current research was designed to disentangle these factors to better understand the underlying mechanisms of sex-related mating differences between men and women, and whether these

patterns persist in different age groups. The reported research tested whether one or more of these factors contribute to, or perhaps fully explain, the typical finding that men prefer ST mating relative to women, and relative to LT mating.

STUDY ONE

Overview

Given the above discussion, it is not clear whether the studies conducted by Buss and colleagues revealed evolved differences in men and women's mating strategies or, rather, psychosocial factors and/or sex-related differences seen primarily in 18-24-year-old samples. It is highly possible that the sex differences observed in SST research, such as men engaging in riskier sexual behavior (e.g., reporting higher numbers of partners; Schmitt et al., 2003), seeking opportunities to engage in short-term mating (Buss, 1994), and taking more risks (e.g., consenting to have sex with a stranger; Clark & Hatfield, 1989), are related to the stage of neurocognitive development or social influences observed during this period of the lifespan and not evolved differences particular to men and women. Therefore, the purpose of Study 1 was to investigate possible alternative explanations for SST's major findings.

Study 1 included measures to capture general risk-taking and social acceptance of women's ST sexual behavior to predict mating preferences, sexual risk-taking, and number of desired partners. Doing so can help determine whether neurodevelopment and psychosocial factors affect men and women's mating preferences in a sample of college-aged students. Additionally, I intended to gather data on concern for personal safety regarding ST sexual encounters but did not due to an error in the data collection process. Nonetheless, I predicted that concern for safety would interact with biological sex and the outcome variables such that women reporting greater concern for their safety would report lower preferences and desire for ST mating (although his trend would not occur for men). However, I included this important variable in the subsequent study.

Research Question and Hypotheses

This study will investigate whether sex differences in the perceived social acceptability of women having many short-term sexual partners, general riskiness and/or neurodevelopmental differences explain the disparity in men and women's desire for short-term (ST) sexual partners, desired number of partners, and sexual risk beyond the evolutionary reasons proposed by SST. Further, the study will explore the relationship between biological sex and long-term (LT) compared to ST preferences. The following hypotheses specify the pattern of results expected for each of these variables assuming they relate to sex differences in sexual behavior and preferences. These hypotheses are not necessarily mutually exclusive.

If Social Acceptance of Women's ST Sexual Behavior Played a Role

Hypothesis 1a. If social acceptance of women's ST sexual behavior played a role, I predicted that acceptance of women's ST sexual behavior and preferences will be lower than that of men's identical behavior.

Hypothesis 1b. If social acceptance of women's ST sexual behavior played a role, there would be an interaction between biological sex and social acceptance in predicting the outcome variables such that there will be greater sex differences at *lower* levels of social acceptance, and little to no difference at *higher* levels of social acceptance).

Hypothesis 1c. Although I had not preregistered this prediction, it may be useful to compute a new variable comparing the difference between social acceptance for women and the social acceptance of men, then compare how biological sex interacts with this new variable. In

this case (and before viewing the results), I predicted an interaction between biological sex when the difference is high (i.e., the double-standard of sexual norms is pervasive), but little to no interaction when the difference is low (i.e., it is equally acceptable for men and women to engage in ST mating).

If Neurodevelopment Played a Role

Hypothesis 2a. Given that individuals' level of riskiness is associated with neurodevelopment in emerging adults (particularly men), there would be a main effect of biological sex such that men will report greater general risk than women (given that men are generally riskier than women; Pawlowski et al., 2008).

Hypothesis 2b. There will be an interaction between biological sex and general risk in predicting the outcome variables such that there will be greater sex differences at *higher* levels of general risk, and little to no difference at *lower* levels of general risk. However, because men should be overrepresented at high risk and women at low risk, I planned to test this by looking at simple slopes. There should be a significant positive association between risk and the outcome variables for men and a less positive or nonsignificant association between risk and the outcome variables for women, with women clustered at other end (i.e., women are less risky; adjustments to be made for heteroscedasticity).

Hypothesis 2c. There will be an interaction between biological sex and general risk in predicting the outcome variables after controlling for social acceptance.

If SST Played a Role

Hypothesis 3. There will be a unique effect of biological sex on the outcome variables, even when accounting for other predictor variables.

METHOD

Power Analysis

A power analysis for a small effect size (f = .04) suggested a sample size of 304 participants is required for a power of .08 with an α of .05. However, I collected as much data as time and resources allowed, with the general goal to collect approximately 400 participants.

Participants

A total of 441 participants remained following data cleaning, which surpassed what was needed according to the power analysis based on a small effect size (f = .04). The majority of participants were single (n = 214, 59.4%), heterosexual (n = 297, 82.5%), and female (n = 227, 63.1%) with an average age of 19.03 years (SD = 1.85). The range for age was 18-33, but it should be noted that most participants (94%) were between 18-21 years of age, similar to samples used by Buss and colleagues (e.g., Buss, 1989; Schmitt et al., 2003).

Procedure

Participants read and agreed to consent forms approved by the Montana State University's Institutional Review Board (IRB) before completing the experiment on computers in the research lab. Participants completed the current survey as part of a collection of surveys being gathered for other studies for approximately 50 minutes. Information collected included demographic information, items regarding their sexual attitudes and behavior, as well as items from other experiments. Following the completion of the survey material, participants were

debriefed about the survey's purpose, granted research credit relevant to their course, and thanked for their time.

Measures

Predictor Variables

A total of 3 predictor variables included biological sex (collected in the demographic portion), social acceptance of women to engage in ST sexual behavior, and general risk.

Social Acceptance. Social acceptance of men and women to engage in short-term sexual behavior, separately, was obtained through two measures created for the purpose of this study. These items were "It is acceptable for men to engage in casual sex or one-night stands" and "It is acceptable for women to engage in casual sex or one-night stands." Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*), with an option to decline to answer. Higher scores indicated greater perceptions that it is socially acceptable for the respective sex to engage in short-term sexual behavior. Only the first item assessing the social acceptance of women's sexual behavior was used for the primary analyses in this study (with the perception of one's own gender used in Study 2). Additionally, a difference score between the two means for the social acceptance of men and the acceptance of women will be computed for each participant as a proxy of the double-standard.

General Risk. The general risk measure included items 1-3 from the Benthin Risk Perception Scale (BRPS) and were modified to reflect a 3-month period instead of the original 6-month format to ensure continuity with the item stems from the sexual risk measure that followed (Benthin et al., 1993). A sample item includes "In the past 3 months, how often have

you ever ridden in a car with an intoxicated (drunk) driver?" Items 4-6 were selected from a study assessing negative risk behaviors among an emerging adult population and reflect contemporary risky situations such as "In the past 3 months, how often have you looked at your phone while driving a car instead of paying attention to the road?" (Duell & Steinberg, 2020). All six items corresponded to a response scale from 0 (*never*) to 4 (*very often*), with an additional option allowing the participant to decline to answer. Responses to these items were averaged to create a general measure of risk with higher scores indicating higher risk, although this measure had very low internal consistency ($\alpha = .29$).

Outcome Variables

A total of 3 outcome variables included ST mating preference, desired number of ST partners, and sexual risk.

Mating Preference. A pair of items was modified from Buss and Schmitt's (1993) measures to reflect more contemporary and descriptive terms for short- and long-term mating. For instance, the original item asked: "To what degree are you currently seeking a long-term mate (defined as a marriage partner)?" whereas the item used in this study asked: "To what degree are you currently seeking a long-term *sexual partner* (defined as a *committed relationship*)?" with modifications noted in italics. The second item was "To what degree are you currently seeking a short-term *sexual partner* (defined as a one-night stand or a brief affair)?" The original response options were retained with a scale from 1 *(complete lack of interest)* to 7 *(high level of interest)*, with an option to decline to answer. A higher score indicates higher desire for a short- or long-term sexual partner. Only the first item assessing desire for ST was used for the primary analyses.

Desired Number of ST Partners. A second pair of items assessed the number of sexual partners desired "How many sexual partners would you ideally like to have in the next 3 months?" and "How many sexual partners would you ideally like to have in your lifetime?" with an open response option and opportunity to decline to answer. Only the first item assessing the 3-month period was used for the analyses as it reflects a short-term time frame, however, both items were used for exploratory purposes.

Sexual Risk. The Sexual Risk Behaviors Scale (SRBS) consists of six items regarding sexually risky behavior within the previous month, although the period was extended to the last 3-month period for this survey (Fino et al., 2021). Sample items include: "In the past 3 months, how often have you had sex while under the influence of alcohol (i.e., drunk)?" and "In the past 3 months, how often have you had sex without a condom with someone you have just met?" Two additional items were created to address sexually risky behavior related to short-term partners. These items were: "In the past 3 months, how often have you had a one-night stand or casual sex while you were not in a committed relationship?" and "In the past 3 months, how often have you had a one-night stand or brief affair while you were in a committed relationship?" All responses ranged on a 4-point Likert scale from 0 (*never*) to 4 (*very often*), with higher scores indicating higher engagement in sexually risky behavior. An additional response option allowed the participant to decline to answer. As with general risk, responses to the 8 items were averaged to create a measure of sexual risk with higher scores indicating higher sexual risk ($\alpha = .78$).

Exploratory Variables

COVID's Effect on Sexual Behavior. An item assessing the effect of the coronavirus SARS-CoV2, known more commonly as COVID-19, on sexual behavior was included for exploratory purposes. The item "The COVID-19 pandemic has affected my sex life" included a response scale of 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores indicating a greater impact of COVID on sexual behavior. This exploratory item could provide insight into whether people's normal sexual behavior was affected by the time-period in which data was collected for this study. For example, perhaps desire for short-term sexual partners was deterred through fear of contracting the disease and, thus, participants limited their opportunities for short-term sexual contact and desire for more sexual partners.

Honesty. Finally, a single item questioned participants' honest responding by asking "How honest were you in completing this experiment?" with responses ranging from 1 (*very dishonest*) to 5 (*very honest*). Higher scores indicated greater honesty in completing the survey.

RESULTS

A hierarchical regression was used to evaluate the influence of biological sex, social acceptance of women's ST sexual behavior, and general risk on men and women's reports of desire for short-term sexual partners (i.e., mating preference), desired number of partners, and sexual risk.

Data Cleaning

Data were removed from analyses using pairwise deletion if values exceeded 2.5 standard deviations from the mean for any variable. More specifically, data were removed for: short-term mating preference (11 cases), number of desired short-term partners (4 cases), number of desired long-term partners (5 cases), average risk (7 cases), and average sex risk (4 cases). No outliers were found for long-term mating preference or for how socially acceptable it was for women and men to engage in ST sexual behavior.

Missing Data Due to Response Options

In respecting participants' level of comfort to disclose sensitive information (e.g., numbers of sexual partners), the option to refrain from answering any item was offered. Resulting non-responses were treated as missing data.

Missing Concern for Safety Variable

Unfortunately, there was an error in setting up the survey material such that the measures of concern for safety were not included. Part of the function of Study 2 will be to investigate this important variable.

Preliminary Analyses

Men and Women's ST and LT Mating Preferences

Similar to previous research (Buss & Schmitt, 1993), men preferred ST mating more than women ($p = .003$). Also consistent with previous work (Buss & Schmitt, 1993), there was no difference in men and women's preference for LT partners ($p = .26$). See Table 1 for full details.

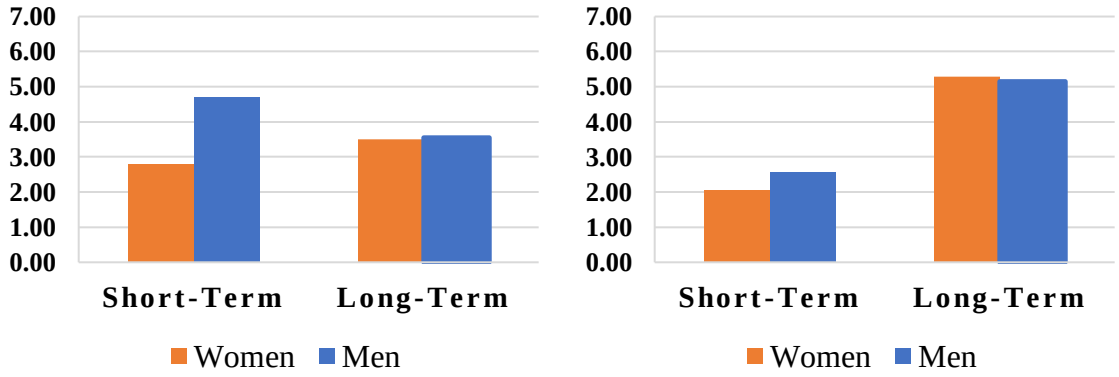
Table 1. Mean differences in men and women's mating preferences.

Mating Preference	Men		Women		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Preference for ST Mating	2.56	1.67	2.06	1.56	.497**
Preference for LT Mating	5.15	2.00	5.29	1.91	-.139

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$

In addition, a new variable was computed by subtracting each participant's ST preference score from their LT preference score to see if men or women have a greater difference in their mating preferences. There was a significant difference when examining these LT-ST scores for men and for women, $t(343) = 2.32$, $p = .013$, with a greater difference in women's mating preferences (mean difference = -3.24) than men's difference in mating preferences (mean difference = -2.61) such that women exhibit a greater relative preference for LT over ST. To sum, although women preferred LT more than ST sex, men preferred ST more than women preferred ST sex, and both men and women valued LT sex equally (all findings that support previous work); however men did not prefer ST more than LT, which failed to replicate previous findings (Buss & Schmitt, 1993; see Figure 1).

Figure 1. Mating preferences between Buss and Schmitt (1993) and the current study.



Men and Women's Desired Number of ST and LT Partners

No difference was found between men and women's report of the desired number of ST partners, a surprising finding that does not replicate previous work (e.g., Buss & Schmitt, 1993). Men and women also did not differ in terms of their desired number of LT partners, although this was expected, as men and women rate LT preferences equally in previous work (e.g., Buss & Schmitt, 1993; see Table 2 for full details).

Table 2. Desired number of ST and LT partners for men and women.

	Men		Women		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Desired Number of ST Partners	1.21	0.81	1.14	0.86	.074 (n.s.)
Desired Number of LT Partners	6.06	6.31	5.36	5.26	.700 (n.s.)

Social Acceptance of Women's and Men's ST and LT Sexual Behavior

Hypothesis 1a, that social acceptance of women's ST sexual behavior will be lower than that of men's identical behavior, was not supported. In fact, the acceptance of women (*M* = 3.62,

SD = 1.09) was identical to that of men (*M* = 3.62, *SD* = 1.11) for all participants (i.e., collapsing across biological sex of participants).

When participant's biological sex is considered with social acceptance, men's report of social acceptance for women's ST sexual behavior (*M* = 3.74, *SD* = 1.03), did not differ from women's report of the same behavior (*M* = 3.56, *SD* = 1.13), *t*(356) = 1.51, *p* = .066. Interestingly, the reports were trending in the direction of women having lower acceptance of women than men do of women. Similarly, men (*M* = 3.72, *SD* = 1.09) and women (*M* = 3.57, *SD* = 1.13) did not differ in their perception of how socially acceptable it is for men to engage in ST sex, *t*(356) = 1.22, *p* = .112, but again showed a non-significant trend of men exhibiting higher social acceptance.

As part of a statistical exploration, a new variable was calculated to represent the magnitude of the double-standard by calculating the difference in participants' scores between acceptance of women and acceptance of men. Surprisingly, only 3% (*n* =11) of participants reported any difference between how accepting they were of men compared to women engaging in ST sex. More specifically, about half of these 11 participants were more accepting of women to engage in ST sex (*n* = 5) and half were more accepting of men to engage in ST sex (*n* = 6). Further, when looking at the difference in the double-standard of men and women based on participant sex, there was no significant difference in the double-standard reported by men (*M* = -0.03, *SD* = 0.36) and women's (*M* =0.01, *SD* = 0.33), *t*(356) = -0.85, *p* = .197).

Men and Women's Risk

Men reported being as risky (*M* = 1.57, *SD* = .34) as did women (*M* = 1.57, *SD* = .34), *t*(349) = -0.04, *p* = .486. Interestingly, the reports were notably low overall considering the

possible scores ranged between 1 to 5. As a result, Hypothesis 2a, that there will be a significant difference between men and women's report of risk, was not supported, or possibly, that risk was not a good proxy for neurodevelopment.

Regression Analyses

Separate hierarchical multiple regression analyses using SPSS PROCESS (Hayes, 2021) were conducted to test whether the perceived acceptability of women's short-term sexual behavior and general risk affected the relation between participants' biological sex on three outcome variables of preference for short-term partners, desired number of short-term partners, and sexual risk.

Regression Results for Preference for ST Partners

In the first analysis, biological sex was entered as the main predictor, then risk and acceptance of women's engagement in short-term sexual behavior (a.k.a. acceptance of women) were entered in step 2, to predict preference for short-term partners (a.k.a. short-term preference), then the interactions between biological sex and these predictors were tested. The analyses tested all main effects and interactions with short-term preference as the outcome variable. Finally, the bootstrapping method was used to resample the data (n = 5,000). Results of this hierarchical multiple regression analysis indicated that the overall model was significant, $F(7, 332) = 5.41$, $p < .001$ (see Table 3 for full effects).

Table 3. Results of the multiple regression analyses for preference for ST mating.

Level of Predictor	R^2	*b*	SE	*t*	*p*	CIS
Overall Model	.10***					
Biological Sex		-0.40	.18	-2.21	.03*	-.74, -.04
Acceptance (of Women)		0.35	.14	2.53	.01*	.08, .62
Risk		-0.18	.44	-0.41	.68	-1.06, .69
Biological Sex x Acceptance		0.09	.17	0.55	.58	-.24, .42
Biological Sex x Risk		0.20	.54	0.37	.71	-.86, 1.27
Acceptance x Risk		0.28	.41	0.68	.50	-.53, 1.08
Biological Sex x Acceptance x Risk		-0.47	.50	-0.95	.34	-1.45, .50

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$; $F(7, 332) = 5.41$, $p < .001$.

Consistent with the analyses reported in the descriptive statistics section above, the analysis revealed a main effect for biological sex such that men preferred ST partners more than did women. There was also a main effect of social acceptance, indicating that greater acceptance of women's ST sexual behavior related to higher preference for ST partners among all participants. Although further research would be needed to clarify the reason behind this finding, perhaps higher social acceptance of women suggests more opportunities for men to engage in ST sex with women.

The analysis revealed no other significant findings, including any of the interaction between variables, which fails to support the predicted interactions between biological sex and acceptance of women (Hypothesis 1b) or risk (Hypotheses 2b-c) related to preference for ST partners. However, these results offer support for Hypothesis 3 given there was a main effect of biological sex with other predictors in the model, suggesting biological sex had unique predictive ability.

Regression Results for Desired Number of ST Partners

For the second analysis, I conducted the same analyses as stated previously, but with desired number of ST partners as the outcome variable. Results of this hierarchical regression analysis indicated that the overall model was significant, $F(7, 284) = 6.34$, $p < .001$ (see Table 4 for full effects).

Table 4. Results of the multiple regression analyses for desired number of ST partners.

Level of Predictor	R^2	*b*	SE	*t*	*p*	CIS
Overall Model	.14***					
Biological Sex		-0.06	.10	-0.57	.57	-.25, -.14
Acceptance (of Women)		0.18	.08	2.41	.02*	.03, .34
Risk		0.18	.24	0.76	.45	-.29, .66
Biological Sex x Acceptance		0.08	.09	0.86	.39	-.10, .26
Biological Sex x Risk		0.26	.29	0.90	.37	-.31, .84
Acceptance x Risk		-0.01	.22	-0.02	.98	-.43, .42
Biological Sex x Acceptance x Risk		0.05	.26	0.20	.84	-.46, .57

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$; $F(7, 284) = 6.34$, $p < .001$.

This analysis revealed a main effect for acceptance for women, suggesting that greater acceptance of women's short-term sexual behavior relates to more desired short-term partners among participants overall. Surprisingly, biological sex did not predict desired number of short-term partners. Additionally, no other findings were significant, including any of the interactions between variables. As a result, these findings fail to support hypotheses that predicted an interaction between biological sex and acceptance of women (Hypothesis 1b) or risk (Hypotheses 2b-c) related to desired number of partners. This is interesting because both men and women reported a desire for more ST partners the more they thought it was acceptable for women to have ST partners. Hypothesis 3, which stated that there would be a main effect of

biological sex and no interactions between biological sex and other variables in predicting desired number of partners if SST played a unique role, was not supported.

Regression Results for Sexual Risk

For the final analysis, I conducted the same analyses as stated previously, but with sexual risk as the outcome variable. Results of this hierarchical multiple regression analysis indicated that the overall model was significant, $F(7, 340) = 14.92$, $p < .001$ (see Table 5 for full effects).

Table 5. Results of the multiple regression analyses for sexual risk.

Level of Predictor	R^2	*b*	SE	*t*	*p*	CIS
Overall Model	.24***					
Biological Sex		0.06	.04	1.46	.14	-.02, .15
Acceptance (of Women)		0.08	.03	2.50	.01*	.02, .15
Risk		0.44	.11	4.05	.00***	.22, .65
Biological Sex x Acceptance		0.02	.04	0.48	.63	-.06, .10
Biological Sex x Risk		0.06	.13	0.47	.64	-.20, .32
Acceptance x Risk		0.06	.10	0.61	.54	-.13, .26
Biological Sex x Acceptance x Risk		0.02	.12	0.20	.84	-.21, .26

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$; $F(7, 340) = 14.92$, $p < .001$.

This analysis revealed a main effect for both acceptance of women to engage in ST sex and for risk, suggesting that greater acceptance of women's short-term sexual behavior and higher risk relate to greater sexual risk. Surprisingly, biological sex did not predict sexual risk, consequently not supporting Hypothesis 2a, that risk would be higher in men if neurodevelopment played a role in predicting this outcome variable. Additionally, no other findings were significant, including any interactions between variables, which fails to support Hypotheses 2b and 2c, that biological sex would interact with risk to predict sexual risk. Hypothesis 3, which stated that if SST played a unique role, there would be a unique effect of biological sex, even when including other variables, was not supported.

Exploratory Analyses

COVID and Sexual Behavior

For exploratory purposes, participants were asked to report on the effect COVID had on their sexual lives. A Pearson correlation test indicated that COVID was significantly related to preference for ST partners, desired number of ST partners, and desired number of LT partners (see Table 6 for details). Perhaps this can be interpreted as loneliness, as the greater COVID affected them, the more the wanted connections (ST and LT) with others. Note that I failed to specify whether the effect of COVID was positive or negative; however, this clarification in item wording and response is included in Study 2.

Table 6. Pearson's correlations and descriptive statistics for variables related to COVID.

Variable	*M*	*SD*	*r*
COVID *(Response range: 1-5; higher = greater effect)*	2.42	1.23	---
Preference for ST partners *(Response range: 1-7; higher = greater interest)*	2.23	1.61	.407**
Desired Number of ST Partners *(Response range: open)*	1.16	0.84	.260**
Desired Number of LT Partners *(Response range: open)*	5.59	5.65	.245**

Note: *** = $p < .001$.

Honest Reporting

Overall, participants indicated a high level of honest reporting of their sexual behavior. The average for both men and women was 4.87 (the highest possible score was 5; *SD* = .52), suggesting that people responded honestly.

Study 1 Discussion

Social acceptance was the only variable to consistently relate to all outcome variables, whereas biological sex—the critical predictor for STT—only related to one outcome variable (i.e., preference for ST). In general, social acceptance was moderately high, with an overall mean for the acceptance of both women and men at 3.62 (*SD* = 1.09), which sits above the 2.5 mid-point of the response range. Recall that only 3% of participants reported any difference in how acceptable they found the ST sexual behavior of men compared to women, with about half of these participants reporting greater acceptance of women (*n* = 5) and the other half reporting greater acceptance of men (*n* = 6). This lack of a double-standard of how acceptable it is for women to engage in ST sexual behavior compared to men seemingly indicates greater equality of the sexual social-script for men and women (especially, women).

As expected, general risk predicted sexual risk, but contrary to predictions, general risk did not interact with biological sex, failing to support Hypotheses 2b-c. In this study, risk was used as a proxy for neurodevelopment, in that college-aged samples (particularly college men), are still completing critical neurological development in key brain areas related to risk-taking behavior, inhibition, and decision-making (Feldstein Ewing et al., 2016). These results may suggest other possibilities. First, perhaps both young men and women in college are so close to this developmental cusp that differences may not be as clear. Second, perhaps women have not completed this development until later than expected. Or lastly, perhaps risk was a poor proxy for neurodevelopment.

Only very limited support was found for SST in that biological sex predicted preference for ST partners, but failed to predict desired number of partners or sexual risk (Hypothesis 3).

These results also suggest that biological sex as part of SST may not be as significant in influencing modern sexual behavior as are social influences. To sum, although biological sex predicted preference for ST mating, and risk predicted sexual risk, neither predicted anything else. Instead, social acceptance was the only variable that reliably predicted all outcome variables, suggesting that social factors may be highly important to consider when formulating theories and predictions about possible sex differences in mating preferences. These findings warrant further investigation into the role of these variables, with particular attention to social factors, in a more age-diverse population to determine which factors have the greatest impact in predicting the ST sexual behavior of adults.

Limitations of Study 1

Missing Concern for Safety Variable. A significant limitation of Study 1 is the absence of data regarding concern for safety, particularly in this sample of college students who are more likely to experience sexual assault (DOJ, 2014). Therefore, I was unable to investigate if women's concern for safety relates to their willingness and desire to engage in ST sexual behavior. This is unfortunate, as this avenue of research seems both important and promising. However, this variable was included in the second study.

Relationship Status. Many students (approximately 40%) reported being in a committed relationship or married, and their responses regarding sexual behavior may be different than what would be observed for single individuals. That is, reporting one's ST mating preferences while in a committed relationship is inherently problematic. Therefore, a more focused sample of single adults was used in Study 2.

College-Aged Convenience Sample. Another limitation to Study 1 was the reliance on a convenience sample of college-aged students. This very shortcoming was presented as the main criticism for Buss and colleagues' previous work (e.g., Buss, 1989; Schmitt et al., 2003). However, my goal in using this particular sample was to test the concern for safety issue that would have been most relevant in a college population and to make a direct comparison to the type of samples used by Buss & Schmitt (1993). A college-based lab study was also deemed important to report updated trends in the data since the key study presented by Buss (1989) was conducted over 2 decades ago. Still, the neurodevelopmental explanation that younger adults are riskier (particularly, young men), and therefore more likely to engage in short-term sexual behavior cannot be tested without comparison to an older sample. The limited studies testing these concepts on older adults relied on small sample sizes (n = 137; Buunk et al., 2001) and have failed to replicate some of SST's other findings, such as women preferring older men (Buunk et al, 2001) or men lowering their standards for ST partners (Gallant et al., 2011). Expanding the age range in future samples would also allow for a more in-depth look the factors affecting mating strategies.

Rationale for Study 2

Study 1 provided limited evidence for SST with only one outcome variable relating to biological sex (i.e., preference for ST mating). Although social acceptance predicted all three outcome variables, it did not interact with biological sex, and no other predictor variables related to the outcome variables in any way. Given women and men found it equally acceptable for women to have ST partners, and that perception predicted all three outcomes, it could be that acceptance is the primary driving force behind ST sexual behavior and preferences. In the past,

differences between how acceptable men and women found ST sexual behavior for women may have explained the differences in men and women's report of the outcome variables. However, now that men and women have the same attitude towards ST sex, the sex differences on the outcome variables failed to replicate when that variable was accounted for in the regression model. All of these sex differences may have been due to the social acceptance to engage in ST sex. Although I have not been able to shed light on why sex differences occur (when they do occur) regarding ST sexual behavior, expanding on acceptance of ST behavior is a promising next step.

Further, I reasoned that including personal sexual attitudes and behavior (a.k.a. sociosexual orientation) in Study 2 will help identify if personal or social acceptance is driving sex differences in preferences for ST mating. To help differentiate between what is socially acceptable (whether one agrees personally with it or not) and what is personally acceptable, the social acceptance item from Study 1 was reworded to best capture a *social* sense of acceptance (regardless of personal views) and the Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008) was used to tap into *personal* acceptance of sexual behavior. This added precision was important in allowing me to clarify the forces affecting personal sexual behavior, and if one's biological sex interacted with these constructs to predict that behavior. For example, including these constructs helped resolve if women are more prone to social pressure in guiding their personal sexual behavior—given social norms tend to penalize women for sexually permissive behavior—or if one's personal level of acceptance trumps societal pressure.

To reduce the number of predictors (and the need to interpret complex, 5-way interactions) and because the risk scale had an especially low Cronbach's alpha ($\alpha = .29$), risk

was removed from Study 2. Recall that risk predicted sexual risk and nothing else in Study 1. The original use of risk was meant to test if higher risk, presumably resulting from delayed neurodevelopment in the frontal lobes of emerging adult men, predicted risky sexual behavior. However, men and women did not differ on the risk measure, which differs from previous research indicating that men are riskier than women (Pawlowski et al., 2008). Another approach to assess whether neurodevelopment relates to risky sexual behavior was to include age as a predictor, given age is highly associated with neurodevelopment, especially among emerging adults. If an interaction occurred in which age predicts riskier sexual behavior in men, but not women, then perhaps neurodevelopment played a role in sexual decision-making and men's, relative to women's, preference for ST mating.

Study 2 also recruited a more age-diverse population of single adults (i.e., not in a committed relationship) through Prolific (a comprehensive online participant recruitment site) to better understand how neurodevelopment and psychosocial factors affected men and women's selection of mating strategies in older, neurologically developed, adults. This is critical in determining if SST's results extend to other age groups or are solely a product of neurodevelopment or social features unique to emerging adults. Lastly, Study 2 captured concern for safety, as this variable was not tested in Study 1.

STUDY TWO

Research Question and Hypotheses

Do differences in concern for safety, the social acceptability of women to have short-term (ST) sexual partners, and/or neurodevelopment measured through age explain some of the disparity in men and women's reports of ST mating preference, desired number of ST partners, sexual risk, and sociosexual orientation compared to Sexual Strategies Theory (SST), which considers only biological sex?

Hypothesis 1

I hypothesized that men and women would differ on the outcome variables of ST mating preference, desired the number of ST partners, sexual risk, and sociosexual orientation before additional predictors were included, as detailed below.

Hypothesis 1a. I hypothesized that men would prefer ST mating more than women, before additional predictors were included.

Hypothesis 1b. I hypothesized that men would desire higher numbers of ST partners than women, before additional predictors were included.

Hypothesis 2

I hypothesized that the full structural equation model would have an acceptable model fit using standard fit indices (i.e., chi-square, CFI, RMSEA, SRMR).

Hypothesis 2a. I hypothesized that concern for safety would be negatively related ST mating preference, desired the number of ST partners, sexual risk, and sociosexual orientation.

Hypothesis 2b. I hypothesized that the perceived social acceptance of women engaging in ST sex would be negatively related to ST mating preference, desired the number of ST partners, sexual risk, and sociosexual orientation.

Hypothesis 2c. I hypothesized that age would be negatively related to ST mating preference, desired the number of ST partners, sexual risk, and sociosexual orientation.

Hypothesis 3

I hypothesized that there would be differences in the strength of the relations between each predictor and the outcome variables for men and women. That is, that the model paths between each predictor and each outcome would vary between men and women, as detailed below.

Hypothesis 3a. I hypothesized that the negative relation between concern for safety and ST mating preference, desired the number of ST partners, sexual risk, and sociosexual orientation would be stronger for women than men.

Hypothesis 3b. I hypothesized that the negative relation between social acceptance of women engaging in ST sex and ST mating preference, desired the number of ST partners, sexual risk, and sociosexual orientation would be stronger for women than men.

Hypothesis 3c. I hypothesized that the negative relation between age and ST mating preference, desired the number of ST partners, sexual risk, and sociosexual orientation would be stronger for men than women.

METHOD

Participants

A total of 357 participants were included in Study 2, which surpassed the 304-participant minimum needed according to the power analysis based on a small effect size (f = .04). All participants were selected to be single, between the ages of 18-35 (M = 26.08, SD = 4.67), and were split almost equally between male (n = 183, 51.3%) and female (n = 174, 48.7%). The majority of participants were heterosexual (n = 249, 69.7%), with the remaining reporting as homosexual (n = 18, 5%), bisexual (n = 62, 17.4%), or other/prefer not to say (n = 27, 7.6%). Most participants were Caucasian (n = 196, 54.9%), with the remaining reporting as Asian (n = 56, 15.7%), African American (n = 42, 11.8%), Mexican or Chicano (n = 21, 5.9%), Puerto Rican/other Latin American (n = 13, 3.6%), American Indian/Alaska Native/Pacific Islander (n = 3, 0.8%), Mixed (n = 24, 6.7%), or Other (n = 2, 0.6%).

Procedure

Participants read and agreed to consent forms approved by the Montana State University's Institutional Review Board (IRB) before completing the survey through Prolific, an online platform that recruits qualified research participants. Each survey took approximately 10 minutes to complete, after which participants were debriefed about the survey's purpose and compensated $3.50 for their time.

Measures

Before completing the survey, participants were informed that all answers would be anonymous (not tied to their identifying information), confidential, and voluntary. Participants were prompted to answer honestly, but could opt out at any given point or choose not to answer any question.

Predictor Variables

Biological Sex and Age. Biological sex and age were collected as part of the demographic information.

Concern for Safety. Two items were created to capture participant concern for safety regarding potential sexual encounters. These items were "How important would you rate concern for safety when meeting a short-term sexual partner?" and "How important would you rate concern for safety when dating for a long-term partner?" Response options ranged from 1 (*not important at all*) to 5 (*very important*), and an option to decline to answer, with higher scores indicating greater concern for safety. For this study, only the item addressing a potential ST sex partners was used in the primary analyses as it is more relevant to the central thesis.

Social Acceptance of Women to Engage in ST Sex. The same item used in Study 1 was used in Study 2.

Outcome Variables

The measures for mating preference, the desired number of partners, and sexual risk were identical to those used in Study 1.

Sociosexual Orientation. The Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008) was used to capture participants' personal sexual attitudes, behavior, and desire, or rather, one's sexual permissiveness. A total of 9 items including questions such as "Sex without love is OK" and "With how many different partners have you had sex within the past 12 months?" Items referring to quantity of partners (i.e., items 1-3) included the response options: "0," "1," '2-3," "4-7," and "8 or more." Items with agreement statements (i.e., items 4-6) included a 5-point Likert-type response scale from "strongly disagree" to "strongly agree." Finally, items asking how often a thought or behavior occurred (i.e., items 7-9) included a 5-point Likert-type response scale from "never" to "nearly every day." The sum of all items was used as a global sociosexual orientation score and achieved a good level of internal consistency (α = .85; Penke & Asendorpf, 2008).

Exploratory Variables

A series of variables were included for exploratory purposes, with items assessing subjective social status, fertility status, sexual trauma, religiosity, abortion access, parental status, COVID's effect on one's sex life, and perceived honest responding, and were presented mostly at the end of the survey to help prevent fatigue and order effects.

Subjective Social Status (SSS). The MacArthur Subjective Social Status (SSS; Adler et al., 1994) scale was used to evaluate overall social and economic status, which is a better

predictor of health and an easier, more accessible reporting method (i.e., participants often find it difficult or undesirable to report income; Ostrove et al., 2000; Singh-Manoux et al., 2005).

Three items were used to capture SSS, including participants' social position in society (i.e., United States), in their communities, and in their childhood. Participants would read the description and then rank their position from 1 (bottom) to 10 (top) on a ladder in relation to others. For instance, the item asking about their social position in society read as: "Think of the ladder with 10 rungs (pictured below) representing where people stand in our society. At the top of the ladder are the people who are the best off, those who have the most money, most education, and best jobs. At the bottom are the people who are the worst off, those who have the least money, least education, and worst jobs or no job. Between 1 (bottom) and 10 (top), where do you think you stand on the ladder?"

Fertility Status. To ensure that the sample included participants of reproductive-age, two items were used to assess fertility status. Men were asked the following item "Have you experienced age-related infertility?" whereas women were asked "Have you experienced menopause?" Participants were excluded from analyses if they responded yes to these items.

Birth Control. Females were also asked if they were taking any form of hormonal birth control, then further prompted to indicate the type (e.g., oral contraceptive, hormonal IUD, etc.). This item was used for exploratory purposes.

Trauma Experience. Two items were used to evaluate previous experience with trauma, with the time frame (i.e., last 12 months, since age 14) with a response range adopted from the Sexual Experiences Survey (SES; Koss et al., 2007). These items were: "Have you experienced

an unwanted sexual encounter in the past 12 months?" and "…since you were 14?" The response options for these items were: 0 times, 1 time, 2 times, and 3 or more times.

Religiosity. A single item, "How religious do you consider yourself," measured religiosity with a response range from 1 (*not religious at all*) to 5 (*very religious*), with higher scores indicating higher religiosity.

Political Stance. A single item, "I would characterize my political stance as," measured political stance with a response range from 1 (*highly socially conservative*) to 5 (*highly socially liberal*), with higher scores indicating greater liberal political ideology.

Abortion Access. A single item, "How accessible is obtaining an abortion where you live," determined one's access to abortion care with a response range from 1 (*highly restrictive*) to 5 (*highly accessible*), with higher scores indicating greater access.

Parental Status. A single item, "Do you have any children (select all that apply)" measured if the participant was a parent with response options for biological children, stepchildren, or a combination of both.

Raised by Single Parent. A single item, "Were you raised by a single parent," assessed whether the participant was raised by a single parent, with a response option of "yes" or "no."

COVID's Effect on Sexual Behavior. A more precisely worded item was used to capture whether COVID has a positive or negative effect on a participant's sex life: "The COVID-19 pandemic had the following effect on my sex life" with a response range from 1 (*very negative*

effect) to 5 (*very positive effect*). The response set to this item was recoded as -2 to +2 to decipher an overall positive or negative effect.

Honesty. The same item measuring honest responding from Study 1 was used in Study 2.

Social Desirability. In addition to asking directly about honesty, an item assessing socially desirable responding was included. Participants were asked to rate their level of agreement on a 5-point Likert-type scale from 1 "strongly disagree," to 5 "strongly agree," for the following statement: "The way in which I am perceived by others is very important to me." Higher scores may indicate a higher level of socially desirable responding.

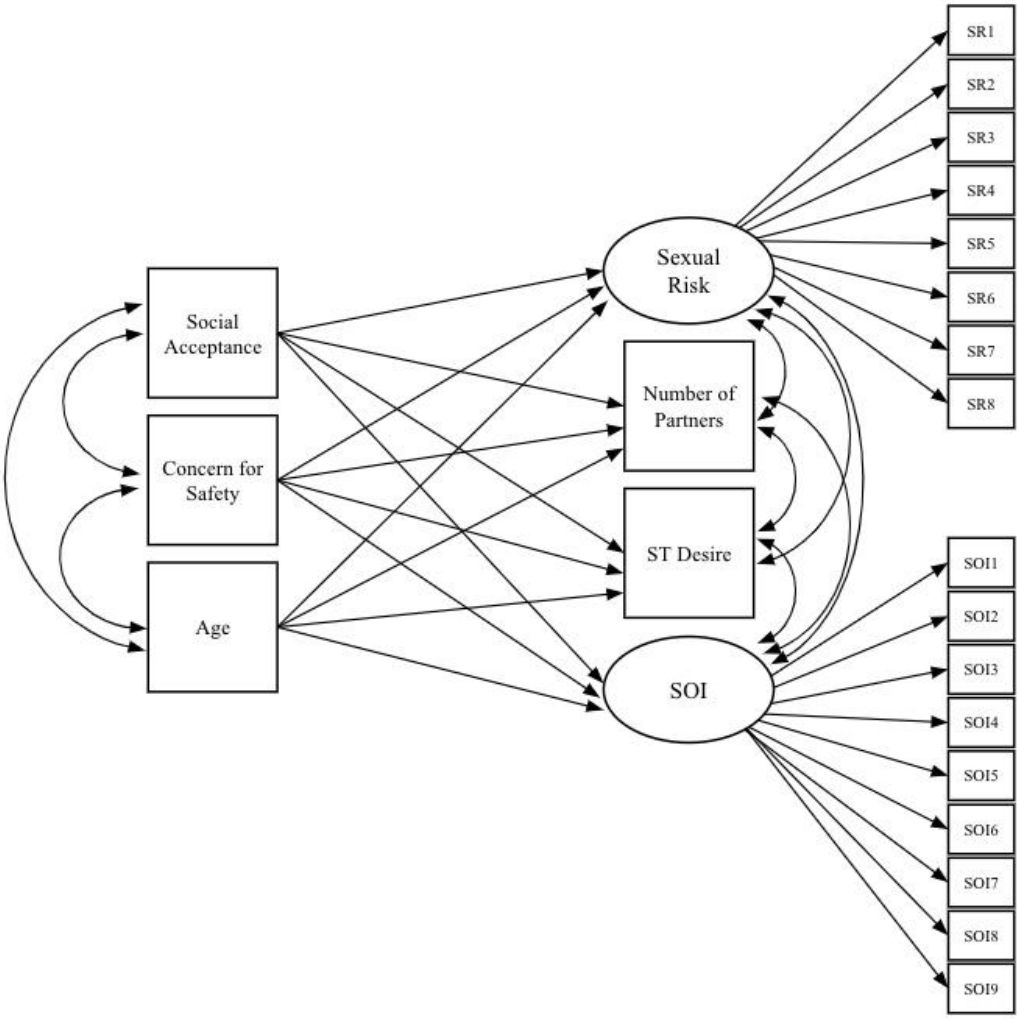
Analytic Technique for SEM

A three-step process was used to test the effect of biological sex on how concern for safety to engage in ST sex, social acceptability of women to engage in ST sex, and age predicted ST mating preference, number of ST partners, sexual risk, and sociosexual orientation. First, a confirmatory factor analysis (CFA) was used to validate the measurement quality and fit of the scale items used to create the two latent variables. That is, 8 item-level indicators were used to specify the outcome latent variable of sexual risk, whereas 9 item-level indicators were used to specify the outcome latent variable of sociosexual orientation (SOI). A cut off value of .35 for factor loading was used for values considered too low.

Second, a structural model was then tested in which the predictor variables of concern for safety, social acceptance of women, and age were regressed onto the outcome variables of ST

mating preference, desired number of ST partners, and the latent variables for sexual risk and SOI. See Figure 2 for the full structural model.

Figure 2. The original full structural model.



Third, a multi-group model analysis was used to examine if structural paths differed significantly between men and women. When evaluating the models, a change in CFI of .01 or greater was considered a significant difference.

Model Fit Indices

Model fit was evaluated with standard metrics, and acceptable fit was indicated with a non-significant χ^2 test, confirmatory fit index (CFI) greater than 0.90, root-mean square error of approximation (RMSEA) less than 0.05 with an upper bound 90% Confidence Interval (CI) of less than 0.10, and standardized root mean square residual (SRMR) less than 0.10 (Ullman & Bentler, 2003). Analyses were performed in Mplus (version 8.3) using the weighted least square mean and variance adjusted (WLSMV) estimator, as it is the most robust and appropriate estimator for non-normally distributed data, such as the zero-inflated distributions found in Study 2 (Bandalos, 2014).

Missing Data

Missing data included incomplete responses, as well as instances in which participants selected not to respond, and was treated using pair-wise deletion to preserve the most data.

RESULTS

Data Cleaning

A total of 417 participants took the survey. Participants were removed from analyses if they did not meet the study or Prolific's criteria, such as being single or timing out of the survey (n = 27). Participants were also removed if they took less than 1 minute to complete the survey (n = 1) or did not include their age (n = 2). Following these steps, a total of 387 participants remained.

Missing Data

Next, data were removed using pairwise deletion if values exceeded 2.5 standard deviations from the mean for any variable. Additional values were considered as missing data if the value provided was not numerical in nature (e.g., "as many as I could") or probable (e.g., 10^{32}). In respecting participants' level of comfort to disclose sensitive information (e.g., numbers of sexual partners), the option to refrain from answering any item was offered. Resulting non-responses were treated as missing data.

Skewness and Kurtosis

Several variable distributions were heavily skewed (+/- 2) or presented with abnormal kurtosis (+/-7; Byrne, 2010; see Table 7). For instance, even after removing an extreme case (i.e., 1 with 33 zeros after it) and any value 2.5 SD away from the mean, desired number of LT partners was still heavily skewed and leptokurtic. For this variable, nine people submitted numbers in the triple and quadruple digits (e.g., 3 marked 1,000), whereas the remaining 348 participants wrote numbers in the double digits (99 and below). Viewed another way, the mean

for number of LT partners was 20.6, but the median was 4 partners, suggesting that a few extreme cases continue to skew the data, even after adjustments. Desired number of ST partners was also skewed, but not as severely and was within normal ranges for kurtosis

Table 7. Skew and kurtosis values for abnormal variables.

	Skew	Kurtosis
Desired Number of ST Partners	2.02	5.75
Desired Number of LT Partners	9.30	90.94
Having Biological Children	-4.00	14.00
Trauma in the Last 12 Months	5.19	29.69
Honest Responding	-7.50	54.64

The distribution for participants with biological children was also skewed and leptokurtic. Only 5.3% (n = 19) participants had biological children, whereas the remaining 94.7% (n = 337) did not, which contributed this variable's irregularity. Similarly, the distribution for sexual trauma in the last 12 months was both skewed and leptokurtic, with most participants (94.1%, n = 335) reporting no trauma in the past 12 months. However, the variable of trauma since age 14 was within normal ranges with approximately ¾ of participants (72.5%, n = 259), reporting no trauma since the age of 14. Honestly was heavily negatively skewed and highly leptokurtic with nearly every participant (98.3%, n = 347) reporting as very honest, the highest possible choice.

Preliminary Analyses

Men and Women's ST Mating Preferences

Similar to previous research (Buss & Schmitt, 1993) and consistent with Hypothesis 1a, men (M = 2.25, SD = 1.11) preferred ST partners more than women (M = 1.60, SD = 0.82),

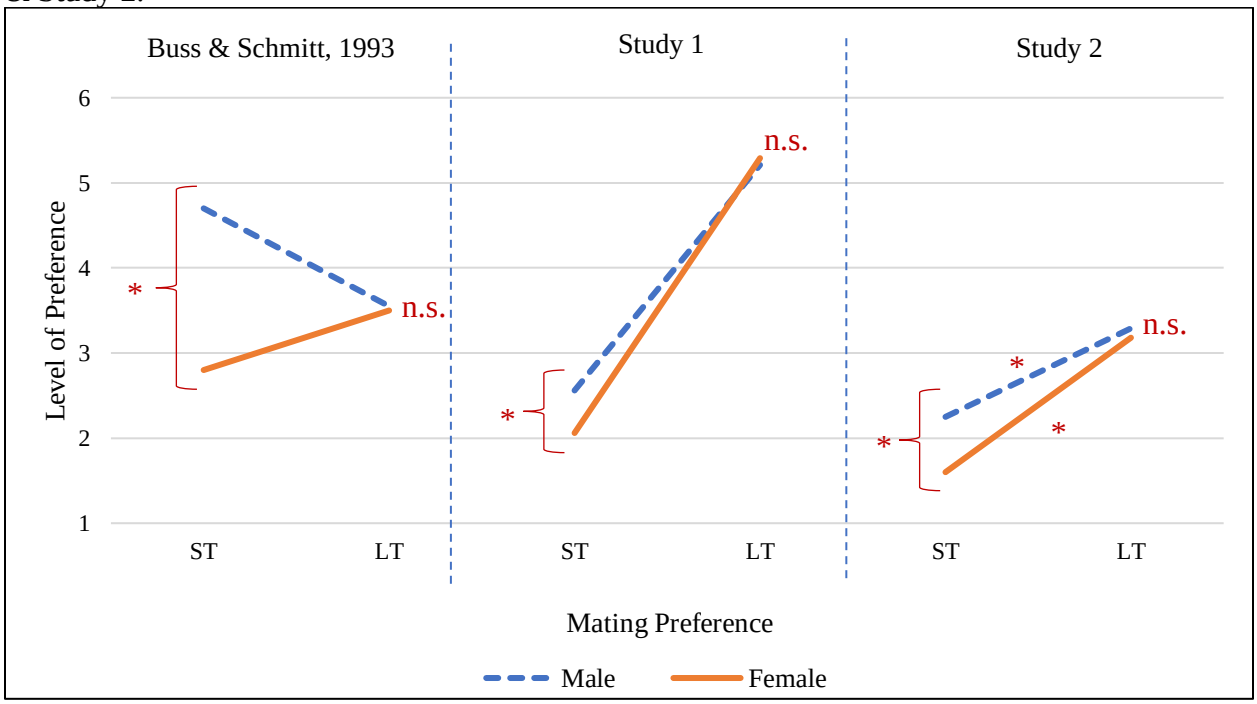
t(317) = 6.14, *p* < .001. Also consistent with that work, there was no difference in men and women's preference for LT partners (*p* = .22; see Table 8). However, inconsistent with Buss and Schmitt (1993), men reported a higher preference for LT than ST mating, a pattern of interest that was also seen in Study 1 (see Figure 3).

Table 8. Mean differences in mating preference for men and women.

Mating Preference	Men		Women		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Preference for ST Mating	2.25	1.11	1.60	0.82	0.65***
Preference for LT Mating	3.22	1.33	3.18	1.35	0.11
Mean Dif.	-0.97***		-1.58***		

Note: * = *p* < .05, ** = *p* < .01, *** = *p* < .001.

Figure 3. Men and women's ST and LT mating preferences for Buss & Schmitt (1993), Study 1, & Study 2.



Note: * = *p* < .05, ** = *p* < .01, *** = *p* < .001; Response ranges for Buss & Schmitt, 1993 and Study 1 were 1-7; response range for Study 2 was 1-5.

Men and Women's Desired Number of ST Partners

Buss and Schmitt (1993) found that men desired higher numbers of partners compared to women, although they failed to specify whether these partners were casual sexual encounters or more serious, long-term partners. The current study focused on ST partners and found that men desired a higher number of ST partners compared to women (Hypothesis 1b), $t(318.8) = 3.85$, $p < .001$ (see Table 9). Of interest, there was no difference between men and women's desired number of LT partners ($p = .07$), and both men and women reported higher numbers for desired LT compared to ST partners (see Table 9). Essentially, the difference in men and women's desired number of ST partners replicates previous work and supports Hypothesis 1b (which focused on ST partners), but this difference disappears when applied to LT partners.

Table 9. Desired number of ST and LT partners for men and women.

	Men		Women		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Desired Number of ST Partners	1.23	1.25	0.78	0.91	0.45***
Desired Number of LT Partners	12.46	22.83	10.32	35.87	18.73
Mean Dif.	-11.23***		-9.54***		

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Men and Women's Concern for Safety

Hypotheses regarding concern for safety assumed that women would be more concerned about their safety than men would be about their safety, particularly regarding potential ST sexual partners. Therefore, I expected to see higher concern from women than men, and higher concern for engaging with potential ST partners than LT partners. Indeed, women rated concern for safety higher than men did for both ST sex, $t(323.4) = -7.40$, $p < .001$, and LT sex, $t(348) = -3.29$, $p = .001$ (see Table 10). Furthermore, women rated concern for safety higher for ST than

LT, $t(170) = 7.23$, $p < .001$, as did men, $t(176) = 4.95$, $p < .001$. To sum, women were more concerned for both types of safety than men, although both men and women rated concern for safety regarding ST partners as higher than concern for LT partners.

Table 10. Mean differences in men and women's ST and LT concern for safety.

Type of Concern	Men		Women		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Concern for Safety for ST	4.24	0.77	4.76	0.54	-0.52***
Concern for Safety for LT	3.86	1.09	4.23	1.00	-0.37**
Mean Dif.	0.38***		0.53***		

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Social Acceptance of Men and Women's ST Sexual Behavior

Finally, I assumed that the social acceptance of women's ST sexual behavior, such as engaging in casual sex or one-night stands, would be lower than acceptance of men's engagement in identical behaviors. Indeed, social acceptance to engage in ST sex was higher for men ($M = 4.33$, $SD = 0.83$) than for women ($M = 3.43$, $SD = 1.14$), $t(347) = -16.80$, $p < .001$ (see Table 11). In fact, on a possible scale of 1-5, acceptance of men was rated almost a full point above women. Interestingly, a closer look at these results based on participant sex revealed that men indicated that it was more socially acceptable for women to have ST sex than it was for men, $t(177) = -9.34$, $p < .001$, whereas women indicated that it was more socially acceptable for men to have ST sex than it was for women, $t(169) = -15.25$, $p < .001$, suggesting that perhaps both sexes feel it is more socially acceptable for individuals of the other sex to engage in ST sexual behavior (see Table 11).

Table 11. Mean differences in social acceptance of men and women's ST sexual behavior.

Type of Acceptance	Men		Women		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Acceptance of Women in ST	3.56	1.19	3.21	1.15	0.39**
Acceptance of Men in ST	4.22	0.86	4.44	0.78	-0.23*
Mean Dif.	-0.59***		-1.23***		

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Age

Age related positively to desired number of LT partners for women, $r = .20$, $p = .01$, meaning as age increased, the desired number of LT partners increased. However, this relationship was not present for men ($p = .48$), nor did age relate to any other main variable, including sexual risk for men ($p = .49$) or women ($p = .12$). Perhaps, women feel less pressure to conform to social acceptance with age and are therefore, more able to pursue ST sexual opportunities.

Summary of Preliminary Analyses

Sexual strategy theory assumes that men and women evolved differences in sexual behavior to solve adaptive problems unique to each sex, predicting men should prefer ST more than LT mating and more than women prefer ST mating (Buss & Schmitt, 1993). Additionally, men should prefer higher numbers of partners than women (Buss & Schmitt, 1993). Indeed, the sample in Study 2 replicated several of these features, such as men preferring ST sexual behavior (Hypothesis 1a) and more ST sexual partners (Hypothesis 1b) relative to women. However, the sample differed regarding LT sexual behavior relative to Buss and Schmitt (1993). Specifically, men and women did not differ in LT mating preference or desired number of LT partners. In other words, participants replicated previous research regarding ST sexual preferences, but

somewhat less so for LT sexual preferences. Likewise, there were biological sex differences for concern for safety, with women being more concerned about ST sex than men. Additionally, social acceptance engage in ST sex was higher for men than it was for women, suggesting that there is a pervasive double-standard favoring men when it comes to ST sexual behavior.

I suggest that biological sex (the basis of SST) interacts with age and social factors, such as concern for one's safety and the social acceptance of women to engage in ST sexual behavior, to provide a more complete picture of men and women's sexual behavior and decision-making. To assist in examining these factors, structural equation modeling (SEM) was used to measure how well age and social factors map onto men and women's mating preferences and sexual behavior.

Structural Equation Modeling

Full Measurement Model

A confirmatory factor analysis (CFA), or measurement model, was used to validate the measurement quality and fit of the scale items used to create the two latent variables of sexual risk and SOI. First, a total of 9 items were used to form the latent variable of SOI; however, this resulted in a poor fitting model. Review of the scale in further detail revealed that three subscales used to create the global SOI score should remain as three separate subscales. Although the creators of the SOI scale suggest summing all nine scale items to create a global SOI score (and provided an adequate Cronbach's α of .85; Penke & Asendorpf, 2008), the fit for the current data improved greatly after dividing these items into their designated subscales of behavior (items 1-3), attitude (items 4-6), and desire (items 7-9). Dividing the items into subscales also makes sense logically, as each subdomain had idiosyncratic response options. For example, the

response range for the behavioral subdomain was a tally of the number of partners, whereas the response range for the attitude subscale was an agreement scale, and finally, the response range for the desire subscale included a frequency response. The final measurement model for SOI was acceptable: $\chi^2(24) = 63.782$ $p < .001$, CFI = 0.99, RMSEA [90% CI] = 0.07 (.05, .09), SRMR = 0.03.

The initial CFA for sexual risk indicated a poor fitting model. Further improvements to model fit were made by removing low-factor loading items. More specifically, item 8, with a factor loading of .174, was below the predetermined cutoff value of .35 and was therefore removed. In addition, item 2 had a low factor loading of .406 that, once removed, improved the overall fit enough to justify exclusion from analyses. Finally, all items used to create the latent variables of the SOI subscales and sex risk were treated as categorical data instead of continuous data because the response ranges most closely resembled categories than a true scale. The final measurement model fit statistics for sexual risk were acceptable: $\chi^2(9) = 17.543$ $p = .04$, CFI = 1.00, RMSEA [90% CI] = 0.05 (.01, .09), SRMR = 0.05.

Following these three modifications of: 1) dividing SOI into the original three subdomains, 2) removing low factor loading items in the sex risk scale, and 3) treating the data as categorical, provided an overall adequate fitting model to the data with both latent variables, $\chi^2(84) = 233.374$ $p < .001$, CFI = 0.98, RMSEA [90% CI] = 0.07 (.06, .08), SRMR = 0.07. For the revised model including these modifications, please see Figure 4.

Full Structural Model

I estimated the hypothesized structural model in which social acceptance of women's ST sexual behavior, concern for safety, and age predicted the outcome variables of number of ST partners, ST preference, and the latent variables of SOI behavior, SOI attitude, SOI desire, and sex risk. This model was an overall acceptable fit to the data, $\chi^2(139) = 317.225$ $p < .001$, CFI = 0.98, RMSEA [90% CI] = 0.06 (.05, .07), SRMR = 0.06. Means, standard deviations, and correlations detailed in Table 12, with standardized estimates, unstandardized estimates, standard errors, and significance tests for each structural path provided in Table 13.

Figure 4. The revised structural model for Study 2.

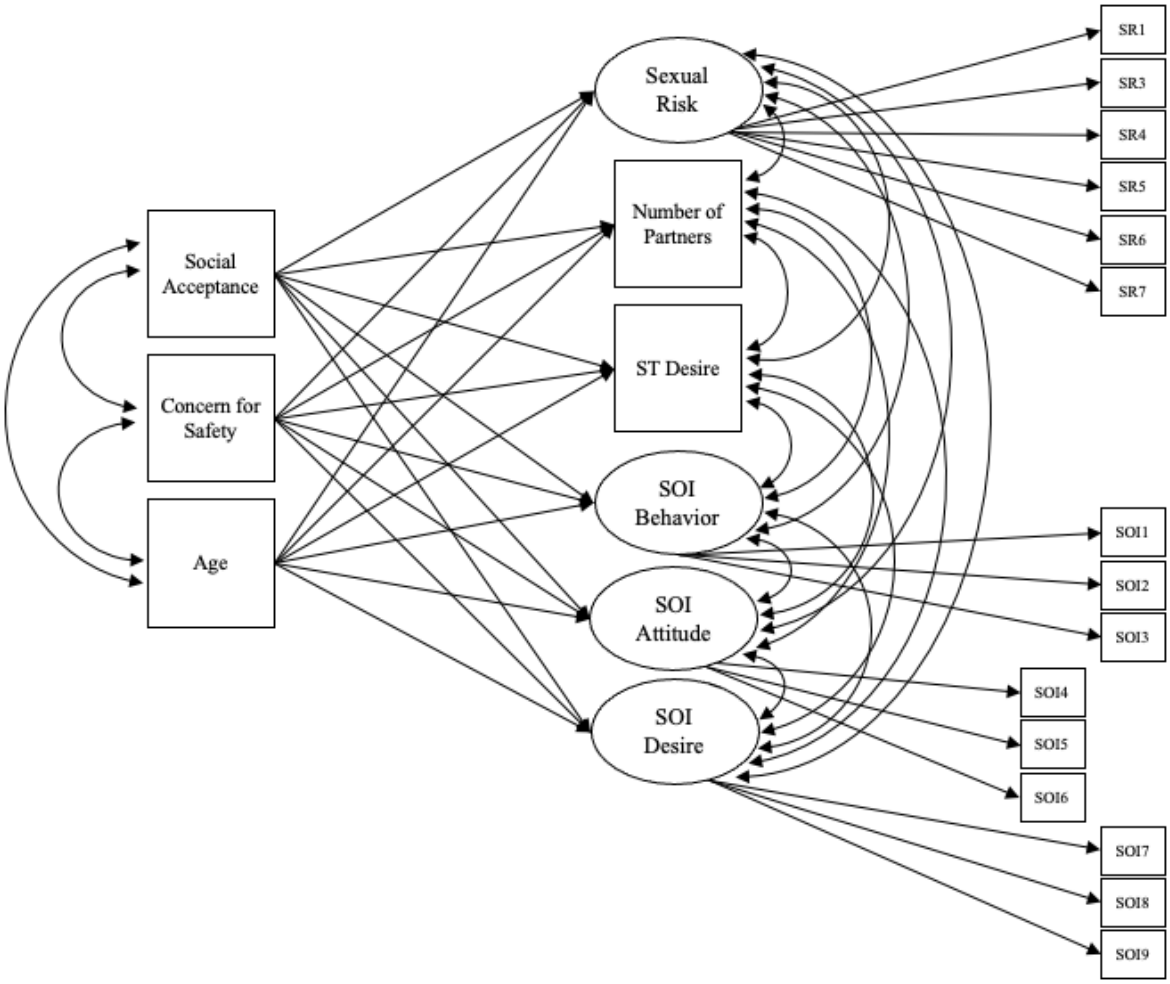


Table 12. Means, standard deviations, and correlations among observed variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.	13.	14.	15.	16.	17.	18.	19.	*M*	*SD*
1. Age																				26.08	4.67
2. Acceptance	.03																			3.37	1.19
3. Safety	.04	-.10																		4.50	0.71
4. ST Partners	.09	.19**	-.32**																	0.99	1.10
5. ST Prefer.	.06	.15**	-.36**	.55**																1.93	1.03
6. SOI 1	.11*	.09	-.21**	.41**	. 38**															1.60	0.91
7. SOI 2	.21**	.06	-.23**	.36**	.35**	.45**														1.65	0.94
8. SOI 3	.25**	.01	-.17**	.36**	.39**	.55**	.77**													1.91	1.22
9. SOI 4	.08	.05	-0.08	.35**	.32**	.27**	.30**	.29**												3.95	1.24
10. SOI 5	.11*	.09	-.29**	.51**	.59**	.37**	.39**	.42**	.45**											2.99	1.44
11. SOI 6R	.16**	.09	-.22**	.49**	.54**	.40**	.44**	.46**	.53**	.70**										2.92	1.41
12. SOI 7	.11*	.12*	-.11*	.48**	.41**	.25**	.26**	.33**	.36**	.42**	.43**									3.13	1.23
13. SOI 8	.10	.18**	-.15**	.45**	.41**	.43**	.29**	.36**	.27**	.39**	.40**	.64**								2.66	1.15
14. SOI 9	.11*	.08	-.25**	.52**	.47**	.38**	.34**	.39**	.28**	.46**	.40**	.65**	.66**							2.35	1.78
15. Sex Risk 1	.01	.15**	-.18**	.25**	.27**	.55**	.26**	.34**	.15**	.20**	.22**	.19**	.28**	.23**						1.23	0.59
16. Sex Risk 3	.04	.03	-.13*	.35**	.31**	.72**	.37**	.41**	.21**	.32**	.36**	.23**	.38**	.30**	.60**					1.48	0.98
17. Sex Risk 4	.09	.07	-.18**	.30**	.31**	.58**	.32**	.31**	.20**	.28**	.29**	.19**	.30**	.28**	.44**	.58**				1.24	0.58
18. Sex Risk 5	.12*	.09	-.08	.22**	.18**	.40**	.29**	.25**	.11*	.17**	.23**	.12*	.22**	.24**	.41**	.46**	.57**			1.14	0.45
19. Sex Risk 6	.00	.11*	-.16**	.27**	.23**	.35**	.17**	.29**	.14*	.23**	.16**	.16**	.26**	.27**	.54**	.34**	.38**	.20**		1.04	0.19
20. Sex Risk 7	.08	-.01	-.24**	.40**	.34**	.72**	.45**	.46**	.22**	.35**	.39**	.27**	.39**	.36**	.56**	.70**	.61**	.40**	.41**	1.33	0.72

Note: **p* < .05, ***p* < .01; Acceptance = Social acceptance of women; Safety = Concern for safety;
ST Partners = Desired number of ST partners, ST Prefer. = Preference for ST mating; SOI = sociosexual orientation.

Table 13. Summary of model estimates.

			B	B SE	β
Main Predictors					
Social Acceptance	→	Sex Risk	0.088	0.051	0.120
	→	Num. of ST Partners	0.156	0.055	0.172**
	→	ST Preference	0.101	0.045	0.117*
	→	SOI Behavior	0.050	0.050	0.059
	→	SOI Attitude	0.047	0.032	0.080
	→	SOI Desire	0.099	0.043	0.138*
Concern for Safety	→	Sex Risk	-0.312	0.080	-0.257***
	→	Num. of ST Partners	-0.474	0.066	-0.314***
	→	ST Preference	-0.506	0.078	-0.351***
	→	SOI Behavior	-0.357	0.079	-0.250***
	→	SOI Attitude	-0.255	0.058	-0.264***
	→	SOI Desire	-0.231	0.067	-0.194***
Age	→	Sex Risk	0.019	0.013	0.104
	→	Num. of ST Partners	0.020	0.012	0.088
	→	ST Preference	0.015	0.011	0.069
	←	SOI Behavior	0.053	0.013	0.243***
	←	SOI Attitude	0.025	0.008	0.168**
	←	SOI Desire	0.026	0.010	0.143*
Scale Items Loaded onto Latent Variables					
SOI Behavior	→	SOI1	1.000	.000	0.959***
	→	SOI2	0.906	0.046	0.877***
	→	SOI3	0.938	0.041	0.905***
SOI Attitude	→	SOI4	1.00	0.000	0.671***
	→	SOI5	1.302	0.089	0.859***
	→	SOI6	1.342	0.090	0.883***
SOI Desire	→	SOI7	1.000	0.000	0.824***
	→	SOI8	1.050	0.041	0.862***
	→	SOI9	1.064	0.043	0.873***
Sex Risk	→	SexRisk1	1.000	0.000	0.833***
	→	SexRisk3	1.128	0.059	0.931***
	→	SexRisk4	1.062	0.056	0.881***
	→	SexRisk5	0.979	0.069	0.817***
	→	SexRisk6	1.067	0.072	0.885***
	→	SexRisk7	1.170	0.062	0.963***

Table 13 (continued).

			B	B SE	β
Covariance Among Outcome (Endogenous) Variables					
Sex Risk	← →	Num. of ST Partners	0.295	0.042	0.362***
	← →	ST Preference	0.300	0.056	0.387***
	← →	SOI Behavior	0.667	0.039	0.854***
	← →	SOI Attitude	0.296	0.038	0.555***
	← →	SOI Desire	0.367	0.046	0.552***
Number of ST Partners	← →	ST Preference	0.461	0.048	0.489***
	← →	SOI Behavior	0.367	0.035	0.387***
	← →	SOI Attitude	0.396	0.039	0.612***
	← →	SOI Desire	0.448	.036	0.554***
ST Preference	← →	SOI Behavior	0.358	0.056	0.396***
	← →	SOI Attitude	0.362	0.049	0.588***
	← →	SOI Desire	0.381	0.053	0.495***
SOI Behavior	← →	SOI Attitude	0.371	0.040	0.598***
	← →	SOI Desire	0.399	0.040	0.515***
SOI Attitude	← →	SOI Desire	0.310	0.035	0.587***

Note: All tests were two-tailed; *$p < .05$, **$p < .01$, ***$p < .001$; SOI = sociosexual orientation. B = unstandardized, B SE = unstandardized standard error, β = standardized.

As denoted in Table 13, concern for safety was the most influential factor, negatively predicting every outcome variable, meaning that the more concerned one is about their own safety, the fewer ST partners they desire, the lower their ST mating preference, and the lower their SOI and sex risk scores. Social acceptance of women engaging in ST sexual behavior positively predicted desired number of ST partners, ST mating preference, and SOI desire, but predicted nothing else. In other words, the more socially acceptable it was for women to engage in ST mating, the more likely both men and women were to prefer ST mating, which makes sense considering that the chances for men to engage in ST sex would be greater if ST sex was more socially acceptable for women. Interestingly, age did not predict sex risk, number of ST partners, or ST preference, which goes against predictions that younger participants engaged in

more ST (and therefore riskier) sexual behaviors. However, age did positively predict scores for each of the SOI subscales, in that the older the participant, the higher their sociosexual desire, attitude, and behavior. This was surprising, in that I would have expected younger participants to report higher desire and more permissive sexual attitudes and behavior. Perhaps, the ability to report one's true desires, free of social pressure, increases with age. In any case, age did not prove to be as influential as social and safety factors, which were more important in predicting ST sexual behavior and desire, overall.

Multi-Group Analysis

A multi-group analysis was used to determine if the two models grouped by biological sex (i.e., men and women) differed in significant and meaningful ways, using a minimum of .01 in the difference in CFI value. Overall, the model was an acceptable fit to the data, $\chi^2(334) = 429.524$ $p < .001$, CFI = .987, RMSEA [90% CI] = .04 (.028, .051), SRMR = .088.

Importantly, a chi-square difference test between the models indicated model invariance, $\Delta\chi^2(18) = 12.076$, $p = .84$, signifying no significant difference between men and women. This indicates that the strength of the paths between each predictor and outcome did not differ enough between men and women to be statistically significant, a finding that fails to support SST and Hypothesis 3, that the models for men and women would differ. Furthermore, hypotheses embedded under Hypothesis 3, such as concern for safety (Hypothesis 3a) or social acceptance of women to engage in ST sex (Hypothesis 3b) being a stronger predictor for women than men in ST sexual was not supported. Likewise, the prediction that age (Hypothesis 3c) would be a stronger variable for men than women in determining ST sexual behavior was not supported. Instead, these findings suggest that men and women are influenced equally by their concerns for

safety and the social acceptance of women to engage in ST sex in predicting their ST sexual behavior, beyond biological sex alone.

Exploratory Analyses

Religion

For men, religion and social acceptance of women were negatively related, r = -.17, p = .03, meaning the more religious, the less acceptable they found it for women to engage in ST sexual behavior, but this was not the case for women (p = .69).

Higher religiosity related to fewer desired ST partners for women, r = -.16, p = .047, but not for men (p = .58). Interestingly, religiosity did not relate to desired number of LT partners for men (p = .05) or women (p = .39). Finally, higher religiosity related negatively to SOI scores for women, r = -.17, p = .03, meaning the more religious, the less permissive, but not for men (p = .94).

Politics

Religion and politics were closely related for both men, r = -35 p < .001, and women, r = -.27, p <.001, meaning more conservative scores (lower scores on the political scale) related to higher religiosity (higher religiosity scores). For men, the more politically liberal, the higher the SOI total score, r = .22, p = .004, but not for women (p = .51). Politics did not relate to any other key outcome variable for men nor women.

Sexual Trauma

Overall, more women (n = 15, 8.7%) than men (n = 6, 3.3%) experienced sexual trauma in the last 12 months, and likewise, more women (n = 70, 40.2%) than men (n = 28, 15.3%)

experienced sexual trauma since age 14. Although the statistic that 40% of women in this sample have experienced sexual trauma since the age of 14 may seem high, consider that 1 in 5 women will experience completed or attempted rape during their lifetime and that 8 in 10 women will experience some form of sexual harassment or assault in their lifetime (Kearl, 2018; Smith et al., 2018). For reference, sexual trauma in the current study was defined as an unwanted sexual encounter (Koss et al., 2007).

Women and Trauma. Women who experienced sexual trauma in the last 12 months reported higher sexual risk (M = 1.47, SD = .50) than women who did not (M = 1.18, SD = .38), $t(15.53) = -2.17$, $p = .02$. Preference for both ST and LT mating was higher in women who experienced trauma since the age of 14 compared to women who did not (see Table 14).

Table 14. Mean differences in mating preference for women who have and have not experienced trauma since the age of 14.

Mating Preference	Trauma		No Trauma		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Preference for ST Partners	1.80	0.83	1.47	0.80	0.33**
Preference for LT Partners	3.46	1.21	2.99	1.41	0.47*

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Men and Trauma. For men, experiencing trauma since the age of 14 related to higher preference for ST (but not LT) sex and higher SOI scores (see Table 15).

Table 15. Mean differences in mating preference for men who have and have not experienced trauma since the age of 14.

Variable	Trauma		No Trauma		
	M	*SD*	*M*	*SD*	*Mean Dif.*
Preference for ST Partners	1.35	0.85	1.19	1.29	0.16***
SOI Scores	3.14	0.62	2.66	0.88	0.48*

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

No variables related to trauma that occurred in the last 12 months for men, but only six men out of 181 (3.3%) reported experiencing trauma in the last 12 months. It is likely that this subsample size is too small to detect significant differences between such imbalanced groups. Like the results related to biological children, these findings come from data that are significantly skewed and should be interpreted cautiously.

Abortion Access

Access to an abortion related to no variables for men, but related positively to SOI total, or sexual permissiveness, in women, $r = .15$, $p = .04$, such that the more accessible access to abortions were for women, the more sexually permissive they reported to be in this study.

Subjective Social Status (SSS)

SSS related to one's own society (denoted as SSSUSA as the sample was restricted to US participants) related positively to LT preference, $r = .17$, $p = .02$ for men but no other key outcome variable. However, for women, SSSUSA related positively to ST preference, $r = .24$, $p = .001$. In fact, ST preference was related to all forms of SSS for women, including social status related to one's community (SSSCom), $r = .16$, p = .03, and social status of one's family during childhood (SSSChild), $r = .22$, $p = .004$. Perhaps, women with resources behave as men typically

do, since men are usually the sex with greater resources (e.g., SSS). This variable would be of great interest to include in future studies.

Having Children

Men who had biological children were sexually riskier than men who did not have biological children, $t(181) = 2.21$, $p = .028$, but differed on nothing else. Similarly, women who had biological children were sexually riskier than women who did not, $t(13.83) = 2.27$, $p = .04$. Additionally, women who had biological children had higher sociosexual orientation scores than women who did not have biological children, $t(171) = 5.25$, $p < .001$. However, these findings should be interpreted with caution as most participants did not have biological children. More specifically, only 2.7% ($n = 5$ out of 183) of men and 8% of women ($n = 14$ out of 173) had children.

COVID

Overall, participants reported that COVID had a slight negative impact on their overall sex lives, both for men ($M = -.45$, $SD = .73$) and women ($M = -.34$, $SD = .65$).

Study 2 Discussion

The purpose of Study 2 was to identify possible explanations for why men and women report differences in ST mating preferences and sexual behavior. More specifically, Study 2 examined whether the perceived social acceptability of women to engage in ST sexual behavior, concern for safety, and/or neurodevelopment captured through age, explains some of the differences in men and women's ST mating preferences, desired number of ST partners, sexual

risk-taking, and sociosexual orientation (SOI) compared to Sexual Strategies Theory (SST), which considers only biological sex.

In Study 2, men preferred ST mating more than did women (consistent with Buss, 1989). However, both men and women preferred LT mating more than ST mating, a finding inconsistent with previous work and theorizing (e.g., Buss, 1989; Buss & Schmidt, 1993), but that replicates the findings from Study 1. Similarly, men desired a higher number of ST partners than women, but there was no significant difference in the desired number of LT partners, in that both men and women desired similar quantities for LT partners. Although Buss (1989) did not differentiate between the desired number of ST versus LT partners, men overwhelmingly desired higher numbers of ST partners compared to women in previous research.

However, biological sex did not matter in predicting ST mating preference, desired number of ST partners, sexual risk, or sociosexual orientation, when combined with social acceptance of women and concern for safety. In more detail, Study 2 revealed that concern for safety predicted every outcome variable for both men and women. That is, the more participants were concerned for their safety with regards to ST mating, the less they preferred ST mating, the fewer ST partners they desired, and the lower their scores were for sex risk and each SOI subscale of behavior, attitude, and desire. Additionally, the more socially acceptable participants believed it was for women to engage in ST sexual behavior, the more they preferred ST mating, ST partners, and SOI desire (but no connection with sexual risk taking).

Contrary to predictions, age did not predict ST mating preference, desired number of ST partners, or sexual risk, rather, age only positively related to each SOI subscale. The inability of age to predict sexual risk or other risky behavior (e.g., higher desired partners, ST mating

preference) fails to support the hypothesis that premature neurodevelopment relates to sexual risk in this sample. Perhaps, the differences in neurodevelopment are not apparent enough to predict risky behavior differences, or that the areas in the brain related to impulsivity and ST reward do not specifically relate to sexual risk.

To sum, differences between men and women replicated some of the findings of SST, but these differences were removed once alternative factors were included in a statistical model. These alternative factors of social acceptance of women to engage in ST and concern for safety to engage in ST sex, emerged as more promising explanations for sexual behavior in this sample. Overall, these findings suggest that SST is limited in its ability to explain why men and women report differences (if any) in their sexual behavior and preferences and that social factors need to be considered for a more complete picture of human mating.

Limitations of Study 2

One limitation for Study 2 was the use of the variable of social acceptance of women, specifically, to engage in ST sex. Would it be more appropriate to use the social acceptance of one's own gender (instead of women) to predict whether someone will prefer ST sex or more partners? Along this logic, I reexamined the model using the social acceptance of one's own gender to see if there was a difference in how this new variable predicted the outcome variables for men compared to women. I found no difference (p = .86) when completing a multi-group analysis of the models between men and women (to be refreshed of the model, visit Figure 4 on page 58).

Other explanations for why biological sex failed to predict any of the outcome variables once alternative factors were included could be due to the similarity of these predictor variables.

For example, some of the items used in the SOI subscales overlapped conceptually with some items used in the sex risk scale. In the future, more precise or diverse measures should be used, or the study could also be completed as a series of smaller studies with just one or two key variables to reduce this overlap.

Similar to Study 1, Study 2 had missing data due to the option not to respond and the nature of the questions being asked. However, missing data due to this particular problem was not as significant for Study 2 as it was for Study 1 due to a change in the way response options were designed. More specifically, the option to not respond was included as a response item for every question in Study 1, whereas in Study 2, the option was not included. Instead, participants could progress to the next question without responding by simply clicking the arrow. By not including the option to not respond as one of the response items, missing data decreased while still allowing participants to continue without answering a question, but in a less conspicuous way.

To conclude, Study 2 identified alternative factors to help explain both men and women's sexual behavior and preferences, with concern for safety as the strongest factor, followed by social acceptance of women. As a result, differences due to biological sex, the view held by SST, were washed out when included with other more potent predictors, such as women being more concerned for their safety and social acceptance. The sex differences in the other predictors are likely responsible for the seeming difference in ST preferences between men and women and not necessarily that men and women evolved to have these differences.

GENERAL DISCUSSION

The purpose of the current studies was to explore alternative explanations to SST that might account for the differences reported in men and women's short-term (ST) and long-term (LT) mating preferences and behavior. According to SST, men prefer ST mating and more ST partners compared to women, a difference believed to have evolved to solve sex-specific reproductive problems (Buss, 1989). However, I suggested other possibilities, such as the social acceptance of women to engage in ST sexual behavior (Studies 1 & 2), neurodevelopmental differences related to general risk taking and age (Studies 1 & 2, respectively), and concern for safety during ST sexual encounters (Study 2), to explain the differences in men and women's sexual behavior and preferences. In addition, Study 2 expanded the breadth of participant ages and further isolated only single adults whose reports of ST sexual behavior and desire would not be complicated by involvement in a committed relationship.

In both studies, I found evidence consistent with SST for differences in ST sexual behavior based on biological sex, such as men preferring ST mating more than did women (Studies 1 & 2) and men desiring a higher number of ST partners than did women (Study 2). However, and more importantly, the analyses from both studies suggest that other psychological factors, such as social acceptance of women to engage in ST sexual behavior (Studies 1 & 2) and concern for one's safety when engaging with a ST partner (Study 2) were likely more important than biological sex in predicting ST sexual behavior and preferences. Specifically, in Study 1, a regression analysis found that biological sex did not predict ST mating preference, desire for ST partners, or sexual risk when social acceptance and risk were included as additional predictors.

That is, any differences due to biological sex were washed out with the inclusion of these other factors.

Additionally, Study 2 found that social acceptance to engage in ST sex was significantly higher for men than women, and that women were significantly more concerned for their safety when engaging with ST partners compared to men. Consistent with Study 1, Study 2 demonstrated that biological sex did not predict ST sexual behavior, and desired number of ST partners, or sexual risk, and sociosexual orientation (Study 2 only) when social acceptance of women and concern for safety were included in the analyses (i.e., SEM in this case).

Reliable findings across these two studies, each with a different type of sample, suggest that social and personal factors were more important than biological sex in predicting ST sexual behavior and preference. In other words, the elimination of biological sex differences casts considerable doubt about whether these differences were evolved. Had SST been true, sex differences in ST preferences should still be evident (even minimally) regardless of the other predictors included in the model; the differences should be inherent. Ultimately, it seems women do not want to be shamed through a societal double-standard or assaulted while engaging in ST sexual behavior, which might be enough to explain the original sex differences found by Buss (1989).

LIMITATIONS & FUTURE RESEARCH

One of the primary limitations of this research was the failure to support most hypotheses related to interactions of predictor variables with biological sex. However, upon closer examination, these failures highlighted a different phenomenon that was equally significant. That is, failing to find interactions between biological sex and the predictor variables in both Study 1 and Study 2 narrates a story indicative of a more sex-equivalent landscape in human mating. For instance, concern for safety and the social acceptance of women were more powerful predictors of ST mating preference and behavior, beyond biological sex alone. Additionally, the evidence supporting more social features of human-mating behavior challenges the assumptions made by SST, in that these behaviors may not have evolved, but rather, were learned. This opens the doorway to a host of other factors that not only change over time, but are highly sensitive to the current cultural landscape.

Another limitation would be the highly skewed nature of the data that plagues this type of research. For instance, in both studies, most participants have not had vaginal or anal sex without a condom in the last 3 months, and therefore responded with "never" for the number of occurrences on that portion of the sexual risk scale. This type of responding leads to zero-inflated distributions, which is challenging to analyze, even with SEM's more robust analytic approach. In attempting to capture highly sensitive data, such as asking about participants' sexual lives and desires, the issue of missing data is considerable, and many cases were missing item-level responses. However, I do not believe this type of research can be conducted without providing this option, as forced responding would likely lead to increased attrition rates or dishonest responding. Researchers should continue to be mindful of this limitation when creating studies

regarding sexual behavior and interpreting their findings with caution considering missing data and responding biases. Additionally, larger sample sizes could potentially outweigh some of the issues of missing data, and the current research had larger sample sizes than needed.

Finally, several of the variables were too similar in nature, which may have contributed to multicollinearity among variables that drowned out possible effects, particularly for Study 2. For example, sexual risk and the SOI covered some of the same behaviors, such as sex without protection and one-night stands. In other words, the overlap in these constructs could be make it difficult to identify which relationships between the predictor variables and these two scales were the most meaningful or impactful. In the future, it would be helpful to conduct preliminary pilot data to determine which variables are too highly correlated and should be eliminated or merged, or alternately, eliminate the sex risk scale given the SOI scale is more comprehensive. To a degree, removing variables that were too similar was done in Study 2 by deciding to eliminate general risk as a proxy to neurodevelopment, as it closely mimics sexual risk but did not provide additional, meaningful information. However, the similarity between the variables of sex risk and SOI was greater than anticipated and may have influenced the outcomes of Study 2.

CONCLUSION

Despite these limitations, Study 1 and Study 2 were important in identifying possible alternatives to SST and the theory's reliance on biological sex alone to predict mating behavior and preferences. More specifically, these two studies offered support for social factors, such as the social acceptance of women to engage in ST sexual behavior, and personal factors, such as concern for one's safety when engaging with ST partners, to predict sexual behavior and preferences above biological sex alone. Indeed, the fact that biological sex did not interact with these predictors suggest that social and personal factors may play a more significant role in predicting both men and women's sexual behavior and preferences, and calls into question whether these differences evolved as suggested by SST.

The results of these studies further highlight the importance of researching current sociocultural influences on sexual behavior given the social climate surrounding ST and LT sexual behavior and how that can impact the behavior of sexually active adults. This is particularly true given Study 1 and Study 2 demonstrated that sexual desire and preferences have shifted since the late 1980's, when researchers first started collecting data specific to men and women's ST mating preferences (see: Buss, 1989 and Buss & Schmitt, 1993). At the very least, we understand that a behavior as complex as human mating is likely driven by the relation between both evolved and social features, the latter of which can be explored in even greater depth. As such, future research should continue to examine and fine tune these social and personal factors, especially as they tend to change over time, in order to understand the forces that shape human mating.

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