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DIMENSIONS OF INDIVIDUALS' JUDGEMENTS ABOUT SEXUAL
ATTRACTION, ROMANTIC ATTACHMENT, AND SEXUAL ORIENTATION

by

Luis F. Morales Knight

A DISSERTATION

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Under the Supervision of Professor Debra A. Hope

Lincoln, Nebraska

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DIMENSIONS OF INDIVIDUALS' JUDGEMENTS ABOUT SEXUAL
ATTRACTION, ROMANTIC ATTACHMENT, AND SEXUAL ORIENTATION

Luis F. Morales Knight, Ph.D.

University of Nebraska, 2012

Advisor: Debra A. Hope

Despite 150 years of scientific interest in sexual orientation, contemporary investigators grapple with a number of serious difficulties. A precise, unified definition of sexual orientation appropriate for scientific use continues to elude researchers, most likely because there is still no single coherent theory of sexual orientation. This lack impedes research into the measurement of sexual orientation. Existing measurements of sexual orientation rely on partial or incompletely empirical research. The present study identified promising avenues for development of credible definitions, theories, and measurements of sexual orientation: (a) mate-selection tasks; (b) the idea that bisexually-identified individuals place a lower priority on partner gender in mate-selection decisions; (c) using “gender diagnosticity”—i.e., measures that differentiate between men and women, using an empirical criterion—to investigate the connections between gender-role orientation, sexual orientation, and mate selection; (d) distinguishing between sexual desire and pair bonding; (e) a cross-category theory of sexual orientation identity.

The present study was conducted via an Internet survey. Participants were 726 participants with varying gender and sexual orientation identities. A large number of participants espoused nontraditional gender and sexual orientation identities. Results indicated strong support for distinguishing between sexual desire and pair bonding, in that different decision rules for mate selection obtained in each, and for understanding

bisexuality as involving lower prioritization of partner gender. The utility of mate-selection tasks was also supported. The use of gender diagnosticity was partly supported, in that a relationship between adult gender typicality and sexual orientation was found, but further investigation is needed to determine appropriate measures as vehicles for this approach. Conceptualizations of sexual orientation were observed to vary with gender and sexual orientation identity categories, though there was also substantial agreement across categories. The cross-category theory of sexual orientation was partially supported in that heterosexually-identified participants who endorsed some same-sex sexuality appeared to be actively exploring their sexual orientation identity. The results highlighted the fractal and dynamic complexity and interrelationship of gender and sexual orientation, and the need to understand nontraditional gender and sexual orientation identities.

DEDICATION

To Margaret Naomi, Victoria Sophia, Hazel Naomi, Janet Diane, and Margaret Alice:

sine quibus, non.

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I have been extraordinarily privileged to have the care, support, and mentorship of Debra Hope over the past six years, from that first telephone conversation in January 2006, through a surprising number of twists and turns, heartbreaks and joys, to the present moment. She answered a thousand emails; read a hundred drafts; taught me what is, and what is not, CBT; rocked my babies to sleep in her arms during lab meetings; and, more than anyone else, made me a psychologist.

Nor would my success have been possible without David Hansen, department chair, teacher, and human being extraordinaire; David DiLillo, tireless DCT and kind soul; Dan Ullman, fellow dad and constant champion; Calvin Garbin, world's greatest statistics professor and source of much of my current teaching style; Will Spaulding, great mind and dear sarcasm; and all the fine people and generous, supportive culture of the UNL Psychology Department.

This dissertation caps off an instance of that very odd phenomenon: the training of a clinical psychologist. We serve many masters, aiming to become researchers, teachers, and clinicians—among other things—in just a few short years (however long they may have seemed at the time!). I owe an unrepayable debt to my mentors not already mentioned: Keith Allen, Lorena Bradley, Myla Browne, Mark DeKraai, Joe Evans, Mary Fran Flood, Tom Guck, Mark Lukin, Jim Madison, Dennis McChargue, Jennifer Perry, Jocelyn Ritchie, Mario Scalora, Bill Shuart, and Bill Warzak.

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Dimensions of Individuals' Judgements about Sexual Attraction, Romantic Attachment, and Sexual Orientation

The field of sexual orientation research is currently grappling with a number of difficulties. The primary difficulty is a pervasive lack of clarity with respect to what researchers mean by the term “sexual orientation,” a fact that has been noted time and again (Brogan, Frank, Elon, & O’Hanlon, 2001; Chung & Katayama, 1996; L.M. Diamond, 2005; Donovan, 1992; Gonsiorek, Sell, & Weinrich, 1995; Savin-Williams, 2006; Savin-Williams & Ream, 2007; Sell, 1997, 2007; Sell & Petrulio, 1996; Shively, Jones, & DeCecco, 1985). Is “sexual orientation” a behavior? Is it a mental state? Is it an indelible, perhaps congenital condition? Does it change over time? Does it differ between the sexes? How many sexual orientations are there? Are there two? Are there three? Is it a continuous, rather than a categorical, variable? What and how many are the dimensions of sexual orientation? Is it purely behavioral? What about emotions and cognitions? What, if any, is the role of gender-atypical behaviors? Is sexual orientation understandable as a biologically-based phenomenon, or is it socially constructed?

Neighbors (2000) neatly sums up the difficulties in this area:

- (a) [... T]erms are offered as definitions of sexual orientation while the terms themselves are not defined but rather assumed to be objective realities. Thus, researchers must operationalize the terms for the analysis to be complete;
- (b) [Researchers] fail to define the quantitative values that are to be applied to homosexual versus heterosexual behavior to make a judgement as to how one [person] fits into one category or the other; (c) [Researchers] fail to provide

information on how these separate dimensions are synthesized into an orientation statement." (Neighbors, 2000, p. 8)

The likeliest overarching reason for this state of affairs is that there is, to date, no single coherent theory of sexual orientation that adequately explains observed variations in human sexual attractions, sexual behaviors, and romantic pair bonding. Evolutionary theories (e.g., Hutchinson, 1959; Weinrich, 1987; Wilson, 1980) are necessarily speculative (e.g., Buller, 2005; Gould & Lewontin, 1979; Panksepp & Panksepp, 2000). Biological theories (e.g., LeVay, 1993; Money, 1988) must be cobbled together out of fragmentary and contradictory evidence (e.g., Bailey, 2009; Bailey, Dunne, & Martin, 2000; Bogaert, 2003; LeVay, 1991; McCormick & Witelson, 1994). Learning and environmental theories (e.g., Bieber et al., 1962/1988; Gagnon & Simon, 1973; Gallup & Suarez, 1983) falter in the face of same-sex sexuality's apparent universality across cultures (Murray, 2000) and persistence in the face of harsh punishments (M. Diamond, 1993), or a relative lack of models (Patterson, 2003; Stacey & Biblarz, 2001). Social-constructionist theories (e.g., Plummer, 1984; Weeks, 1996) can describe the emergence of culturally-defined taxonomies of sexual phenomena, but cannot account for the reason an individual experiences same-sex attraction in the first place.

Without a coherent theory or definition of the phenomenon under study, the second major difficulty in the field naturally arises: There is no really plausible, theory-based, empirically-supported tool or system for measuring sexual orientation. Direct measurement of genital response (e.g., Chivers, Rieger, Latty, & Bailey, 2004; Chivers, Seto, & Blanchard, 2007; Lawrence, Latty, Chivers, & Bailey, 2005; Rieger, Chivers, & Bailey, 2005) provides promising data but is reductionistic, uses non-representative

samples, and does not scale to large studies. Masculinity–femininity (M–F) scales (e.g., Aaronson, 1959; Hathaway & McKinley, 1943; Panton, 1960; Terman & Miles, 1936) have historically failed to measure sexual orientation, typically measuring gender-role adherence instead (Lewin 1984a, 1984b). Scales of “heterosexuality–homosexuality¹” that use bipolar scales (e.g., Kinsey, Pomeroy, & Martin, 1948; Kinsey, Pomeroy, Martin, & Gebhard, 1953; Klein, Sepekoff, & Wolf, 1985) incorrectly treat the two endpoints as zero-sum tradeoffs, resulting in an inability to account for the absolute magnitudes of either same- or opposite-sex sexual attraction (Sell, 2007; Shively & DeCecco, 1977). Unipolar scales (e.g., Bickford, 2003; Shively & DeCecco, 1977) avoid this problem, but neither bipolar nor unipolar scales can adequately account for equifinality or changes over time (Sell, 2007). Those scales that attempt to include a time dimension (Berkey, Perelman-Hall, & Kurdek, 1990; Coleman, 1987; Klein et al., 1985) actually use vague quantifiers such as “past,” “present,” and “ideal,” rather than truly assessing change over meaningful increments of time. Those measurement instruments that depart from a single dimension of “heterosexuality–homosexuality” (or separate, general “homosexuality” and “heterosexuality” dimensions) in favor of a multidimensional model (e.g., Coleman, 1987; Klein et al., 1985; Sell, 1996) do not base their selection of dimensions on overarching theory or empirical evidence, do not agree on which dimensions to include, and do not know the relative importance of the various dimensions (Neighbors, 2000;

¹ The term “homosexuality” originated as a technical term in 1868 (Sell, 1997), and has since accumulated enough negative connotations to be considered a term of opprobrium. It will be used in this work when in quotes from, and in discussions about, primary sources that use the term, but not otherwise.

Sell, 1996; Tannenbaum, 2006). Neighbors (2000) offers an excellent, concise critique of components models, which is taken as a touchstone for the proposed work:

[R]esearchers who have sought to develop self-report assessment instruments offer definitions that involve a variety of components such as sexual behavior or sexual fantasy, but they seem to have naïve views of definitions of sexual orientation. They fail to define the proposed components and fail to specify how these components are synthesized into a sexual orientation statement. They also fail to systematically test their hypothesized components within a theoretical framework except to measure the congruence between their definition and subjects' self-identified sexual orientation as if self-identification were an accurate criterion. (Neighbors, 2000, pp. 38–39)

This criticism can be more generally applied to published measures of sexual orientation, none of which have been the subject of replication by independent researchers or psychometric research across populations (Morales Knight & Hope, 2010).

Definitions of Sexual Orientation are Inconsistent

Problems in the definition of sexual assessment have plagued sexual orientation research practically since its beginning. Ulrichs (1994), an early advocate for the scientific study of same-sex sexuality, writing in the late 1800s, famously defined an *Urning* (approximately “gay man”) as *anima muliebris virili corpora inclusa* “[a] woman’s soul in [a] man’s body.” Although many of Ulrichs’ proposed questions for the assessment of *Urningism* (see Sell, 1997, 2007) primarily tapped desire, attraction, and fantasy—implicating an internal urge, rather than explicit behavior, as defining the

phenomenon—to a large degree Ulrichs’ definition, as illustrated by his taxonomy of such subtypes of *Urning* as *Mannling* (a masculine-acting *Urning*) and *Weibling* (a feminine-acting *Urning*) entailed gender-role orientation as well.

The definition of “homosexuality” (or, more tellingly, “sexual inversion”; H. Ellis & Symonds, 1897/1975) as involving same-sex sexual desire plus a disorder of gender was further popularized by medical writers such as Krafft-Ebing (1886/1965) and by Anglophone writers such as Mayne (1908; cited in Sell, 1997, 2007) and H. Ellis and Symonds (1897/1975). The gender-inversion concept found a methodological cul-de-sac in efforts to diagnose homosexuality by assessing gender deviance (e.g., Terman & Miles, 1936) and was eventually dropped altogether by most researchers (Lewin, 1984a, 1984b), but its influence continued to be felt. Later researchers such as Kinsey and colleagues (Kinsey et al., 1948; Kinsey et al., 1953) added more emphasis on overt sexual behavior in defining homosexuality, arguably privileging “sexual experience” over “psychic reaction”.

Researchers since Kinsey’s time have used various combinations of psychological (e.g., attraction and/or fantasy) and behavioral variables (e.g., history of sexual contact, variously defined) to conceptually define sexual orientation. Shively and colleagues (1985) analyzed 228 articles across 47 journals and found a total of ten different concepts used in various combinations, ranging from “physical sexual activity” (used in 50% of studies that conceptually defined sexual orientation) through “affectional attachment” (28%) to “arousal” (21%) and “erotic fantasies” (21%; p. 132). Sell (1997, 2007) noted that even slight variations among related terms (e.g., “sexual passion,” “sexual urge,” “sexual feelings,” and “sexual attraction”) entailed “describing slightly different

phenomena despite the similar label[s]” (Sell, 1997, pp. 640–641). (It should be noted that the date range covered in Shively et al.’s analysis is not clear. See note² for a brief discussion of this problem.)

More concretely, Gonsiorek and colleagues (1995) were among the first to note that variations in conceptualizing sexual orientation strongly influenced obtained prevalence rates. Sell, Wells, and Wypij (1995), using national samples in France, the United Kingdom, and the United States, found that prevalence rates varied from 3% to 12% depending partially on whether “attraction” or “behavior” was used to define sexual orientation. (Sell et al.’s results also depended on whether participants were men or women, and on whether they were from France, the U.K., or the U.S.) Similarly, Savin-Williams (2006) reviewed several large studies across several countries and found that prevalence rates varied from 1% to 21% depending partially on whether “attraction,” “fantasy,” or “behavior” was the definition. (Savin-Williams’ results also depended on whether participants were men or women; on whether they were adults or adolescents; and on whether they were from the U.S., Australia, Turkey, or Norway). Savin-Williams and Ream (2007) reanalyzed the National Longitudinal Survey of Adolescent Health (Add Health) dataset (Udry & Bearman, 1998) and found similar variations from 1% to 15% depending on whether “attraction” or “behavior” was the criterion. (Savin-Williams and Ream’s results also depended on whether the participants were boys or girls.)

² Shively et al. state that they excluded articles prior to 1969 “since that year historically marked the beginning of the Gay Liberation Movement and the proliferation of published research on sexual orientation” (p. 128), but also state that they included “major exceptions” (p. 128). However, the bulk of the articles probably were published after 1974: “Since the *Journal of Homosexuality* was first published in 1974, the search for articles in [*Archives of Sexual Behavior*, *Journal of Homosexuality*, and *Journal of Sex Research*] commenced with that year” (p. 128), despite the fact that both of the other journals had been in publication for several years by 1974. No end date is given for the analysis.

More worrisome than the proliferation of conflicting definitions is the tendency not to conceptually define the population under study at all. Brogan et al. (2001), discussing research on the health of lesbians, noted that early studies in the field had defined “lesbian” to mean “any subject who participated in a study about lesbians” (p. 109). Indeed, Shively et al. (1985) found that only 12.3% of their studies conceptually defined sexual orientation. Sell and Petruccio (1996), assessing a total of 152 public health articles published between 1990 and 1992, found that only four articles (2.6%) conceptually defined sexual orientation. There is no reason to believe the situation has improved: L. M. Diamond (2003a), Savin-Williams (2008), and Sell (1997, as well as in his 2007 update of the same paper) all decry the problem, presumably out of their own experiences as researchers in the field; they do not offer, or refer to, any newer hard data.

Theories of Sexual Orientation are Flawed

Theories of sexual orientation may be roughly classified as appealing to evolutionary, biological, learning/environmental, and socially constructed factors in understanding the origin, topology, and function of the phenomenon. They are briefly reviewed here, primarily in order to make the point that they are all incomplete. Each class of theory fails to account for one or more known facts about sexual orientation.

Evolutionary theories. Several attempts have been made to understand the role of same-sex sexual orientation as an evolutionary adaptation. Hutchinson (1959) and Ruse (1981) both advanced a “balanced polymorphism” theory, to the effect that same-sex sexual orientation may be a phenotype corresponding to an individual’s bearing two copies of an autosomal recessive gene, which has the maladaptive effect of causing the individual’s chance of reproduction to lessen. However, individuals bearing only one

copy of the gene might benefit from some as-yet-unknown adaptive fitness. This idea is analogous to what is known about the gene for sickle-cell anemia: individuals with only one copy of the gene have increased resistance to malaria. Along these lines, E. M. Miller (2000) has suggested that “feminizing” genes might help some men attain reproductive success, but the presence of more than some low number of these genes might result in same-sex sexual orientation. Alternately, Camperio Ciani, Corna, and Capiluppi (2004) found increased fecundity in maternal-line women related to gay men, and Iemmola and Camperio Ciani (2009) replicated the finding. Camperio Ciani, Cermelli, and Zanzotto (2008) advanced the explanation that “sexually antagonistic selection,” i.e., a trait that increases fecundity in women but decreases it in men, may be responsible for at least some incidence of men’s same-sex sexuality.

Wilson (1980) advanced a separate “kin selection” theory, in which the benefits of same-sex sexuality might not redound to the individual, but to the individual’s kin group, as a non-reproducing individual might be freed to help care for his or her kin. Weinrich (1987) extended this idea somewhat, suggesting that even in societies with universal marriage, same-sex orientation would lead to extramarital sex that could not produce illegitimate children.

More recent writers have suggested “interactionist” theories. Money (1988) suggests that some biological predisposition toward same-sex sexuality exists from birth, which is then activated (or deactivated) by environmental stimuli occurring during a critical period of early development. Byne and Parsons (1993) suggest that the underlying predisposition is not to sexuality *per se*, but to particular traits of personality that influence the experiences that shape sexual orientation. Similarly, D. Bem (1996)

suggests that temperaments or predispositions lead to the individual's identification or disidentification with his or her own gender, in the latter case leading to the development of a same-sex sexual orientation. Most promising in this area is L. M. Diamond's (2003b) "biobehavioral" model, which roots itself in evolutionary theory (as well as in endocrinological and behavioral data), and which will be discussed at length further below.

Flaws in evolutionary theories. Evolutionary theories bring together a wide range of often conflicting research and attempt to synthesize them, but all of the theories mentioned here have a somewhat speculative character, because their hypotheses (i.e., that specific behaviors originally arose as evolutionary adaptations in the Pleistocene Era; Cosmides, Tooby, & Barkow, 1992; Cosmides & Tooby, 1997) are difficult to falsify (Gould & Lewontin, 1979; Panksepp & Panksepp, 2000; see Buller, 2005, esp. pp. 93ff., for a more nuanced critique). The most central flaw is that any evolutionary explanation rests on two pillars: (1) the heritability of the trait in question (which has been adequately shown; see below) and (2) that the trait somehow increases reproductive fitness. As discussed above, this has been shown for men, but has not been shown for women. Finally, given that evolutionary theories address phenomena at the population level, evolutionary theories do not attempt to explain how individuals come to an awareness of their sexual identities.

Biological theories. The literature on the biology of sexual orientation is vast and has a long history. In their broadest terms, biological theories posit that sexual orientation is partially or wholly determined by biological factors. The evidence for biological theories rests on the discovery of biological markers associated with adult gay, lesbian, or

bisexual identity, or same-sex sexual behavior (depending on the specific study). A selected number of representative findings are reviewed in this section, which owes a significant debt to the webpage maintained by Simon LeVay that aggregates research in this area, (LeVay, 2009), as well as to Balthazart (2011).

Genetic findings. The earliest genetic theories of sexual orientation focused on the assumption that same-sex sexual orientation involved a sort of genetic chimerism, i.e., having chromosomal or genetic structures of both sexes (or of the opposite sex) (Bohan, 1996). Once it became possible to test these theories through chromosomal analysis, it became apparent that gay men and lesbians did not differ genetically from their heterosexual counterparts in the proposed manner (Meyer-Bahlburg, 1984). Genetic research into same-sex sexual orientation then focused on its heritability. Pillard and Weinrich (1986) found an elevated incidence of same-sex sexual orientation (22%) among siblings of homosexual probands, versus 4% among siblings of heterosexual probands; Bailey and Benishay (1993) found similar effects for sisters of lesbian women. Bailey and Pillard (1991) found concordance rates of same-sex sexuality to be 52% among monozygotic (MZ) twins, 22% among dizygotic (DZ) twins, and 11% among adoptive siblings of homosexual male probands. Bailey, Pillard, Neale, and Agyei (1993) found similar concordance rates among female twins of both types. Famously, Hamer, Hu, Magnuson, Hu, and Pattatuci (1993) and Hu et al. (1995) discovered a link between the presence of several markers on the Xq28 section of the X chromosome and male homosexuality, suggesting that for at least some men, there is a sex-linked genetic contribution to the same-sex sexual orientation, inherited through the female line. However, when McGuire (1995) re-analyzed their data, he found “no evidence for a

maternal effect” (p. 133). A later meta-analysis (Bocklandt & Vilain, 2007) suggested that this linkage does exist, but also advanced an epigenetic theory, in which gene expression is modified by environmental factors (see also Ngun, Ghahramani, Sanchez, Bocklandt, & Vilain, 2011).

Neuroendocrine findings. With the discovery of sex hormones in the mid-twentieth century, scientific attention turned to the idea that homosexual men were hormonally “feminized” and that homosexual women were hormonally “masculinized” (Gooren, 1990). Some credence was given that children who exhibit behaviors typical of the opposite gender (more recently called “childhood gender nonconformity” or CGN) have a much stronger than average tendency to identify as gay or lesbian at maturity (e.g., Green, 1987). However, comprehensive reviews (Meyer-Bahlburg, 1984; Meyer-Bahlburg et al., 1995) found no connection between adult hormone levels and sexual orientation.

Attention then turned to the prenatal environment, with somewhat better results. One early theory along these lines suggested that “prenatal stress” in expectant mothers led to the insufficient androgenization of male fetuses and thence to same-sex sexual orientation (Dörner et al., 1980; Dörner, Schenk, Schmiedel, & Ahrens, 1983), but attempts at replicating these findings failed (Bailey, Willerman, & Parks, 1991). However, hormonal treatments in the perinatal period can modify partner preferences in rats (e.g., Bakker, Brand, van Ophemert, & Slob, 1993; Henley, Nunez, & Clemens, 2009). In humans, conditions such as androgen insensitivity syndrome (AIS), congenital adrenal hyperplasia (CAH), and exposure to artificial hormones such as diethylstilbestrol (DES) are known to expose the fetus to sex-atypical hormonal environments. AIS genetic

males are born with female genitalia, overwhelmingly develop a female gender identity, and are sexually oriented toward men (Gooren, 1990). CAH women have a greater than average tendency toward same-sex fantasy and behavior (Gooren, 1990), increased preference for “boys’ toys” over “girls’ toys” (Berenbaum & Hines, 1992) and, less strongly, male over female playmates (Berenbaum & Snyder, 1995). CAH men show a lower-than-average incidence of same-sex sexual orientation (Gooren, 1990). Research has shown elevated incidence of same-sex fantasy and behavior in DES-exposed women (Gooren, 1990). Given these findings, it seems likely that the prenatal hormone environment organizes the development of sexual orientation, at least for some individuals. Balthazart (2011) makes the further point that at least some of the biological markers discussed below (e.g., the D2:D4 ratio, neuroanatomical findings) are likely due to prenatal endocrine effects, and brings up the tantalizing notion that fluctuations in the prenatal endocrine environment during fetal development may account for some of the observed variations.

Fraternal birth order effect. A particularly interesting set of studies (see Blanchard, 2004, and Bogaert & Skorska, 2011, for reviews) suggests that gay men tend to have more older brothers than straight men, drawing the conclusion that over the course of multiple pregnancies with sons, women may develop antibodies to proteins encoded on the Y-chromosome that somehow affect the masculinization of subsequent sons. Bogaert and Skorska (2011) identified several candidate proteins that may affect sex-linked neuroanatomical development (which see below).

Neuroanatomical findings. Swaab and Fliers (1985), following on research in rats, discovered a brain area, located in the preoptic area of the hypothalamus, that is

sexually dimorphic in humans, containing approximately twice as many cells in men as in women. This they named the “sexually dimorphic nucleus” or SDN. Another area, the suprachiasmatic nucleus (SCN), was found to have sexual dimorphism in shape, but not in cell number. This and other research (e.g., Allen & Gorski, 1990) spurred researchers to search for brain areas that were dimorphic between nonheterosexuals and heterosexuals. Swaab and Hofman (1990) subsequently found that the SCN was 1.7 times larger in volume, and had 2.1 times as many cells, in homosexual as in heterosexual men. Further research found dimorphism in a cell group in the interstitial nuclei of the anterior hypothalamus, denominated INAH-3 (LeVay, 1991), and in the anterior commissure (Allen & Gorski, 1992). These results were interpreted as pointing toward a biological origin for same-sex sexual orientation in the prenatal neuroendocrine environment.

More recently, Savic and Lindstrom (2008) have found some interesting dimorphisms in MRI and PET studies. In an MRI study, heterosexual men had right hemispheres that were 2% larger, on average, than the left hemisphere; this difference was absent in heterosexual women. Lesbian women, in contrast, showed the same size difference between hemispheres as did heterosexual men, and gay men showed no difference. In a PET study reported in the same paper, straight men and lesbian women had more neuronal connections in the right amygdala than in the left amygdala, whereas gay men and straight women had more connections in the left amygdala than in the right.

Functional findings. Lindesay (1987) found lower incidence of right-handedness in gay men than in nongay men, as well as greater incidences of ambidexterity and left-handedness. These results were interpreted as pointing to a lower incidence of strong left-hemispheric laterality in gay men, at least for motor functions. A later meta-analysis

(Lalumière, Blanchard, & Zucker, 2000) confirmed these results and extended them to women, finding that gay men had a 39% greater chance than heterosexual men of being non-right handed, and that lesbian women had a 91% greater chance of being non-right-handed than did heterosexual women.

McFadden (2002) found that nonheterosexual women have auditory system functioning that appears to be somewhat masculinized, although no feminization effect was found in nonheterosexual men, and McCormick and Witelson (1994), in a dichotic listening test, found that heterosexual men and women who were strongly right-handed showed significantly greater listening accuracy in the right ear. In gay men and lesbian women, however, there was no relationship between handedness and asymmetry of listening accuracy. Similarly, Rahman, Kumari, and Wilson (2003) studied prepulse inhibition (PPI)—the phenomenon in which the normal neurological reaction to a stimulus can be weakened (inhibited) by applying a weak stimulus (a prepulse) immediately prior—and found that lesbian women had greater PPI than heterosexual women, though did not find any difference in PPI between gay and heterosexual men.

Several studies (Martins et al., 2005; Savic, Berglund, Gulyas, & Roland, 2001; Savic, Berglund, & Lindstrom, 2005) have found that exposure to candidate human sex pheromones at high concentrations elicits differential activity in the anterior hypothalamus, in which gay men and heterosexual women respond to male pheromones and do not respond to female pheromones, but lesbian women and heterosexual men show the opposite pattern of hypothalamic response. In the Martins et al. (2005) study, the results suggested that gay and straight men may produce recognizably different body odors. However, these results have not been replicated.

Another set of studies suggests differential cognitive functioning, at least between gay and heterosexual men. Gay men may not perform as well as straight men on visuospatial tasks (e.g., McCormick & Witelson, 1991; Rahman & Wilson, 2003a). However, they may show superior performance in spatial memory (Hassan & Rahman, 2007; Rahman, Wilson, & Abrahams, 2003) and in verbal fluency (McCormick & Witelson, 1991).

The D2:D4 ratio. Several studies suggest that the so-called “D2:D4 ratio” (the ratio of the length of the index, or second, finger to the length of the ring, or fourth, finger), which is typically lower in men than in women, is lower in lesbian women than in heterosexual women, presumably in response to differential androgenization (see Breedlove, 2010; Grimbos, Dawood, Burriss, Zucker, & Puts, 2010, for reviews; but see Wallen, 2009, for criticism, and Lippa, 2003, for contradictory results). A similar D2:D4 difference has not been found between gay and heterosexual men in general (Balthazart, 2011).

Interaction effects. Some studies have found interaction effects between biological factors. Bogaert, Blanchard, and Crosthwait (2007) re-analyzed the original Kinsey data and found an interaction between handedness and birth order effects, such that right-handed men with larger numbers of older brothers were likelier than average to have “extensive experience” (p. 847) of same-sex sexual behavior, whereas non-right-handed men did not have an increased likelihood of having extensive experience of same-sex sexual behavior. Bogaert (2007) found an elevated rate of extreme right-handedness in gay and bisexual men, compared to heterosexual men, and found that the birth order effect only obtained for non-extremely-right-handed men; for extremely right-handed

men, fraternal birth order did not affect the odds of identifying as gay or bisexual in adulthood. Williams and colleagues (2000) found that men with two or more older brothers had D2:D4 ratios that were more masculinized than did men with one or no older brothers.

Flaws in biological theories. The biological theories offer a wide range of tantalizing, but ultimately fragmentary and contradictory evidence. The major flaw in all biological theories is that they cannot at present determine the cause for the biological markers associated with same-sex sexuality. While genetic or prenatal-environmental factors provide a plausible explanation for many such markers, these factors themselves are not yet known. It is also the case that some markers, such as neuroanatomical organization, brain function, or laterality, may themselves be caused by interactions between culture, behavior, and genetics. Epigenetic theories may have some explanatory promise here, as they most explicitly lay out interactions between genotype, phenotype, and environmental factors.

More specifically, biological theories cannot account for individuals with same-sex attractions and behavior who do not share the biological traits thought to be implicated in same-sex sexuality (i.e., the variance in the samples previously cited), including adults who did not exhibit CGN (Dunne, Bailey, Kirk, & Martin, 2000; Green, 1987); people whose same-sex attractions do not show up early in development (L. M. Diamond, 2003b); or children with CGN who grow up to identify as heterosexual (Dunne et al., 2000; Green, 1987). They cannot account for people whose patterns of same- and opposite-sex attraction/behavior change radically over the lifespan (L. M. Diamond, 2007), including people who engage in same-sex behavior exclusively in specific

situations (prisons, ships at sea, monasteries) or whose same-sex (or other-sex) attractions are person-specific (L. M. Diamond, 2003b). They cannot account for people who claim that a potential partner's sex is not the primary determinant of attraction for them (Kaplan & Rogers, 1984; Ross, 1984; Ross & Paul, 1992/2000). They cannot account for cultures where same-sex behavior is very common (see Murray, 2000, for a broad survey of this area). Finally, they cannot account for why societies have the categories of sexual orientation they have at any given moment; why categories change; and why people choose to assume specific identity categories.

Learning/environmental theories. A wide range of theories linking adult same-sex sexual orientation to aspects of childhood learning or environment have been propounded. As with the biological theories, a selected number of representative theories are reviewed here. See Bohan (1996) or L. Ellis (1996) for more in-depth reviews.

Psychoanalytic theories. Although Freud himself never really developed a comprehensive theory of same-sex sexual orientation, he conceptualized it as a developmental arrest, a failure to adequately resolve the Oedipal complex, especially in men (L. Ellis, 1996). This led to the hypothesis that men's same-sex sexual orientation develops in a family context with an overly intimate, even overbearing and overprotective, mother, and a distant, aloof, disconnected father. Bieber et al. (1962/1988) found evidence to support this hypothesis, in a study wherein a large number of psychoanalysts described the childhoods of their gay male patients. However, this study has been roundly criticized for major methodological flaws (Bohan, 1996), and a later study (Bell, Weinberg, & Hammersmith, 1981) showed that even when these family dynamics are present, the direction of causation is unclear at best: fathers may act aloofly,

and mothers protectively, toward a male child who shows gender-atypical behavior, whether or not he grows up to be a gay man.

Social learning theories. Bohan (1996) gives a brief summary of the social learning theories of same-sex sexual orientation: “The task is to identify those events that might be associated with same-sex... experiences, and to determine what learning experiences might lead one to imitate..., might reinforce..., or might punish... a particular orientation.” (Bohan, 1996, p. 79). One theory (Gallup & Suarez, 1983) suggests that same-sex sexuality can arise from a fear of and/or negative experiences with opposite-sex sex. More generally, Gagnon and Simon (1973) proposed that learning theory could account for the genesis of same-sex sexuality in rewarding or punishing sexual experiences in youth. Other learning theories, reviewed in Bohan (1996), include the hypothesis that same-sex sexuality arises in response to the presence of role models who demonstrate same-sex sexuality.

Flaws in learning/environmental theories. The primary flaw in learning/environmental theories is pointed out by Bohan (1996): “[H]eterosexuality is consistently and pervasively modeled and reinforced.... LGB identity, on the other hand, is relatively invisible and is punished.... The dilemma here... is how one explains the persistence of LGB identity despite this situation” (p. 82). Indeed, learning theories cannot account for the apparent universality of same-sex sexuality across cultures (Murray, 2000), or its persistence in cultures where it is harshly punished (M. Diamond, 1993). They cannot account for the persistence of same-sex sexuality despite the fact that most models of sex and coupling are opposite-sexed (Patterson, 2003), nor for the fact that most children of same-sex couples do not identify as gay (Stacey & Biblarz, 2001).

Perhaps most damningly, these theories cannot account for the demonstrated inefficacy of interventions aimed at using learning/environmental theory to get rid of same-sex attractions and/or CGN (Haldeman, 2003). Further, learning theories cannot account for the biological markers of same-sex sexuality previously reviewed, nor for people whose same-sex attractions and/or CGNs show up early in development, and persist throughout the lifespan despite, presumably, societal disapproval and punishment (Bailey & Zucker, 1995; Dunne et al., 2000).

Social-constructionist theories. Some writers (e.g., Plummer, 1984; Weeks, 1996) have argued that terms such as “homosexuality” or “sexual orientation” do not describe any pre-existing biological or psychological phenomenon, but that they are the result of researchers, acting out of the prejudices and constraints of their dominant culture and of their specific tradition of research, assigning meanings to inherently meaningless observations about people’s behaviors and preferences (Bohan, 1996). The existence of these terms has interacted with social and political factors to create a social phenomenon over time, in essence constituting a self-fulfilling prophecy. The result has been that, in the coining and use of the term “sexual orientation,” a series of assumptions specific to modern Western cultures have been codified into a set of labels including “gay,” “lesbian,” “bisexual”, and “heterosexual”. These identity labels say something about the sex of that person’s preferred sexual partner, but also, inevitably, bear with them fairly specific connotations about the person’s femininity or masculinity, the social milieu he or she may frequent, and even the interests, avocations, or professions he or she may prefer.

Flaws in social-constructionist theories. While social-constructionist theories can ably trace the development of the meanings assigned to human phenomena,³ they typically cannot account for the phenomena *per se*. In the case of same-sex sexuality, social-constructionist theories cannot account for the fact that some people have relatively stable sexual desires for one sex versus the other. Nor can social-constructionist theories account for the biological markers associated with same-sex sexuality, as reviewed above.

Measurements of Sexual Orientation are Without Theory or Evidence

Many researchers do not measure sexual orientation at all. Perhaps due to the lack of any single agreed-upon definition or theory of sexual orientation, researchers have yet to develop a credible, theoretically sound, and empirically anchored measurement of sexual orientation. Even accounting for this lack, however, researchers have all too often failed to provide any operationalization of the terms “homosexual,” “gay,” “lesbian,” “bisexual,” or “heterosexual” in their published research reports. In other words, the most pervasive and persistent problem in the measurement of sexual orientation may be that it is so rarely practiced. As mentioned above, Brogan et al. (2001) noted the custom among public-health researchers of taking the term “lesbian” to mean “any subject who participated in a study about lesbians” (p. 109). Indeed, Shively et al. (1985) found that in 36% of the studies they surveyed, the authors had, in fact, assumed the sexual orientation of their subjects without explicitly assessing it, typically because they had recruited

³ Weeks (1996) gives a particularly interesting, and plausible, account of the origin of the notion of same-sex sexual desire as constituting an innate condition in the rise of urban gay male subcultures in Europe in the Renaissance and early Industrial Revolution. Weeks’ argument is that enough same-sex-attracted men had to be able to congregate in sufficient numbers, and persistently enough, before they could form a sense of themselves as having an identity, or at least a condition, in common.

subjects from “homosexual or heterosexual organizations” (p. 130). Sell and Petruccio (1996) noted that “setting” was one of the prevalent methods of identifying subjects, although they did not identify the number of studies that used this method alone. Chung and Katayama (1996), in a partial update of Shively and colleagues’ work, analyzed 144 studies published in the *Journal of Homosexuality* between 1974 and 1993, and found that 31.3% of the studies either did not assess subjects’ sexual orientations, or else did not clearly state how sexual orientation was assessed. Sell and Petruccio (1996) found an appreciable fraction⁴ did not state any method of assessing subject’s sexual orientation. Even more revealing is Shively et al.’s (1985) finding that the majority of their studies (42.6%) involved other-report of sexual orientation, “such as psychiatrists, institutional authorities or records, other researchers, or some participants identifying other[] [participants]” (p. 130).

Unfortunately, there does not appear to be any more recent empirical research examining how often social-science researchers ask, or fail to ask, questions about sexual orientation. A recent “best practices” report implies that there is still a relative dearth of large-scale, population-level surveys asking questions about sexual orientation (Sexual Minority Assessment Research Team, 2009), but it seems that no data is available on this question. It is possible that the situation may have improved with changing societal attitudes about sexual orientation, particularly over the last five years or so.

⁴ Sell and Petruccio do not make clear the proportion of the total number of articles they reviewed that failed to supply this information: “Five percent of the articles sampling homosexual females, 7% of articles sampling gays, 8% of articles sampling lesbians, and 20% of articles sampling homosexual males did not provide this information.” Sell and Petruccio noted that all of the articles sampling bisexual men and women did give information about how subjects were identified.

Many researchers rely on self-reported sexual orientation identity as a proxy for sexual orientation. Perhaps the most common failure mode for assessing sexual orientation has been to rely on individuals' self-report of their sexual orientation identity (e.g., as gay, lesbian, bisexual, and/or heterosexual individuals). In Shively et al.'s (1985) analysis, only 3.1% of the articles used this method; however, in Chung and Katayama's (1996), a narrow majority of studies (32.6%) used this method. Sell and Petruccio (1996) found that 58.6% of the articles that reported a method of identifying subjects' sexual orientation used self-report, either alone or in combination with other methods. While it should be noted that some researchers have found self-reported sexual orientation identity to coincide well with other methods of assessing sexual orientation (e.g., L. Ellis, Robb, & Burke, 2005; Weinrich, 1993), others have observed important discrepancies between self-reported sexual orientation identity and self-reported sexual attractions or behaviors (e.g., Chandra, Mosher, Copen, & Sionean, 2011; Laumann, Gagnon, Michael, & Michaels, 1994; Ross, Essien, Williams, & Fernandez-Esquer, 2003) that are, or should be, large enough to give researchers pause when identity is not the key variable for the study. Apropos, Savin-Williams and Ream (2007) suggest "abandon[ing] the general notion of sexual orientation and measur[ing] only those [variables] relevant for the research question" (p. 385)—i.e., to avoid using sexual orientation identity as a proxy for other variables such as sexual attraction or sexual behavior.

A note on direct measurement of sexual arousal and/or its correlates. It is apposite to note here that there is a wealth of research involving the direct measurement of sexual arousal, i.e., penile or vaginal engorgement in response to stimuli (see Bailey, 2009, for a thorough review). In general, men's sexual arousal tends to show "category

specificity,” i.e., gay men become aroused in response to sexual images involving men, but not in response to sexual images involving women, and vice versa for heterosexual men. Women’s sexual arousal tends not to show category specificity: women’s arousal is correlated with intensity of sexual activity rather than gender of the actors (Chivers, Seto, & Blanchard, 2007) and with relationship context (i.e., lower arousal to audio sexual narratives involving friends than to narratives involving strangers or long-term partners; Chivers & Timmers, 2012).

The measurement of arousal in bisexually-identified men has led to some controversy. Rieger, Chivers, and Bailey (2005) found that bisexually-identified men tended to report subjective arousal to images of men and women, but became objectively aroused in response to either images of men or women, but not both. They concluded that bisexually-identified men are not equally sexually attracted to men and women. However, Rosenthal, Sylva, Safron, and Bailey (2011, 2012), using more stringent recruitment criteria, determined that at least some bisexually-identified men do display a bisexual pattern of arousal to visual stimuli. Cerny and Janssen (2011) found similar results (but see Bailey, Rieger, & Rosenthal, 2011; Janssen & Cerny, 2011).

Other studies have measured correlates of sexual arousal. Several studies have used viewing time (i.e., latency of response in rating sexual interest in images) to assess sexual interest. Lippa (2012; see also Lippa, Patterson, & Marelich, 2010) used this paradigm to replicate findings regarding category specificity in men but not in women. Ebsworth and Lalumière (2012) found that bisexual men and women displayed bisexual patterns of interest. Several studies (e.g., Safron et al., 2007) have used brain imaging to observe neural correlates of sexual arousal in men. Taking a different tack, Zhang and

colleagues (2011) used fMRI to observe neural correlates of disgust (as well as of sexual arousal) when viewing films of mixed- and same-sex couples engaged in sexual activity. They found that female couples induced disgust in gay men, and male couples induced disgust in heterosexual men. These studies have found that sexual arousal and disgust engaged broad networks spanning multiple areas of the brain.

While these studies provide insight into the topology of sexual arousal in humans (and, laudably, follow Savin-Williams and Ream's [2007] call to directly measure variables of interest), they are not, for the purposes of this discussion, measurements of sexual orientation. Bailey (2009) narrowly defines (and valiantly defends the notion of) sexual orientation as centered on the genital response of a subject; however, sexual orientation, properly understood, is not limited to factors affecting blood flow in tissue. It is more appropriate to discuss sexual orientation as involving factors that affect sexual attraction (including, but extending beyond, genital response), sexual behaviors, and sexual relationships between humans (Chasin, 2011; L. M. Diamond, 2012). It is also important to note that direct measurement of sexual response is an invasive, deeply artificial procedure that is impractical for general use as a research tool. Accordingly, the following discussion will focus on survey instruments for measuring sexual orientation.

Review of measurements of sexual orientation. Where objective measurement of sexual orientation is attempted, it has historically fallen short. Survey instruments for measuring sexual orientation have been relatively few and far between. Those that have been developed have not been the subject of programmatic research to establish reliability or validity, nor have they been studied across populations or via independent replication studies (Morales Knight & Hope, 2010).

Masculinity–femininity scales. The earliest attempts to detect same-sex sexual orientation—it would not be accurate to call them measurements of sexual orientation—were via masculinity–femininity (M–F) scales such as Terman and Miles’ (1936) Attitude–Interest Analysis Survey (AIAS), comprising 456 items selected solely for their ability to distinguish between men and women. The scale was intended to measure “a subject’s deviation from the mean of his or her sex” (Terman & Miles, 1936, p. 6), including detection of “the genuine invert who is capable of romantic attachment only to members of his or her own sex” (p. 3). As it happened, the original AIAS could not distinguish “inverts” from “normals” (Lewin, 1984a). Instead, the researchers derived an “I” score” to accomplish the task, comparing “passive male homosexuals” (a sample of incarcerated men and their non-incarcerated social contacts) to “normals” (high school boys and girls). Terman and Miles eventually concluded that “active homosexuals” and “passive homosexuals” comprised different populations: one (the “passives”) suffering from a distorted gender role and the other (the “actives”) not. Terman and Miles operationalized “active” as preferentially performing penetrative sex acts and “passive” as being penetrated, a distinction Murray (2000) calls “gender stratification.” Historical factors are probably involved in both the presence of this stratification in the sample and in Terman and Miles’ understanding of it. See Murray (2000) for a more complete discussion of gender stratification as it applies to same-sex sexual relationships in America.

Following Terman and Miles, the *Mf* scale (Scale 5) of the Minnesota Multiphasic Personality Inventory (MMPI: Hathaway & McKinley, 1943) was developed with the specific aim of identifying homosexual men. (Most notable about the *Mf* scale is that the

responses of 13 gay men were used to confirm the validity of the femininity items: Lewin, 1984b; see also Hathaway, 1956). Other MMPI researchers derived other homosexuality-detecting subscales, such as the Masculinity–Femininity Index (MFI; Aaronson, 1959; Aaronson & Grumpelt, 1961) and the Homosexuality (HSX) scale (Panton, 1960). The California Psychological Inventory (CPI; Gough, 1952) also included a scale (Femininity, Fe) that was intended to detect homosexuality in men (Hoffman, 2001).

Ultimately, M-F scales are not useful for measuring sexual orientation, because they measure deviation from gender norms, rather than measuring anything about sexual attraction or behavior. Even in cases where researchers have been able to detect individuals with same-sex sexual attractions or behaviors, the only people so detected have been those whose scores were markedly gender-deviant.

Bipolar continuous scales of heterosexuality–homosexuality. Kinsey and colleagues objected to dichotomous models of sexual orientation: “Males do not represent two discrete populations, heterosexual and homosexual. . . . [i]t is a fundamental of taxonomy that nature rarely deals with discrete categories” (Kinsey et al., 1948, p. 639); “[M]any persons do not want to believe that there are gradations in [sexual orientation] from one to the other extreme” (Kinsey et al., 1953, p. 469). Instead, Kinsey and colleagues proposed a model of heterosexuality and homosexuality that placed these at either end of a bipolar scale ranging from 0 to 6, where 0 represented “exclusively heterosexual”, 3 represented “equally heterosexual and homosexual,” and 6 represented “exclusively homosexual.” The scale itself was named the Kinsey Heterosexual–Homosexual Scale (KHHS). Some later entrants in the field would follow this model,

most notably Klein et al.'s (1985) Klein Sexual Orientation Grid (KSOG), which is discussed below. For the purposes of the following discussion, the KHHS is taken as representative of bipolar scales of sexual orientation.

All numbered scales, although they may purport to represent a continuum, in fact represent a number of categories equal to the number of gradations on the scale.

Although this criticism has been made of the KHHS (Sell, 2007), it is mentioned here only in passing;⁵ Kinsey and colleagues were aware of the problem: “While the scale provides seven categories, it should be recognized that the reality includes individuals of every individual type, lying on a continuum...” (Kinsey et al., 1953, p. 471). Perhaps more importantly, a single bipolar scale, like the KHHS, is naturally incapable of capturing change over time (Klein et al., 1985; Sell, 2007); however, Kinsey and colleagues were aware of this as well: “Some of the males who are involved in one type of relation at one period in their lives, may have only the other type of relation at some later period. There may be considerable fluctuation of patterns from time to time. ...” (Kinsey et al., 1948, p. 639). In fact, Kinsey and colleagues were careful to collect retrospective ratings over the lifespan (DeCecco, 1981; Kinsey et al., 1948, see esp. pp. 653–654; Kinsey et al., 1953, see esp. pp. 472–475).

Apart from these quibbles, there are two major problems with bipolar scales.

First, the individual points on the scale conceal equifinal histories. Consider, e.g., a

⁵ Although true continua (“visual analog scales”) have been used as rating scales (where the participant marks a location on the continuum, and its distance from the endpoints is measured by the researcher; S. D. Miller et al., 2003) the practice is uncommon, unwieldy, and likely unfamiliar to the participant. Survey-design research suggests that scales of between five and seven points achieve an optimal balance between capturing variation in responses and not overburdening the participant (Krosnick & Fabregar, 1997, cited in Dillman, Smyth, & Christian, 2009).

“Kinsey 5” (predominantly homosexual, only incidentally heterosexual) with a history of having his or her very first sexual experience twenty years ago with an other-sexed person, an experience never to be repeated, versus a “Kinsey 5” who was a Kinsey 6 until an unexpected sexual encounter the day previous. Second, bipolar, or hydraulic, scales treat their endpoints as diametrically opposed: one pole is approached “at the expense of” (Shively & DeCecco, 1977, p. 43), or as a “trade-off” for (Sell, 2007, p. 365), the other. In other words, one only becomes “more homosexual” by becoming “less heterosexual.” This leaves the scale unable to reveal the absolute magnitude of the construct represented by either endpoint. In the case of the KHHS, the scale cannot account for high levels of both same-sex and other-sex desire, nor can it account for low or nonexistent levels of both (asexuality).

Unipolar scales distinguishing heterosexuality from homosexuality. Some scales of sexual orientation (e.g., Bickford, 2003; Shively & DeCecco, 1977) , following S. L. Bem’s (1974) Bem Sex-Role Inventory (BSRI), use paired-unipolar scales in order to avoid one of the major structural flaws of bipolar scales. Shively and DeCecco point out that this approach “describe[s] both qualitative and quantitative differences” in the constructs being measured. Applied to sexual orientation, “Qualitatively, individuals can be seen as heterosexual, homosexual, or both.... Quantitatively, individuals can be seen as having ... very much to very little” of each construct (p. 45–46). Incidentally, this allows for some people to be measured as asexual, or as having little to no sexual attraction for either gender. It should be noted that while Shively and DeCecco constructed paired-unipolar scales for “homosexuality” and “heterosexuality,” Bickford (2003) argued against anchoring sexual orientation scales against the participant’s own

gender, choosing instead to anchor his scale in the partner's gender. The result was a paired-unipolar approach using "androphilic" (toward men) and "gynophilic" (toward women) continua.

While paired-unipolar scales represent an improvement over bipolar scales, circumventing some of their worst limitations, they can still fall prey to others. Like bipolar scales, the ratings on paired-unipolar scales conceal equifinal histories. They also do not, in themselves, account for changes over time. However, used appropriately, an array of paired-unipolar scales can capture both types of information, and in a more meaningful way than is possible with arrays of bipolar scales.

The use of time in measures of sexual orientation. Several scales do attempt to capture information about changes over time in sexual orientation. The Klein Sexual Orientation Grid (KSOG; Klein et al., 1985) measures several theoretical "components" of sexual orientation (discussed below), in which each component is addressed by three bipolar scales, one querying "your past," one "your present," and one "your ideal". Similarly, the Coleman Assessment of Sexual Orientation (Coleman, 1987), uses bipolar scales to address "present" and "ideal" ratings for each of its components (discussed below). The Multidimensional Scale of Sexuality (MSS; Berkey et al., 1990), in a different approach, uses 45 true/false items, some of which assess a past/present distinction in order to classify the participant as "concurrent bisexual," "sequential bisexual," "past homosexual, currently heterosexual," or "past heterosexual, currently homosexual."

All of these scales suffer from the fact that their time (or timelike) dimensions are assessed with vague quantifiers: "past," "present," and (most vague of all) "ideal." There

is a theoretical problem in that the “ideal” dimension may not be meaningfully interpretable as a “future” dimension. There is also the problem of reliability, in that it is not clear that all participants will understand the timelike quantifiers in the same way.

Multidimensional (“components”) models of sexual orientation. Kinsey’s studies (Kinsey et al., 1948; Kinsey et al., 1945) acknowledged, without making distinct in the KHHS, a distinction between behavioral and cognitive/emotional aspects of same-sex sexuality. Shively and DeCecco (1977), in elucidating the Shively Scale of Sexual Orientation, seem to have been the first to explicitly posit that same-sex sexuality is divisible into some number of components: in their view, “sexual identity” was the overarching construct, and its components were biological sex plus three “psychological components”: gender identity, social sex-role, and sexual orientation. The sexual orientation component they further subdivided into address “physical sexuality” (sexual behavior) and “affectional sexuality” (sexual attraction). Klein et al. (1985), in constructing the KSOG, further extended the model (arbitrarily; Sell, 1996) to include emotional preference (loving and liking women vs. men) and social preference (spending time with women vs. men), as well as self-identification (as heterosexual vs. homosexual) and “heterosexual/homosexual lifestyle” (i.e., preferentially spending time with heterosexual vs. gay people). Coleman (1987) took Shively and DeCecco’s work in a different direction entirely: his dimensions were relationship status, sexual orientation identity, self-acceptance of sexual orientation identity, biological sex, gender identity (divided into general and “in my sexual fantasies”), sex-role identity, and sexual orientation identity (divided into behavior, fantasy, and “emotional attachments [not necessarily sexual]”). The MSS (Berkey et al., 1990) adds an “arousal to erotic material”

component to four KSOG-like components (behavior, attraction, fantasy, and “emotional factors”). Silva (1991), in an unpublished dissertation, constructed a survey assessing sexual attraction to men, sexual attraction to women, self-acceptance (of sexual orientation identity), and fear related to gay identity. Sell’s (1996) Sell Assessment of Sexual Orientation uses a successively aggregated set of dimensions: at the question level, we find number, frequency, and intensity of attraction to men and women; number and frequency of sexual contacts with men and women; and strength of identification as homosexual and heterosexual. At the second level, the highest ratings in each dimension are taken as summary scores of homosexual and heterosexual attraction, sexual behavior, and identity. Summary scores for bisexuality and asexuality can also be derived. Finally, a single Kinsey score can be aggregated out of the summary scores. Friedman (n.d.; see also Friedman, 2004) has more recently devised an unpublished scale that queries physical sensations of arousal, thoughts and emotions related to attraction, and a clearly specified list of sexual contact behaviors. Bickford (2003), in an unpublished dissertation, decided on affect, behavior, and cognition, apparently out of an implicit cognitive-behavioral theoretical orientation. He further subdivided these into romantic and sexual domains, noting that previous measures had conflated sexual and romantic elements. Bickford also eschewed “homosexual” and “heterosexual” domains in favor of “androphilia” and “gynophilia,” as discussed above.

Despite the fact that components models of sexual orientation have been theorized for over thirty years, and a wide variety of them have been proposed in measures of sexual orientation (as well as outside of them), components models suffer from some very important flaws. Chief among them is that components appear to be selected *ad hoc*

(see especially Klein et al., 1985), without clearly being anchored in a theory of sexual orientation. Corollary to this, the components themselves have never been systematically researched and their names, numbers, and, perhaps most critically, their relative importance continue to be in doubt, as can be seen by the inability of researchers to agree on what components should be included. A recent unpublished doctoral dissertation (Tannenbaum, 2006) has made promising inroads in this area, however, and will be further discussed below.

Avenues for Improvement of Definitions, Theories, and Measurements of Sexual Orientation

Despite the problems with existing definitions, theories, and measurements of sexual orientation, there are some promising avenues that have been developed in recent years. Six such avenues form the basis of the present study.

Mate selection studies suggest profitable methodologies for understanding same-sex relationships. Lippa (2007) hypothesized that comparing mate selection strategies across sexual orientation categories could help to solve the dispute over whether observed differences by sex in mate selection strategies (e.g., that heterosexual men prefer women who are young, healthy, and physically attractive, and that heterosexual women prefer men who have greater wealth and social status) are the product of evolved dispositions, or whether they are the products of culture-bound ideologies about the roles of men and women in sexual relationships. Lippa suggested that if, e.g., gay men resembled heterosexual men more than they resembled heterosexual women in terms of mate trait rankings, “it becomes less plausible to attribute such mate preferences solely to sexist ideologies, attitudes about women, and expectations about

traditional marriage roles” (p. 195). On another tack, Lippa suggested that the specific traits that proved to be similarly important for heterosexual and nonheterosexual participants might help to understand how mate selection decisions may be driven by the fact that one’s partner is a man or a woman, rather than by the fact that oneself is a man or a woman.

Working from a massive Internet survey sponsored by the British Broadcasting Corporation (BBC), comprising over 200,000 participants across 53 countries, Lippa (2007) analyzed participants’ first-, second-, and third-ranked most-important traits in a relationship partner. Traits were selected by participants from a list of 23 items: age, ambition, communication skills, dependability, domestic skills, face attractiveness, fitness, fondness for children, hands, health, honesty, humor, industriousness, intelligence, kindness, money, all round good looks, parenting abilities, prosperity, religion, social status, teeth, and values. Individuals’ top three traits were coded as ranked 1, 2, and 3 respectively, with unselected traits ranked 4. Mean rankings were compared by sex and by sexual orientation, and subjected to multidimensional scaling analyses.

Lippa (2007) found that differences between men and women trumped sexual orientation differences in that men consistently ranked physical attractiveness (“overall good looks” and “face attractiveness”) higher than did women, and women consistently ranked character traits (honesty, humor, kindness, and dependability) higher than did men, regardless of sexual orientation. However, Lippa also found differences by sexual orientation identity category: Heterosexual participants ranked religion, fondness for children, and parenting abilities more highly than did nonheterosexual participants. Multidimensional scaling analyses showed that participants’ ranking profiles clustered

according to gender, rather than according to sexual orientation or nationality, a result that agrees with previous research in this area. Bailey, Gaulin, Agyei, and Gladue (1994) surveyed heterosexual men and women, gay men, and lesbians, and found that differences between men and women in constructs such as “interest in uncommitted sex,” “interest in visual sexual stimuli,” “unimportance of partner’s status,” and “importance of partner’s physical attractiveness” trumped differences by sexual orientation;. Kenrick, Keefe, Bryan, Barr, and Brown (1995) analyzed partner age preferences stated in singles advertisements placed by heterosexual and nonheterosexual men and women, and found that men in both sexual orientation categories preferred progressively younger partners as they themselves aged, while women in both sexual orientation categories found older partners acceptable across all age groups.

Lippa’s results suggest that a survey eliciting ranking or rating of traits, followed up by a multidimensional scaling analysis, is a profitable method for discovering sex- and sexual-orientation differences in preferences about partners. However, the survey Lippa was working from did not distinguish between sexual desire and romantic attachment, a distinction that is likely to be important, and which is discussed further below. The participants ranked a subset of mate traits, rather than rating all of them, which would have better suited a multidimensional scaling analysis (something Lippa himself noted in a personal communication on August 5th, 2010, in which he stated that the nature of the ranking task was dictated by the BBC). Finally, the differences Lippa observed between heterosexual and nonheterosexual participants with respect to the importance of children and parenting may not reflect true differences between the two groups, given that

nonheterosexual individuals face significant barriers to becoming parents, as compared to heterosexual individuals, in most or all of the countries involved in the BBC survey.

Bisexuality may be partially explained as lower prioritization of partner gender in mate selection decisions. Another promising theoretical avenue, the idea that “bisexuality” may be characterized, at least in some individuals, by a tendency to place a relatively low priority on the sex of a potential partner when making mate-preference decisions, was first raised by writers such as Paul (1984), Ross (1984), and Zinik (1985/2000), but seems to have been largely neglected in the research literature since that time. Ross and Paul (1992/2000) attempted to revive the issue by presenting idiographic data, elicited using a “repertory grid” method based on Kelly’s (1955) personal construct theory, from nine individuals who identified themselves as Kinsey 3s (equally heterosexual and homosexual). The participants generated idiographic lists of constructs that distinguished themselves, their mothers and fathers, specific “most preferred” male and female sexual partners, and specific “best nonsexual” male and female friends from each other, as well as constructs on which these people were similar to each other. The sets of constructs, and the similarities and contrasts, were different for each individual in the study (e.g., “demanding” vs. “relaxed”; “manipulative” vs. “noninhibited”; “pushy” vs. “feminine”), although all participants were explicitly provided with the pair “masculine vs. feminine” by the researchers. Ross and Paul performed a principal-components analysis on the sets of constructs and concluded that the participants tended to classify their partners on the basis of personality dimensions rather than on the basis of sex. It seems simple enough to test this notion empirically by including the partner’s biological sex in a list of constructs relevant to mate selection, and asking participants to

rank them in order of importance. If Ross, Paul, and Zinik are correct, bisexually-identified individuals should, on average, rank “partner’s biological sex” lower than other sexual orientation identity groups.

Gender diagnosticity shows promise for connecting gender role orientation, sexual orientation, and mate selection. Another promising avenue has to do with the connection between gender role and sexual orientation. While no credible argument exists that deviation from gender role norms and same-sex sexuality are coterminous, available evidence (e.g., Bailey & Zucker, 1995; Dunne et al., 2000; Rieger, Linsenmeier, Gygax, & Bailey, 2008; Weinrich, 1987) suggests that there is some relationship at least between childhood gender nonconformity and sexual orientation, one worthy of further study, although there is little recent literature connecting adult gender presentation to sexual orientation (Sandfort, 2005; but see Lippa, 2000). However, there is literature connecting observers’ ability to judge sexual orientation (“gaydar”) to gender-atypical behavior in adulthood—a connection, and an ability, that crosses cultural boundaries (Ambady, Hallahan, & Conner, 1999; Rieger, Linsenmeyer, Gygax, Garcia, & Bailey, 2010; Rule, Ambady, & Hallett, 2009; Rule, Ishii, Ambady, Rosen, & Hallett, 2011).

There is also evidence that a potential partner’s gender presentation plays a role in nonheterosexuals’ mate selection decisions. Bailey, Kim, Hills, and Linsenmeier (1997) analyzed personal ads placed in print publications by gay men, lesbian women, and heterosexual men and women, and found that the ads contained both self-descriptors and descriptors for preferred partners that were masculine or feminine traits. Gay men’s advertisements showed a strong preference for masculine men and a strong dispreference for feminine men, although this effect was weakened for men who described themselves

as more feminine. Lesbian women's advertisements showed a preference for feminine women, but no dispreference for masculine women. Heterosexual men's and women's advertisements were less likely than gay men's or lesbian women's advertisements to include gendered self-descriptors, or to include statements about the gender presentation of preferred partners. Phua (2002), in a qualitative study, examined personal advertisements placed on the Internet by gay and heterosexual men and found that gay men strongly preferred masculine partners and were much more likely to include descriptors of their own gender presentation than were heterosexual men. Smith and Stillman (2002) studied personal advertisements placed in print and online by lesbian women and found that only a minority of advertisers described themselves as "butch" (masculine) or "femme" (feminine), or stated preferences for butch or femme women. Those who described their own gender presentation more often described themselves as "femme" than as "butch;" those who stated partner preference more often stated preference for a "femme" woman than for a "butch" woman.

This evidence raises the question of how a potential partner's gender presentation affects mate selection decisions generally. Sandfort (2005) poses the question: "Is it just biological sex that people feel attracted to or the associated gender?", but deliberately does not answer it (p. 599). There seems to be good reason to revisit the connections between gender presentation, sexual orientation, and mate selection. A new approach that shows some promise to this end (Udry & Chantala, 2004) is discussed here.

Lippa and Connelly (1990), noting the failure of M-F scales (e.g., S. L. Bem, 1974; Spence, Helmreich, & Stapp, 1975) to successfully predict gender differences in behavior, proposed a new approach they termed gender diagnosticity (GD). In this

approach, the Bayesian probability that an individual participant is a man or a woman is derived mathematically from discriminant function scores (which are themselves computed from sets of items that empirically differentiate between men and women). This metric is (and should be) entirely variable: Lippa and Connelly categorically state that gender diagnosticity can only apply to “the behaviors that differentiate men and women in a particular population in a particular culture during a particular historical era,” as well as in specific stages of development (Lippa & Connelly, 1990, p. 1053). Gender diagnosticity, then, is a pure empirical-criterion-keying approach that does not, unlike traditional M–F scales, require reference to a specific normative population. In this way, gender diagnosticity splits the difference between social-constructionist and essentialist views of gender, because it does not encode socially-constructed norms about gender, but it does seek to discover what differences exist nonetheless between men and women. The critical theoretical point is that gender diagnosticity does not pretend to measure “masculinity” or “femininity,” but the degree to which a participant’s responses resemble those made by known men and known women.

In a personal communication (August 5th, 2010), Lippa explained that the exact set of items is not important; all that is needed is a set of items that reliably and accurately differentiates men from women. In Lippa’s own experience, occupational preference questionnaires, typically subsets of the Strong-Campbell Interest Inventory (Campbell & Hansen, 1981) appear to be the most efficient and effective means of achieving discrimination between men and women, although he has also used tests of spatial ability, measures of interpersonal aggression, and measures of preferences for

academic subjects, activities, and hobbies (Lippa & Connelly, 1990; Lippa, 1991, 2000, 2002).

Lippa (2000) has also applied the gender-diagnostics approach to differentiating participants by sexual orientation. Working from questionnaires on hobby and occupational preferences, across two independent samples, Lippa used discriminant functions to compute the probability that any individual would be predicted to be gay (or lesbian) versus heterosexual. These probabilities were labeled “gay-heterosexual diagnostics” scores (for men), and “lesbian-heterosexual diagnostics” scores (for women). Lippa found that this approach was successful in differentiating between self-identified gay and heterosexual men, and between self-identified lesbian and heterosexual women, showing absolute effect sizes ranging from .98 to 1.83.

Lippa (2000) also found that the correlations between sexual-orientation diagnostics scores and gender-diagnostics scores were very high (e.g., for men, the correlation between GD and “gay-heterosexual diagnostics” as assessed by occupational preference was $r = -.88, p < .001$ in one sample and $r = -.90, p < .001$ in the other; for women, the same correlation was $r = .83, p < .001$ in one sample, and $r = .94, p < .001$ in the other). When Lippa corrected for attenuation, he found that these correlations approached unity. Lippa concluded that gender diagnostics and sexual orientation diagnostics were identical, and that “such robust effects provide an empirical challenge to *all* theories of sexual orientation and sex typing” (Lippa, 2000, p. 924), although he himself clearly believed that these results lent more support to biologically-based theories of sexual orientation: “[B]iological theories ... imply stronger links between sexual orientation and sex-typed behaviors than do psychosocial

theories. Thus, the very strong links documented here between adults' sexual orientation and their gender-related occupational and hobby preferences seem more consistent with biological theories than with psychosocial theories [of sexual orientation]" (Lippa, 2000, p. 924).

The critical methodological points here are that this new approach to assessing gender appears to achieve what previous approaches (the M–F scales) could not: accurate differentiation between at least some sexual orientation categories, with the caveat that (a) bisexually-identified individuals were not fully included in Lippa's analyses (making up a small fraction of the smallest of three samples discussed in Lippa, 2000) and (b) intragroup variation in gender diagnosticity scores remains to be fully understood and/or to be connected to variations in sexual orientation. It therefore seems likely that Lippa's measure of gender diagnosticity, providing a scalar score, could be used to better understand the connections between individual gender-role orientation and other variables related to sexual orientation.

Exploring lay participants' understanding of hypothesized components of sexual orientation may help establish their construct validity. Tannenbaum (2006), investigating the construct validity of multidimensional models of sexual orientation, noted that expert and nonexpert participants might have different beliefs about the meaning and underlying structure of sexual orientation, and that nonexperts in different sexual orientation "communities" might have further differences among them: which, if true, would suggest that existing measures of sexual orientation would be differently understood by each of these different groups, and therefore not equally reliable or valid across all of them. Tannenbaum provided expert, lay, LGB-identified, and non-LGB-

identified participants with an apparently exhaustive list of previously theorized components of sexual orientation (behavior, attraction, fantasy, self-identification, emotional preference, social preference, community affiliation, gender identity, sex-role identity, and social context; see esp. Tannenbaum, 2006, p. 5) and asked them to rate, on a 7-point Likert scale, how important each one in defining sexual orientation. She found that experts tended to rank a small subset of components (attraction, self-identification, fantasy, emotional preference, biology, and behavior) as particularly important, whereas laypersons' highest rankings ranged across a wider array of components. She also found that heterosexually-identified participants ranked behavioral expressions of sexuality higher than did LGBT-identified participants, who ranked self-identification, emotional preference, and social preference higher. Tannenbaum also found that women and men ranked components differently, with women ranking sexual attraction and emotional preference higher than men. It should be noted that Tannenbaum's scales of "attitudes toward components of sexual orientation" (ATCSOS) and of "personal identification toward components of sexual orientation" (PITCSOS) are poorly worded and often not well operationalized (e.g., "Fantasy: sexual reactions based on imagination;" "Behavior: actual sexual behavior as opposed to attraction;" "Social preference: closely related to emotional preference, but often different..."; p. 155), and therefore potentially confusing to lay participants, which may account for some of the expert/lay differences she encountered. Further, Tannenbaum's PITCSOS relies on a bipolar, Kinsey-like scale, the deficits of which have already been discussed.

Tannenbaum (2006) appears to be among the first (and only) to attempt to assess lay participants' ideas about theorized components of sexual orientation and their relative

importance.⁶ Tannenbaum's scales were poorly written, but the general approach is profitable in that it seems to have discovered meaningful differences between lay heterosexual, lay LGBT, and expert participants, although analyses further differentiating between sexual orientation identity groups were not performed. A revised version of Tannenbaum's scale should provide meaningful data about the constructs people believe are relevant to their sexual orientations.

Diamond's biobehavioral model. L. M. Diamond (2003b) has marshaled evolutionary, biological, and behavioral data to elucidate a "biobehavioral" model of sexual orientation that distinguishes between short-term (sexual-desire-driven; see also Weinrich, 2000) and long-term (pair bonding-driven) sexual relationships. This distinction was partly inspired by observations of her own research subjects' sexual and nonsexual relationships (e.g., L. M. Diamond, 2008) to the effect that some women might have only one same-sex relationship during their time in the study—once, and never again. Diamond argues, from a large body of empirical evidence, that sexual desire and pair bonding are separately evolved processes: the former is an adaptation allowing for successful mating and reproduction, and the latter is an adaptation allowing for close, supportive relationships between people, probably in order to facilitate the survival of offspring. (However, Diamond has yet to publish any data of her own specifically exploring this model.)

Diamond suggests that while individuals' sexual desire is typically "oriented" toward one gender or the other, due to its evolutionary basis in the mating drive, pair

⁶ Neighbors (2000) is probably the first entrant in this area, but she focused specifically on participants' judgements about others' sexual orientations.

bonding has no specific gender orientation, due to its separate evolutionary basis in the mother-infant attachment bond. Because pair bonding appears to arise out of conditions that can exist independently of sexual interaction—long-term proximity and physical contact—individuals may be sexually oriented toward one gender or another, but have the capacity to pair-bond with (fall in love with) members of either gender. Most importantly, Diamond argues that the connections between sexual desire and pair-bonding are bidirectional. Not only may individuals develop pair bonds as a result of sexual interaction, but they may also develop sexual desires as a result of pair bonding—even novel sexual desires, toward members of the sex they are not sexually oriented to. Diamond suggests that women will be likelier than men to have had nonsexual pair-bond relationships, and likelier than men to have undergone such transitions. In most cases, Diamond hypothesizes, such pair-bonding-motivated sexual desires that run counter to a person's sexual orientation should be specific to the individual relationship and should be unlikely to generalize to other partners. Drawing from the literature on love and attachment, Diamond noted that pair-bonding has two major stages, infatuation (or limerence, or falling in love) and attachment (or companionate love), and that each stage could be operationalized in terms of behaviors and emotions:

In a self-report study of over 1,000 individuals, Tennov (1979) found that infatuation was characterized by intense desires for proximity and physical contact, resistance to separation, feelings of excitement and euphoria when receiving attention and affection from the partner, fascination with the partner's behavior and appearance, extreme sensitivity to his or her moods and signs of interest, and intrusive thoughts of the partner. The same features were noted by Hatfield and Sprecher (1986) as characteristics

of passionate love. In contrast, attachment or companionate love is characterized by feelings of calm, security, mutual comfort seeking, and deep affection (Hatfield, 1987; Hazan & Shaver, 1987; Sternberg, 1986). (L. M. Diamond, 2003b, p. 176.)

Diamond's (2003b) model is particularly intriguing in that it aims to sort out some of the difficulties with extant theories of sexual orientation that have already been discussed above. Its greatest contribution is the distinction between sexual desire and romantic attachment, a distinction that has so far almost always been absent in the empirical literature on same-sex sexuality. It seems eminently possible to combine this distinction with a mate-selection task similar to that in Lippa (2007), and/or with a construct rating task similar to that in Tannenbaum (2006).

Another important contribution of Diamond's (2003b) model is the idea that plasticity in sexual desire may be related (in some cases) to specific behavioral contexts (i.e., pair-bond relationships) and mediated (in those cases) by biological factors (i.e., oxytocin). Specific questions about pair-bond and sexual relationships could be used to attempt to (at least partially) validate the model.

A cross-category sexual identity development theory can help explain variations in heterosexual identity. One area of significant confusion in the sexual orientation literature is the question of people who identify as heterosexual, but who also have same-sex attractions, fantasies, and/or behavior (e.g., Laumann et al., 1994; Morales Knight & Hope, 2012; Murphy, 2007; Savin-Williams, 2006; Vrangalova & Savin-Williams, 2010). Some writers have suggested that at least some of these individuals might prefer identity labels such as "mostly straight" (Thompson & Morgan, 2008), "bi-curious," or "questioning" (Morgan & Thompson, 2006), although other writers (e.g.,

Russell, Clarke, & Clary, 2009) suggest that only a few such individuals, at least among youths, adopt nonheterosexual identity labels. The question of whether such discordance represents a distinct identity or a transitional phase in development remains open.

Worthington, Savoy, Dillon, & Vernaglia (2002), suggested that such individuals (particularly younger individuals) might be engaged in a so-called “active exploration” phase of sexual identity development. To explore this idea, Worthington, Navarro, Savoy, and Hampton (2008), building on Marcia’s (1966) model of identity development, developed a questionnaire (the Measure of Sexual Identity Exploration and Commitment; MoSIEC) to investigate individuals’ relative levels of exploration and commitment with respect to sexual orientation identity. The measure also addresses participants’ uncertainty about sexual orientation identity, as well as the degree to which identity synthesis/integration has occurred. Worthington et al. (2008) demonstrated that the MoSIEC captured differences between sexual orientation identity groups; Worthington and Reynolds (2009) showed that significant within-group differences were also captured by the MoSIEC. This instrument appears to show promise for exploring the relationships between variables of sexual orientation identity and other variables of sexual orientation such as attraction, fantasy, and behavior.

Statement of the Problem

The literature review has shown that researchers cannot agree on how to define sexual orientation. The likeliest major contributor to this problem is that extant evolutionary, biological, learning/environmental, and social-constructionist theories of sexual orientation all fail to account for different aspects of the empirical data on same-sex sexual relationships. Difficulty in defining and operationalizing sexual orientation has

in turn led to difficulty in creating credible measures of sexual orientation. The core of the problem seems to be the lack of a single credible theory of orientation. Based on the literature review, such a theory, perhaps better called a theory of sexual and love relationships, should address the following points:

- Distinguish between sexual desire and pair bonding;
- Account for differences between men and women in the specificity and flexibility of sexual orientation;
- Account for changes over time in the sex of an individual's sexual partners, including the question of "special relationships" (i.e., individual relationships that break an individual's usual pattern of being attracted to one sex or the other);
- Understand the role of gender-role orientation;
- Understand how "sexual orientation" and "attachment orientation" affect partner selection;
- Understand how people conceptualize their own sexual orientation (including aspects of their sexual identity development);
- Lead to a reliable and valid method of assessing sexual orientation.

The present study sought to develop evidence toward a credible theory of sexual orientation by investigating the constructs relevant to individuals' mate selection strategies; the constructs relevant to their conceptualization of their own sexual orientations; and the relationships between each set of constructs. The critical task in the present study was to discover whether participants differentiate between sexual desire and pair bonding as they apply to mate selection decisions. A secondary task was to

discover whether participants believe gender role orientation is connected to any of these decisions.

Research Hypotheses

The following hypotheses emerge from the literature review and the problem statement:

1. Gender role orientation and sexual orientation are related. Men and women whose gender diagnosticity (GD) scores differ significantly from the average for their gender will be more likely to identify as gay or lesbian. More specifically, GD score deviance from gender means will predict individuals' self-rated same-sex attraction. No similar prediction is made about identification as bisexual.
2. Mate selection strategies differ when the motivation is sexual desire vs. when the motivation is pair bonding. Decision rules about mate selection will differ depending on whether the decision is motivated by short-term (sexual desire) or by long-term (pair-bonding) considerations.
3. Mate selection strategies have already been observed to differ between men and women, but there will also be an interaction with the sexual-desire/pair-bonding distinction. Decision rules about both short- and long-term mate selection will differ between men and women in that men will rate physical attractiveness, youth, and health traits more highly than will women, and women will rate character and child-rearing traits higher than will men; but these differences will be larger in the sexual-desire mate selection task than in the pair-bonding mate selection task.

4. Mate selection strategies are related to gender role orientation. Differences similar to those in Hypothesis 3 will emerge between people scoring in the male and female directions on a measure of GD, regardless of whether they are men or women.
5. Bisexuality may be partially explained as lower prioritization of partner gender in mate selection decisions. Bisexually-identified individuals will be less likely than people in other sexual orientation identity categories to rate the sex of partners as “extremely important” in both short- and long-term mate selection.
6. Components of sexual orientation will be differently rated between and within sex and sexual orientation identity groups, as previously observed in Tannenbaum (2006).
 - a. Sexual attraction will be, on average, most highly rated as a determinant of sexual orientation across all groups.
 - b. Women will rate sexual attraction more highly as a determinant of sexual orientation than will men.
 - c. Heterosexually-identified individuals will rate sexual behavior more highly as a determinant of sexual orientation than will people in other sexual orientation identity categories.
 - d. Ratings of gender role orientation as a determinant of sexual orientation will differ between men and women. Men will rate gender role orientation more highly as a determinant of sexual orientation than will women.
 - e. Ratings of gender role orientation as a determinant of sexual orientation will differ between sexual orientation identity groups. Gay- and lesbian-

identified individuals will rate gender role orientation more highly as a determinant of sexual orientation than will bisexually- and heterosexually-identified individuals.

7. Ratings of components of sexual orientation are related to participants' own gender role orientations. People scoring in the male direction on a measure of gender diagnosticity, regardless of sex, will rate sexual attraction more highly as a determinant of sexual orientation than will people scoring in the female direction, regardless of sex.
8. As suggested in L. M. Diamond (2003b), men and women will have different histories of pair-bond relationships and sexual fluidity related to those pair-bond relationships.
 - a. Heterosexual women will be more likely than heterosexual men to report a history of same-sex nonsexual pair-bond relationships, and lesbian women will be more likely than gay men to report a history of opposite-sex pair-bond relationships.
 - b. Heterosexual women will be more likely than heterosexual men to report a history of same-sex nonsexual pair-bond relationships becoming sexual, and lesbian women will be more likely than gay men to report a history of same-sex pair-bond relationships.
9. Heterosexually-identified individuals who have same-sex attractions, fantasies, and/or behaviors will show less identity commitment and more identity exploration and uncertainty than will heterosexually-identified individuals without any same-sex attractions, fantasies and/or behaviors.

Method

Participants

Recruitment. The recruitment goal in the present study was to recruit a sample that had equal proportions of men and women and equal proportions of heterosexual, gay/lesbian, and bisexual individuals. To that end, two sets of advertisement flyers (one specifically recruiting lesbian, gay, and bisexual (LGB)-identified individuals, and one recruiting without reference to sexual orientation) were composed. The flyers described the study as focusing on “how people understand their romantic and sexual relationships.” They were placed in social gathering locations in Lincoln and Omaha such as clubs, coffee shops, and churches. The LGB-themed flyers were placed in locations that specifically serve LGB populations. The flyers were also distributed for posting to confederates in other cities around the U.S. (e.g., Miami, OH; Eugene, OR; Los Angeles, CA; and Minneapolis, MN).

For online recruiting, a recruitment email was sent to LGB-oriented email lists (e.g., APA Division 44; AFFIRM; ABCT LGBT SIG). Notices were also posted on the Facebook pages of BiNet USA and LBGTcampus.org. Readers of the emails and notices were requested to distribute them as widely as possible, and to people of all sexual orientations.

Eligibility. People who were at least 19 years old (the age of majority in the State of Nebraska) were eligible to participate in this study. There were no other eligibility or exclusion criteria.

Compensation. Participants were informed that at the end of the survey, they would be given a chance to enter their email address, if they chose, in order to receive an Amazon.com gift card worth \$5.00.

Valid vs. invalid responses (“spam”). A total of 1,985 survey responses were received. The following guidelines were used to identify invalid (“spam”) responses, completed solely with the aim of receiving a gift card (or, in many cases, multiple gift cards). Responses were classified as spam and eliminated from analyses under one or more of the following conditions:

- Completion time under 12 minutes (i.e., more than 1.5 *SDs* shorter than the mean completion time for the pilot version of the survey): 854 responses, with completion times ranging from 00:43 to 11:59, were eliminated under this rule.
- Participants taking less than 2 seconds to make each rating in the occupational-preference or BSRI questionnaires: 27 responses were eliminated under this rule.
- Responses failing a “Turing test” (i.e., responding to items designed to catch nonhuman response patterns, or responding to items in a clearly and consistently illogical manner): 50 responses were eliminated under this rule.
- Responses associated with clearly “spammy” email addresses, i.e., addresses created at random or at pseudorandom in order to register multiple times for the reward., particularly when these came from large-volume, free email providers. Twelve responses were eliminated under this rule, although there was a vastly larger number of spammy email addresses in the registration data that did not correspond to any survey response.

- Internet Protocol addresses (IPs) associated with multiple attempts to respond were often, but not always, eliminated. In general, multiple attempts were considered spam if other spam-identification rules were violated in one or more of the attempts associated with that IP: 30 responses were eliminated under this rule.
- A “guilt by association” rule was employed in which IPs associated with responses violating one or more of the above rules (and/or placing false registrations in the registration database) were identified, and then responses were sorted by IP address. In some cases, it was possible to identify entire IP blocks that were clearly major sources of spam responses and/or false registrations. Responses from those IP blocks were eliminated: 306 responses were eliminated under this rule.

In all, 1,254⁷ of the 1,985 completed surveys received were eliminated as spam, leaving 731 surveys prior to data cleaning. (Another 238 incomplete surveys were not analyzed.) 589 rewards were disbursed, and 167 nonspam surveys did not include reward registration data.⁸

Missing variables; ineligible participant. Four surveys were missing a relatively large number of variables on the core questionnaires (range 7–98 missing variables) and were eliminated from analyses on that basis. One response was eliminated because the participant’s stated age was 18, below the eligible age of 19. Analyses were completed with the remaining 726 responses.

⁷ The numbers in the bullet points do not add up to 1,254 because some responses were eliminated under more than one rule.

⁸ As a further illustration of the spam problem, it should be noted that 2,390 registrations for the reward were received. In one notable case, one IP address was responsible for 302 reward registrations over a little more than two hours!

Description of the sample. Participants' ages ranged from 19–78 with a mean age of 34.36 years ($SD = 14.71$ years). By gender, 43% of the sample identified as men, 46% as women, and 10% as transgender or “other.” By sexual orientation, 21% identified as heterosexual, 23% as bisexual, and 21% as lesbian or gay. Fully 36% espoused another label, or no label, for their sexual orientation identities. Chi-square analyses showed that women were likelier than men to have a non-traditional (i.e., other-label or no-label) sexual orientation, $\chi^2(1, N = 650) = 43.10, p < .001$, and that participants who identified as neither men nor women were likelier than men and women to also have a non-traditional sexual orientation identity, $\chi^2(1, N = 726) = 86.50, p < .001$. A tabulation by gender and sexual orientation identity categories is given in Table 1.⁹

By race/ethnicity, 6% of the sample identified as Latino (orthogonal to the other categories), 6% as African American, 3% as Asian American/Pacific Islander, 4% as Native American, 89% as European American, and 5% as “other.” Two percent of the sample selected more than one racial/ethnic identification (excluding Latino). Due to small cell *ns*, only chi-square analyses of gender or sexual orientation distribution by European American vs. non-European American race/ethnicity were performed. No relationship was found. The chi-square for gender gave $\chi^2(4, N = 690) = 1.57, p = .814$. The chi-square for sexual orientation gave $\chi^2(4, N = 690) = 8.37, p = .079$.

⁹ Participants who selected “other” for gender or sexual identity were given the option of commenting on that selection. Comments included a number of labels for gender (e.g., agender, agendered, bigender, brrl, genderfluid, genderless, genderneutral, gender-non-conforming, grrl, femme, MtM (not FtM), queer, and Two Spirit) and for sexual orientation (e.g., asexual, bi-curious, demisexual, heteroflexible, heteroromantic, homoromantic, mostly gay, mostly straight, omnisexual, panromantic, pansexual, and queer.)

Representative self-labels and comments from participants who chose “other” as their race/ethnicity identity are given in Table 2.

Participants’ relationship statuses varied. 31% of the sample reported not currently being in a relationship; 27% were dating; 18% were cohabiting; 5% were engaged (including engagements for relationships not legally recognized as marriage); 26% were married (including relationships not legally recognized as marriage); and 15% described their relationship status as “other.” (Percentages total more than 100% because these choices were nonexclusive.) In all, 56% of the sample chose at least one status indicating having at least one sexual or romantic partner. Of these, 52% indicated that the relationship was exclusive; 26% that it was open; and 22% “other.” Irrespective of current relationship status, 57% of the sample indicated that they were not looking for a new relationship at present; 43% were looking for a new relationship.

The sample as a whole had relatively high education status. 26% of the sample had some college education; 29% held a four-year degree; 29% held graduate and professional degrees. Parental education levels were lower: 25% of mothers were described as holding high school diplomas, 25% four-year degrees, 14% held graduate and professional degrees. Similarly, 26% of fathers held high school diplomas, 22% four-year degrees, and 22% graduate and professional degrees. These three variables (own education, mother’s education, and father’s education¹⁰) were recoded to binary variables where 0 indicated less than a four-year college education, and 1 indicated a bachelor’s or higher degree. A 5 (gender identity) × 5 (sexual orientation) MANOVA including these

¹⁰ It should be noted that these items incorrectly assumed that respondents would identify their parents as one mother and one father.

binarized variables as dependent variables showed no multivariate effect of sexual orientation identity, Wilks' $\lambda = .971, F(12,2094) = 1.71, \eta_p^2 = .010, p = .059$, or gender identity, Wilks' $\lambda = .978, F(12,2094) = 1.27, \eta_p^2 = .007, p = .227$, and no multivariate interaction, Wilks' $\lambda = .948, F(12,2094) = .97, \eta_p^2 = .018, p = .528$, suggesting sexual orientation and gender identity were unrelated to participant or parental education..

Participants tended to describe their individual, personal income as relatively low: 47% reported incomes of \$20,000 or less per year, and only 10% reported incomes of greater than \$80,000 per year. A 5 (gender identity) \times 5 (sexual orientation identity) ANOVA showed a significant effect of gender on income level, $F(4,699) = 21.30, p < .001$, but no effect of sexual orientation, $F(4,699) = 1.68, p = .151$, nor any interaction effect, $F(4,699) = 1.40, p = .154$. Post-hoc followups using LSD found that men had higher average incomes than all other gender identities except MTF, all $ps < .001$, and that women had higher average income than participants with "other" gender identity, $p = .013$. Fully 80% of participants described their location as "urban," and 20% described it as "rural." A 5 (gender identity) \times 5 (sexual orientation identity) ANOVA showed no effect of gender identity, $F(4,702) = 1.33, p = .257$, or sexual orientation identity, $F(4,702) = .55, p = .701$, nor any interaction effect, $F(4,702) = 1.03, p = .418$, on rural/urban identification. Participants were asked to provide full or partial ZIP codes. Figure 1 is a map showing the regional distribution of participant ZIP codes across the

U.S.¹¹ There were 17 participants who provided international postal codes or otherwise identified themselves as not located in the US. All 17 were located in Canada or the U.K.

The complete set of demographic items is given in Appendix I.

¹¹ Where participants provided partial ZIP codes, the lowest-numbered corresponding ZIP codes are portrayed on the map (e.g., a response of “113” is portrayed as 11351; “940” is portrayed as 94002). A small number of participants provided ZIP codes that do not exist (e.g., 11862; 91163). These were not included in the map. A full map, including international postal codes, will be maintained as long as possible at the following Web address: <http://batchgeo.com/map/05ff895c299bbc76f3b4318ecd8dfdd4>.

Table 1

Gender and sexual orientation identity frequencies in the sample

Sexual orientation	Gender Identity (n, %)					Total
	Men	Women	MTF	FTM	Other	
Heterosexual	58 (8%)	90 (12%)	1 (< 1%)	1 (< 1%)	1 (< 1%)	151 (21%)
Bisexual	99 (14%)	59 (8%)	0 (0%)	0 (0%)	6 (1%)	164 (23%)
Gay or lesbian	100 (13.8%)	48 (7%)	1 (< 1%)	0 (0%)	2 (< 1%)	151 (21%)
Different label ^a	46 (6%)	99 (14%)	1 (< 1%)	7 (1%)	2 (< 1%)	193 (27%)
No label ^b	10 (1%)	41 (6%)	2 (< 1%)	2 (< 1%)	40 (6%)	67 (9%)
Total	313 (43%)	337 (46%)	5 (1%)	10 (1%)	61 (8%)	726 (100%)

Note. Percentages may not sum to 100% due to rounding. MTF = male to female transgender. FTM = female to male transgender.

^aItem text: “I prefer a different label.”

^bItem text: “I don’t use any label for my sexual orientation.”

Table 2

Representative comments on selection of “other” ethnicity

Single ethnicity labels	Single ethnicity comments	Multiple ethnicity comments
Arabic	I’m black and white but this identity is a new one completely so I’m really neither.	As a Latin@ I consider my race multiracial (since Latin@ is no longer a race option).
Asian		
Armenian	Filipino -- technically Asian, though I don’t really “feel” Asian (which to my mind means East Asian, like Chinese).	My mother is Guyanese and my father is Irish/German-American. [...]I am of Melungeon ^a descent and, by DNA test, am 72% Northern European, 13% Amerindian, and 15% Sub-Saharan African. [...]
Caribbean		
Colombian	Because my ethnic background is Middle Eastern and Eastern European Jewish, which is kind of its own thing; even though I guess I’m white.	I am Armenian as well as Irish/Scottish/Austrian/White-European-Time, etc., and I occasionally get asked by “perceptive” individuals “What are you?”. Overall, I would not say that I appear mixed, though, and I do not participate heavily in Armenian culture. For all intents and purposes, I am ‘white’, and I experience white privilege.
Cajun		
Jewish	I am ‘white’, and I experience white privilege.	
Mexican		
Sri Lankan		
White (European)		
South African		

Note. Comments are lightly edited for typographical errors. Some material is elided with ellipses, “[...]”.

^aMelungeons are a mixed ethnic group living in the Cumberland Gap region of the U.S. (See: <http://melungeon.org/>)



Figure 1. Map showing regional distribution of participant ZIP codes. Each circle is located roughly in the center of the region to which it corresponds. Numbers indicate number of participants in each region. Shadings in circles are generated by the mapping software and do not represent relevant data. Cities are included on the map for reference purposes only. For a full, interactive map, see <http://batchgeo.com/map/05ff895c299bbc76f3b4318ecd8dfdd4>

Measures

Survey prototyping and piloting. The survey instrument was prototyped using think-aloud cognitive interviews (as described in Dillman, Smyth, & Christian, 2009) with a small number of participants, and piloted with a larger sample. Both stages resulted in changes being made to the candidate measures originally identified. Survey prototyping and piloting are described in Appendix A.

Mate selection tasks. A mate-selection task that assessed how important various characteristics are when selecting a mate was designed, based on the mate-selection task in Lippa (2007). In the original version, participants ranked traits. For the present study, participants rated the importance of each trait on a 7-point Likert-type scale ranging from “not at all important” to “extremely important.” The ratings were first made for “a short-term, no-strings-attached sexual relationship” and then for “a long-term, committed romantic and sexual relationship” to differentiate between sexual desire and pair bonding as motivations for mate selection. Participants also rated how interested they were in each of those types of relationships on a 1–7 scale, with higher numbers indicating greater interest.

List of traits. The list of traits was similar to that used in Lippa (2007), with some modifications. Lippa used the following list of traits: “age, ambition, communication skills, dependability, domestic skills, face attractiveness, fitness, fondness for children, hands, health, honesty, humor, industriousness, intelligence, kindness, money, all round good looks, parenting abilities, prosperity, religion, social status, teeth, and values” (p. 197). Lippa did not give reliability or validity data for this list.

Items retained without modification. For the proposed work, the constructs of age, ambition, communication skills, dependability, intelligence, honesty, humor, kindness, and parenting abilities all were retained without modification.

Items modified for familiarity, clarity, and/or better operationalization.

“Industrious” was modified to *hard-working*; the former was deemed likely to be unfamiliar to some participants. Similarly, “fondness for children” was modified to *likes children*. Lippa’s “religion” and “values” items were judged to be poorly operationalized and were modified to *shares my religious/spiritual beliefs* and *moral/ethical values*. “Domestic skills” was modified to *skills for maintaining a home*. “Health” was modified to *physical health* and fitness was modified to *physical fitness*.

Items collapsed due to having been poorly differentiated in Lippa’s results.

Lippa’s (2007) data suggested that “face attractiveness” and “all round good looks” were not well differentiated by participants, showing consistently close average rankings across sex and sexual orientation groups. These were collapsed into a single *physical attractiveness* item. Similarly, “money,” “social status,” and “prosperity” were not well differentiated by Lippa’s participants; these were collapsed into *wealth* and *career achievement*.

Items dropped due to adding little information. Lippa’s (2007) items “hands” and “teeth” were consistently very low-ranked and did not seem to add meaningful information to his results. Both items were dropped.

Items added. The items *is a man* and *is a woman* were added in order to investigate whether bisexually-identified individuals would tend to rate it as less important than would participants who do not identify as bisexual (Paul, 1984; Ross,

1984; Zinik, 1985). The items *acts masculine* and *acts feminine* were added per the discussion of Lippa and Connelly (1990) and Lippa (2000) above. Further, Lippa's (2007) discussion noted additional traits that could have been added to the original list, including "chastity," "loves me," "acceptable to parents and friends," "shares my interests," and "exciting sex partner." These were included as *sexually faithful, loves me, gets along with my parents/friends, shares my interests, and exciting sex partner* ("good in bed").

Items changed after the prototyping stage. In prototyping interviews, some participants commented that some items were semantically ambiguous. Explanatory text was added as follows: *Physically healthy (doesn't get sick often); Sexually faithful (has sex only with me); Shares my religious/spiritual beliefs (or lack of same)*. The prompt for the mate-selection task was reworded to clearly define the term "committed relationship," as follows: "*Committed*" means that you and your partner have a clear understanding about what constituted sexual "unfaithfulness."

The final list of 28 traits rated for a short-term sexual relationship and for pair bonding was:

Acts masculine	Exciting sex partner ("good in bed")
Acts feminine	Gets along with my parents/friends
Age	Hard-working
Ambition	Honesty
Career achievement	Humor
Communication skills	Intelligence
Dependability	Is a man

Is a woman	Physically healthy (doesn't get sick often)
Kindness	Sexually faithful (has sex only with me)
Likes children	Shares my interests
Loves me	Shares my religious/spiritual beliefs (or
Moral/ethical values	lack of same)
Parenting abilities	Skills for maintaining a home
Physical attractiveness	Wealth

The order of presentation of the characteristics was randomized, in order to guard against order effects. The complete measure is given in Appendix B.

Gender diagnosticity. Lippa (2000, 2002, 2010; Lippa & Connelly, 1990) found that occupational preference questionnaires provided reliable and valid gender-diagnosticity scores. Lippa's occupational preference items have historically been selected from the Strong-Campbell Interest Inventory (Campbell & Hansen, 1981). A 70-item questionnaire has previously shown excellent reliability ($\alpha = .92$ overall, .89 for men, and .79 for women; Lippa, 1998). A 10-item version of this questionnaire has previously shown lower, but still acceptable, reliability ($\alpha = .82$ overall, .76 for men, and .71 for women) when ipsatized items were computed, i.e., when the individual's mean rating across all items was subtracted from individual item ratings (Lippa, 2010). In a personal communication (August 7th, 2010), Lippa suggested that scales containing a minimum of 20 items would be likely to balance reliability against participant burden. Ultimately, the 40 occupational-preference items were taken from Lippa (2002, Appendix B). In the present sample, this 40-item measure showed excellent reliability ($\alpha = .88$ overall, .91 for men, and .85 for women).

In the GD task in the present study, participants were asked to rate, on a 7-point Likert scale ranging from “strongly dislike” to “strongly like,” how much they would like working in each of the following 40 occupations:

Accountant	Costume designer	Manager of a clothing store
Art museum director	Dance teacher	Mathematician
Auto mechanic	Editor	Mechanical engineer
Auto sales person	Electrical engineer	Minister, rabbi, clergy person
Beauty consultant	Farmer	Newspaper reporter
Biologist	Fashion model	Nurse
Bookkeeper	Flight attendant	Physician
Building contractor	Florist	Poet
Business executive	Grade school teacher	Professional athlete
Carpenter	Interior decorator	Psychologist
Chemist	Inventor	Social worker
Children’s author	Jet pilot	Writer of fiction
Clerk	Lawyer	
Computer programmer	Librarian	

A 41st item, “Please select ‘Slightly Like’,” was added as a Turing test. The order of presentation of items was randomized. The complete measure is given in Appendix C.

Bem Sex-Role Inventory. The Bem Sex-Role Inventory (BSRI; S. Bem, 1974) was included in order to provide a check of convergent validity for the occupational-preference questionnaire. The BSRI is a questionnaire on which participants rate, on a 7-point Likert scale ranging from “Never or almost never true of me” to “Always or almost

always true of me,” the degree to which each of 60 personality traits are characteristic of themselves. The BSRI includes 20 items classed as “masculine,” 20 items classed as “feminine,” and 20 items classed as “neutral” (i.e., androgynously socially desirable). The masculinity subscale has shown good reliability ($\alpha = .86$), as has the femininity subscale ($\alpha = .80-.82$) (S. Bem, 1974). In the present data, the masculinity subscale showed excellent reliability ($\alpha = .90$) and the femininity subscale showed good reliability ($\alpha = .81$). The BSRI is typically used to provide masculinity, femininity, and androgyny scores, but, for the purposes of this study, was used as a gender-diagnostics measure. In accordance with this purpose, and in response to comments during survey prototyping about the length and burden of the full 60-item questionnaire, only the 40 “masculine” and “feminine” items were included. The complete measure is given in Appendix D.

Sexual-partner and pair-bonding histories. In order to test L. M. Diamond’s (2003b) biobehavioral model of sexual desire and pair bonding, participants were asked how many nonsexual pair-bond friendships they had had with men and women that involved features of limerence and/or attachment as described in L. M. Diamond (2003b), and how many, if any, of these relationships eventually became sexual. They were also asked about their numbers of friendships with men and women, sexual partners, and short-term (sexual-desire-driven) and long-term (pair-bond) sexual relationships. The complete measure is given in Appendix E.

Ratings of theorized components of sexual orientation. Participants rated, on a 7-point Likert scale ranging from “does not define a person’s sexual orientation at all” to “very strongly defines a person’s sexual orientation,” the following 12 constructs. The list of constructs was adapted from Tannenbaum’s (2006) Attitudes Toward Components of

Sexual Orientation Scale (ATCSOS). The original measure showed acceptable reliability ($\alpha = .79$). In the present study, the ATCSOS items were reworded for simplicity, clarity, and consistency of wording. The constructs assessed were:

- Sexual attractions
- Sexual behaviors
- Sexual fantasies
- Falling in love
- Sexual orientation identity
- Acceptance of and comfort with own sexual orientation identity
- Gender identity
- Gender role orientation
- Cultural factors
- Social experiences
- Changes over time in factors related to sexual orientation
- Biological factors

A 13th item, “Please choose ‘somewhat defines a person’s sexual orientation’ to answer this item,” was added as a Turing test. In the present sample, the items showed acceptable reliability ($\alpha = .73$). The complete measure is given in Appendix F.

Ratings of own levels of theorized components of sexual orientation.

Participants first rated, on a 7-point Likert scale ranging from “not at all” to “very much,” their sexual attraction to men and women. Next, they rated, on 7-point Likert scales ranging from “0% (none of them)” to “100% (all of them)” the following proportions:

- Proportion of their own sexual fantasies that were about men

- Proportion of their own sexual fantasies that were about women
- Proportion of sexual experiences with men
- Proportion of sexual experiences with women
- Proportion of “falling in love” experiences with men
- Proportion of “falling in love” experiences with women

The complete measure is given in Appendix G.

Sexual identity exploration and commitment. In the prototyping and piloting stages, the Measure of Sexual Identity Exploration and Commitment (MoSIEC; Worthington et al., 2008), a scale based on Marcia’s (1966) model of general identity development, and Worthington et al.’s (2002) model of heterosexual identity development, was used to assess sexual identity exploration and commitment. However, prototyping interviews showed that participants had marked difficulty understanding and responding to the items, and pilot analyses showed a wide variation in subscale α s across gender and sexual orientation identity categories (α s = .48–.85). Given these concerns, the MoSIEC was replaced with 9 items, reworded for clarity, on which participants rated, on 6-point Likert scales ranging from “very uncharacteristic of me” to “very characteristic of me,” the degree to which they questioned and/or explored their own sexual orientation identity and the degree of comfort they felt with their own sexual orientation identity. The complete measure is given in Appendix H.

Demographic items. In order to describe the sample, participants were asked age; sex; race/ethnicity; education level; mother’s education level; father’s education level; individual annual income; sexual orientation identity label; and current relationship status. The demographics items are given in Appendix I.

Procedures

Participants accessed the study instrument via Qualtrics.com, an online survey tool. They were required to affirm that they were at least 19 years old, and that they had read the informed consent form, before beginning the survey. After the survey was completed, participants were presented with a debriefing form and a link to a separate survey where they were given the opportunity to enter their email addresses in order to be sent compensation. Compensation was provided in the form of \$5 electronic Amazon.com gift cards, which were sent directly to the individual email addresses. Compensation was sent at irregular intervals, depending on the rate of accumulation of responses, but generally not longer than 3 weeks elapsed between response and compensation. All procedures were approved by the University of Nebraska–Lincoln’s Institutional Review Board (IRB).

Results

Most analyses excluded participants with MTF, FTM, and other gender identities due to very small cell *ns*. Participants with unlabeled or other-labeled sexual orientation identities were also excluded from most analyses, despite relatively large cell *ns*. Given that these participants’ comments clearly indicated (a) a wide variety of identities and self-definitions, and (b) that these participants saw themselves as distinct from traditional gender and sexual orientation identity groups—a distinction that is supported in the literature (e.g., Kuper, Nussbaum, & Mustanski, 2011; Chasin, 2011)—and given that gender and sexual orientation identity effects were not observed for demographic variables (see *Description of the Sample*, above) it was judged inappropriate to subsume these participants into other groups. Instead, they were excluded from analyses for

research hypotheses that did not contemplate nontraditional sexual orientation identities. However, future work from this dataset will involve analyses that do include participants with nontraditional sexual orientation identities.

Hypothesis 1

Gender role orientation and sexual orientation are related. Men and women whose GD scores differ significantly from the average for their gender will be more likely to identify as gay or lesbian. More specifically, GD score deviance from gender means will predict individuals' self-rated same-sex attraction. No similar prediction is made about identification as bisexual.

A linear discriminant function (LDF) was performed, with self-reported gender (men and women only) as the criterion and the items in the occupational preference questionnaire as the independent variables. Participants with MtF, FtM, and other gender identity were excluded. Prior probability of group membership was constrained at 50% each. The analysis resulted in a single function with eigenvalue = .690, canonical correlation = .639, Wilks' $\lambda = .592$, $\chi^2(40, N = 637) = 322.79$, $p < .001$. The group centroid for men was .868; that for women was $-.793$. The function correctly classified 79.7% of cases; 19% of men were classified as women, and 22% of women were classified as men. Function scores were used as gender diagnosticity (GD) scores in later analyses.

A second linear discriminant function (LDF) was performed, with self-reported gender (men and women only) as the criterion and the 40 "masculine" and "feminine" BSRI items as the independent variables. Prior probability of group membership was constrained at 50% each. The analysis resulted in a single function with eigenvalue =

1.034, canonical correlation = .713, Wilks' $\lambda = .492$, $\chi^2(40, N = 642) = 440.11$, $p < .001$. The group centroid for men was 1.060; that for women was $-.972$. The function correctly classified 85.2% of cases; 16% of men were classified as women, and 14% of women were classified as men. Function scores were used as gender diagnosticity (GD) scores in later analyses.

Pearson correlations between the GD score for the occupational-preference items and the GD score for the BSRI were calculated. The overall correlation for both men and women was strong, $r(632) = .607$, $p < .001$. The correlation for men was medium, $r(301) = .287$, $p < .001$. The correlation for women was medium, $r(331) = .267$, $p < .001$.

Pearson correlations between each GD score and sexual orientation identity (binary coded as 0 = heterosexual, 1 = lesbian, gay, or bisexual [LGB]) were calculated separately for men and women. For both men and women, the correlations between sexual orientation identity and GD score from the occupational-preference questionnaire were nonsignificant: men's $r(250) = -.072$, $p = .255$. women's $r(194) = .056$, $p = .437$. For women, the correlation between sexual orientation identity and GD score from the BSRI was nonsignificant, $r(195) = .128$, $p = .075$. For men, the correlation between sexual orientation identity and GD score from the BSRI was significant, $r(253) = -.231$, $p < .001$. Men who scored in the female direction on the BSRI were more likely to identify as LGB than were men who scored in the male direction.

Pearson correlations between each GD score and attraction to men and attraction to women were calculated separately for men and women. GD score from the

occupational preference questionnaire predicted both men's attraction to men, $r(304) = -.129, p = .024$, such that men who scored in the female direction reported more attraction to men, and men's attraction to women, $r(304) = .306, p < .001$, such that men who scored in the male direction reported more attraction to women. GD score from the occupational-preference questionnaire did not predict women's attraction to women, $r(333) = -.035, p = .520$, or to men, $r(333) = -.069, p = .212$. GD score from the BSRI predicted both men's attraction to men, $r(307) = -.244, p < .001$, and men's attraction to women, $r(307) = .307, p < .001$. GD score from the BSRI predicted both women's attraction to men, $r(335) = -.162, p = .003$, and women's attraction to women, $r(334) = .145, p = .008$. In all cases where correlation was significant, participants whose GD score was in the gender-typical direction reported greater attraction to the other gender, and participants whose GD score was in the gender-atypical direction reported greater attraction to the same gender.

Hypothesis 2

Mate selection strategies differ when the motivation is sexual desire vs. when the motivation is pair bonding. Decision rules about mate selection will differ depending on whether the decision is motivated by short-term (sexual desire) or by long-term (pair-bonding) considerations.

Multidimensional scaling analyses were performed on individuals' ratings of mate traits in both mate selection tasks, omitting the items "is a man," "is a woman," "acts masculine," and "acts feminine" in order to allow for comparability across gender and

sexual orientation identities. The number of dimensions was constrained at 2 for maximum interpretability. The whole-sample solution for the short-term (sexual-desire) relationship task had $N = 719$, $R^2 = .97$, and stress = .08. The x -dimension appeared to sort attributes by importance, with more preferred attributes to the right (in the $+x$ direction) and less preferred attributes to the left (in the $-x$ direction). The x -origin line appeared to sharply divide the map into essential vs. nonessential attributes. The y -dimension appeared to reflect participants' consensus on ratings, with items consistently given a specific rating by more participants clustering along the x -axis line, and with items whose ratings varied more among participants diffusing outward. Among the critical attributes, sexual-attractiveness attributes (e.g., "physical attractiveness," "exciting sex partner") were clearly clustered separately from character-attractiveness attributes (e.g., "intelligence," "humor," "honesty"). Among the non-critical attributes, achievement (e.g., "wealth," "career achievement") and family (e.g., "parenting skills," "skills for maintaining a home") attributes were clearly clustered separately from relationship attributes (e.g., "loves me," "sexually faithful"). The map is displayed in Figure 2.

The whole-sample solution for the long-term (pair-bond) relationship task had $N = 720$, $R^2 = .95$, and stress = .12. The map displayed a similar dimensional structure, with the x -axis reversed (i.e., more essential attributes in the $-x$ direction, and less essential attributes in the $+x$ direction). Character-attractiveness attributes were clearly preferred to sexual-attractiveness attributes. The cluster structure was less well defined, with character-attractiveness attributes forming a clear cluster and sexual-attractiveness attributes forming a looser second cluster, suggesting that participants tended to highly

rate a wider variety of attributes than in the sexual-desire task. The whole-sample pair-bond solution map is displayed in Figure 3.

Multidimensional scaling analyses were then performed separately by gender and sexual orientation identity, including the partner gender items. Due to the very exploratory nature of this analysis, it was thought appropriate to include all participants in these analyses. Due to small cell *ns*, the MTF, FTM, and “other” gender identity categories were collapsed into a single “other gender” category. Similarly, the differently-labeled and unlabeled sexual orientation identity categories were collapsed into a single “other sexual orientation” category. Fit statistics are given in Table 3. Some MDS solutions had very low cell *n* and will not be considered further. Solution maps are displayed in Figures 4–21. Representative means are given in Tables 4–7.

The group sexual-desire MDS solutions generally showed a similar structure to the whole-sample solution, with sexual- and character-attractiveness attributes toward one end of the *x*-dimension, and achievement, family, and relationship attributes toward the other end of the *x*-dimension, with more popular attributes closer to the *x*-axis. The pair-bond MDS solutions were generally less clearly structured, with physical- and character-attractiveness attributes intermingled along the *x*-axis or in a single large cluster. Achievement, family, and relationship attributes tended to be at the outskirts, suggesting minority popularity.

The placement of partner gender attributes deserves some separate discussion. In the sexual-desire MDS solution for heterosexual men, “is a woman” appeared to be the most important characteristic. “Is a man” and “acts masculine” were placed at a distance from all other variables on both dimensions. “Acts feminine” was among the most

important attributes, but separated along the y -dimension, suggesting that it was not of equal importance to all heterosexual men. A similar picture obtained for gay men. The maps for heterosexual and bisexual women showed the inverse pattern. The maps for bisexual women and for participants of all genders with other sexual orientation identity all had group MDS solutions with partner gender and gender presentation clustered together and located among the less critical attributes. The map for bisexual men was more complex than the other maps, suggesting that women and femininity were less important to this group and that men and masculinity were more important to at least some bisexual men.

The partner gender/gender presentation picture in the pair-bond MDS solutions was more complex than in the sexual-desire MDS solutions. For heterosexual men, “is a woman” remained of paramount importance, and “acts feminine” only slightly less so; “is a man” and “acts masculine” remained apart from other attributes. An almost perfectly inverse situation obtained for heterosexual women and gay men. For lesbian women, “is a woman” was within the main cluster of attributes, and “is a man” and “acts masculine” were well separated from other variables, but “acts feminine” was situated with the critical variables along the x -dimension, yet separate along the y -dimension, suggesting importance to a subset of lesbian women. For men and women who identified as bisexual or with other sexual orientation identity, partner gender and gender presentation were among the least important attributes of a pair-bond partner, although split along the y -dimension, suggesting that subsets of this group had differing preferences. For other-gender participants with other sexual orientation identity, partner gender and gender identity were clustered together and located among the least important attributes.

Table 3

Cell ns and fit statistics for sexual-desire and pair-bond MDS solutions, by gender and sexual orientation identity

Sexual orientation identity	<u>Sexual-desire mate selection</u>			<u>Pair-bond mate selection</u>		
	<u>Gender identity</u>			<u>Gender identity</u>		
	Men	Women	Other	Men	Women	Other
Heterosexual	$n = 56$ $R^2 = .97$ Stress = .08	$n = 88$ $R^2 = .98$ Stress = .08	$n = 2^a$	$n = 57$ $R^2 = .99$ Stress = .07	$n = 89$ $R^2 = .99$ Stress = .07	$n = 3^a$
Bisexual	$n = 99$ $R^2 = .94$ Stress = .12	$n = 58$ $R^2 = .96$ Stress = .10	$n = 6^a$	$n = 96$ $R^2 = .94$ Stress = .14	$n = 58$ $R^2 = .97$ Stress = .10	$n = 6^a$
Gay or lesbian	$n = 97$ $R^2 = .97$ Stress = .08	$n = 48$ $R^2 = .96$ Stress = .09	$n = 3^a$	$n = 98$ $R^2 = .98$ Stress = .09	$n = 48$ $R^2 = .97$ Stress = .10	$n = 3^a$
Other label	$n = 55$ $R^2 = .91$ Stress = .14	$n = 139$ $R^2 = .96$ Stress = .10	$n = 64$ $R^2 = .96$ Stress = .09	$n = 56$ $R^2 = .93$ Stress = .14	$n = 139$ $R^2 = .96$ Stress = .10	$n = 64$ $R^2 = .97$ Stress = .08

^aCell n too low for interpretability

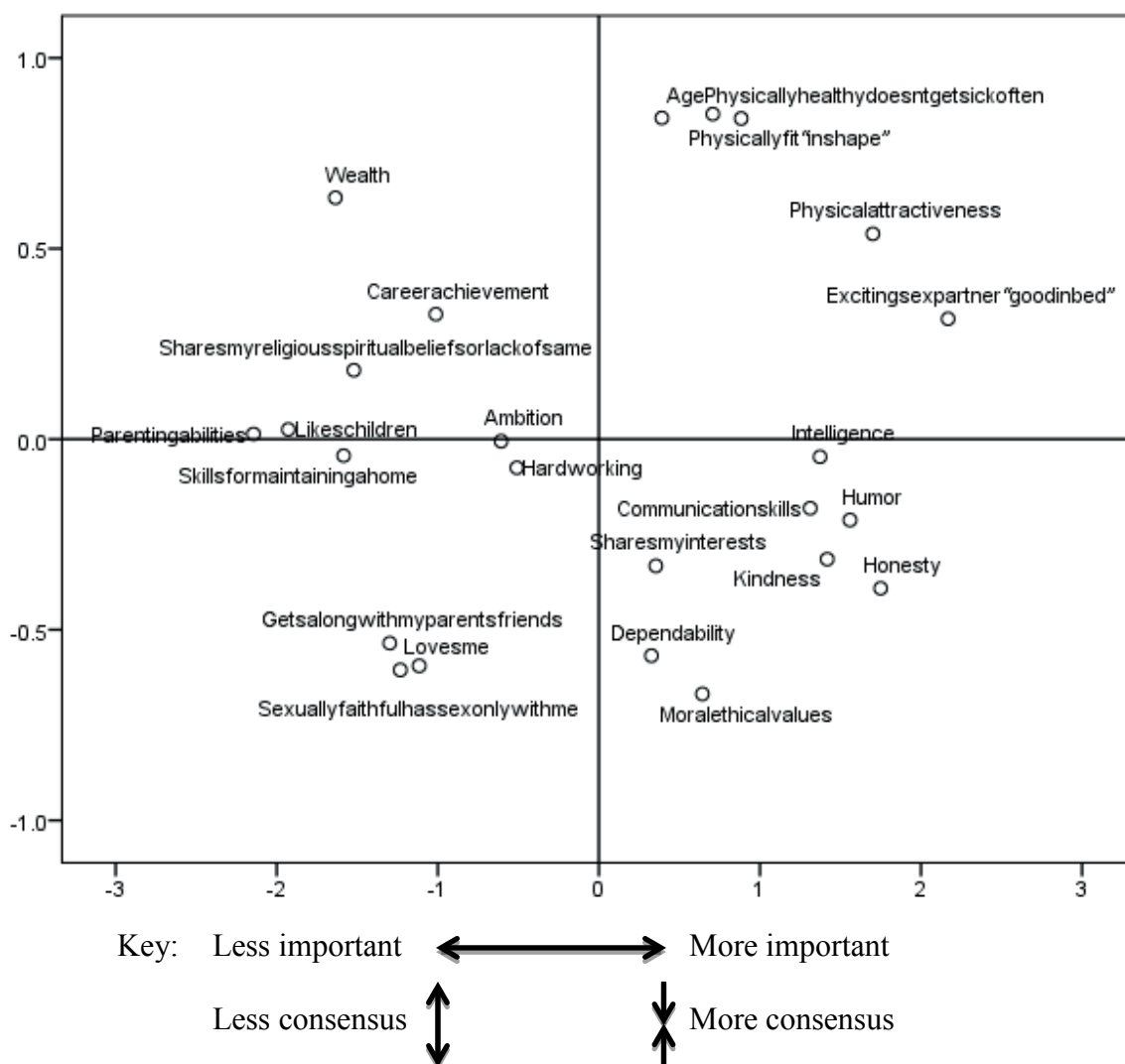


Figure 2. MDS solution map for whole sample, sexual-desire mate selection task. The x -dimension appears to rank the attributes, with less preferred items in the $-x$ direction (to the left) and more preferred attributes in the $+x$ direction (to the right). The y -axis appears to divide the map into essential (to the right) and inessential attributes (to the left). Items closer to the x -axis appear to have greater consensus in rating, and items further out have less consensus.

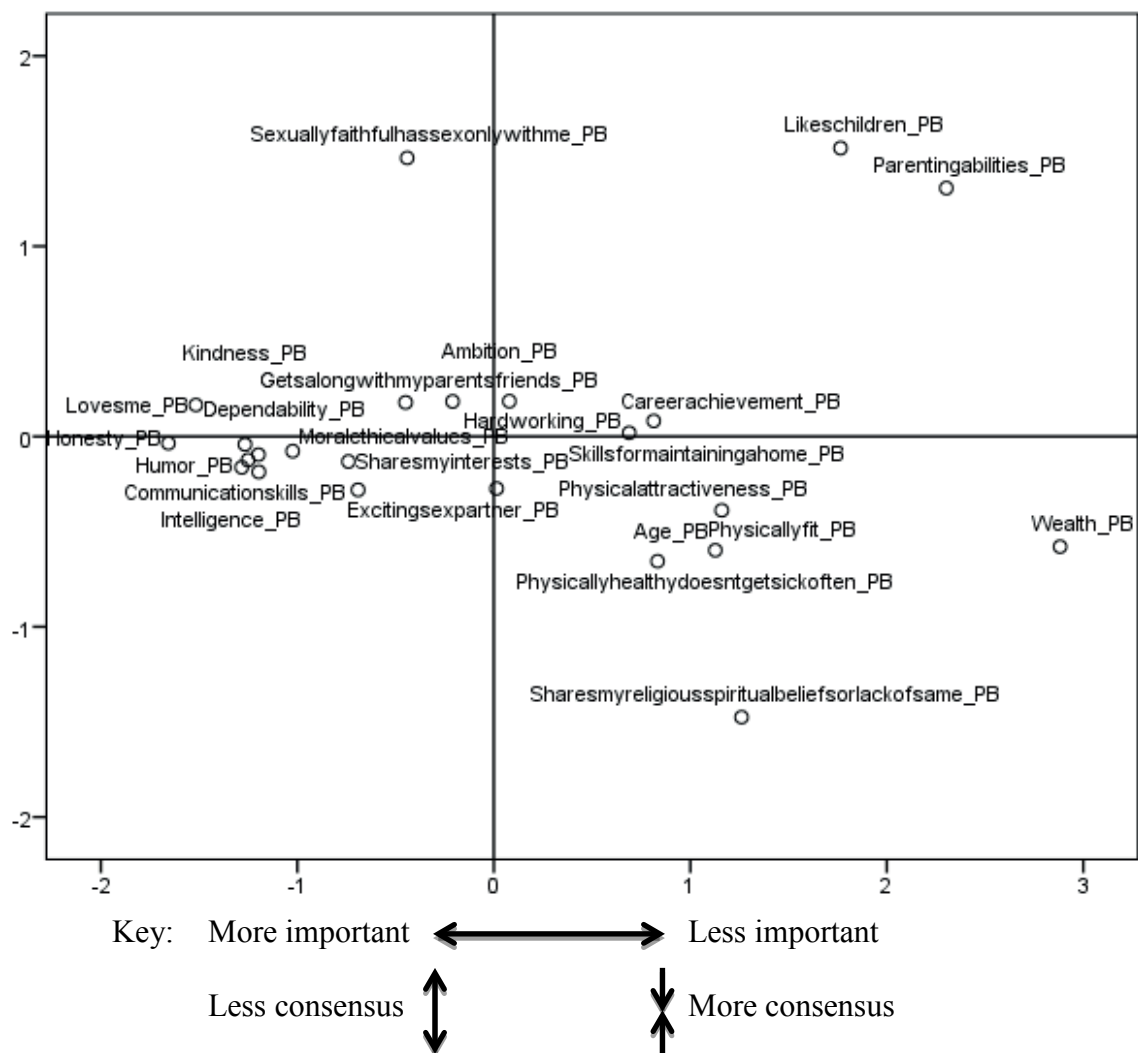


Figure 3. MDS solution map for whole sample, pair-bond mate selection task. Sexual- and character-attractiveness traits are intermingled in a single large cluster. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating.

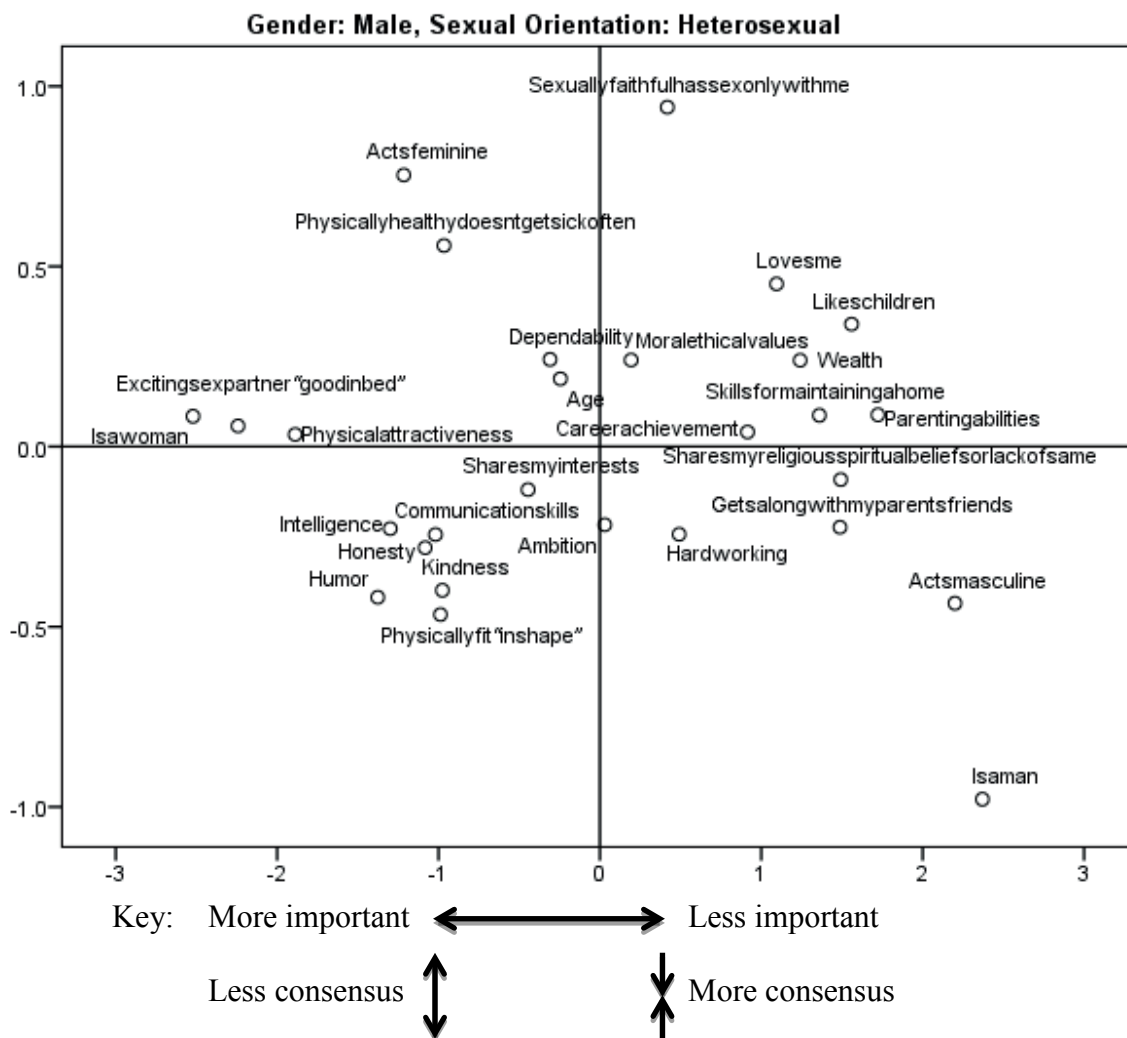


Figure 4. MDS solution map for heterosexual men's sexual-desire mate selection task.

The x-dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$).

Items closer to the x-axis appear to have greater consensus in rating

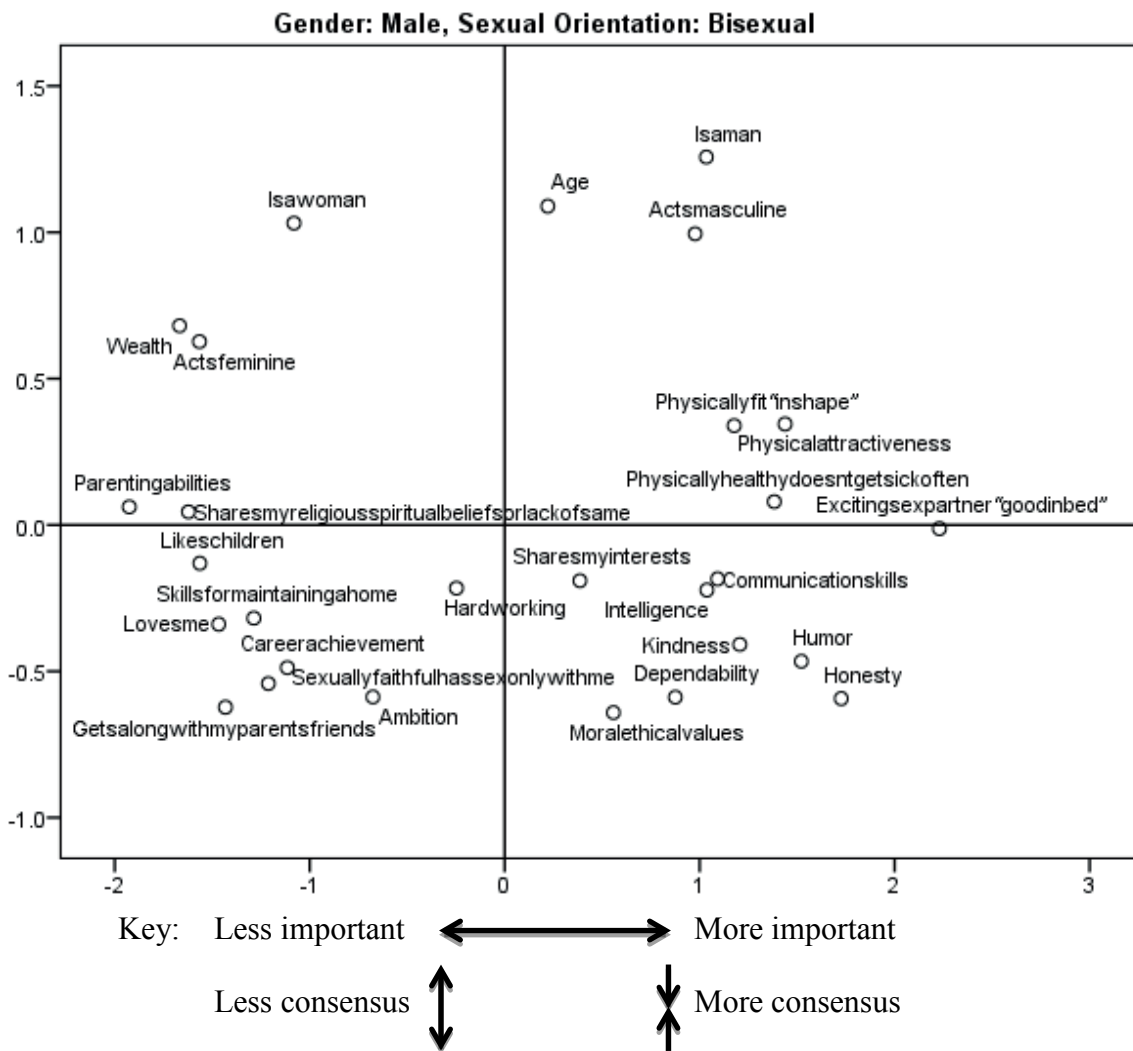


Figure 5. MDS solution map for bisexual men's sexual-desire mate selection task. The x -dimension appears to rank items from less preferred ($-x$) to more preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

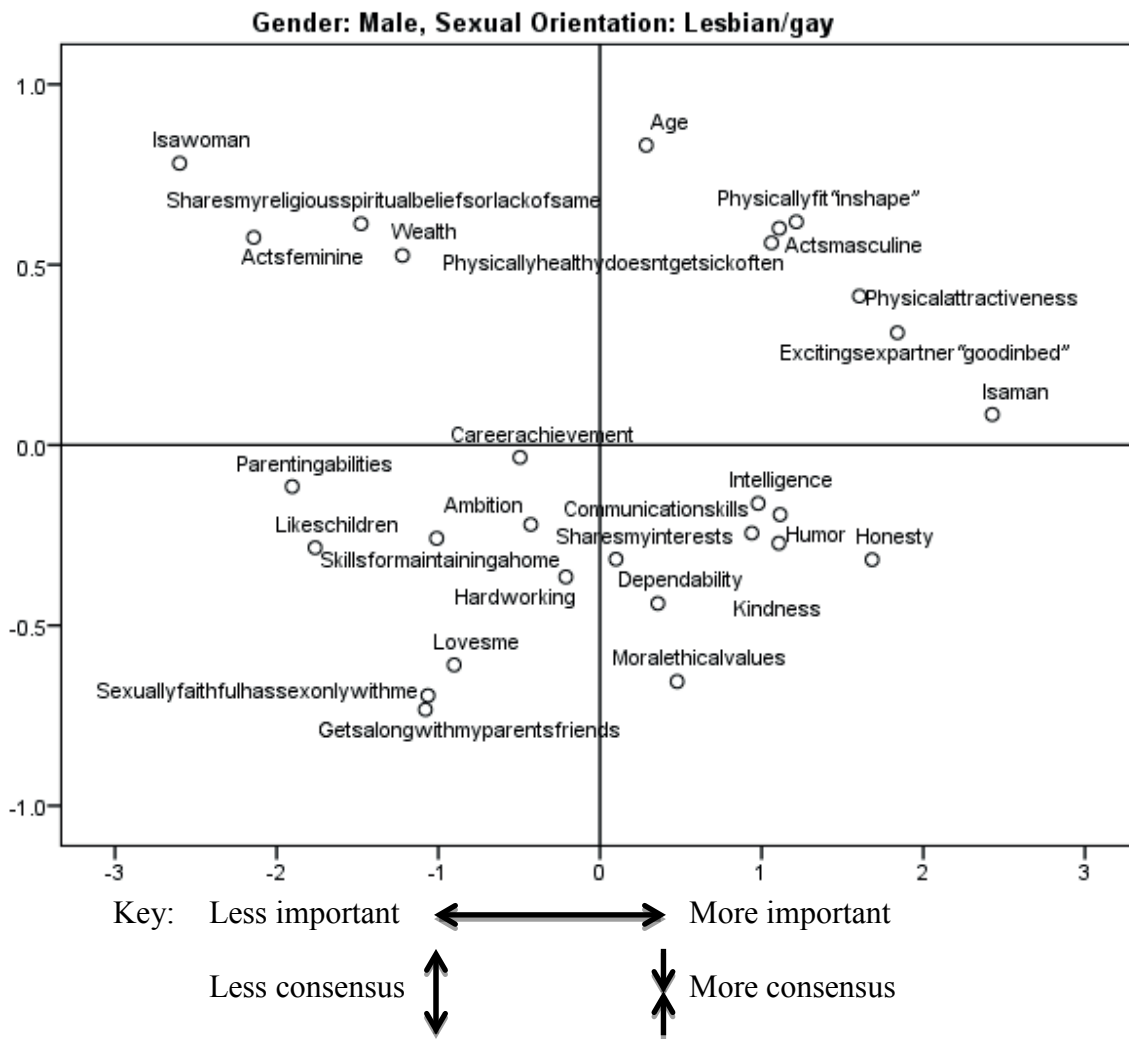


Figure 6. MDS solution map for gay men’s sexual-desire mate selection task. The x-dimension appears to rank items from less preferred (-x) to more preferred (+x). Items closer to the x-axis appear to have greater consensus in rating

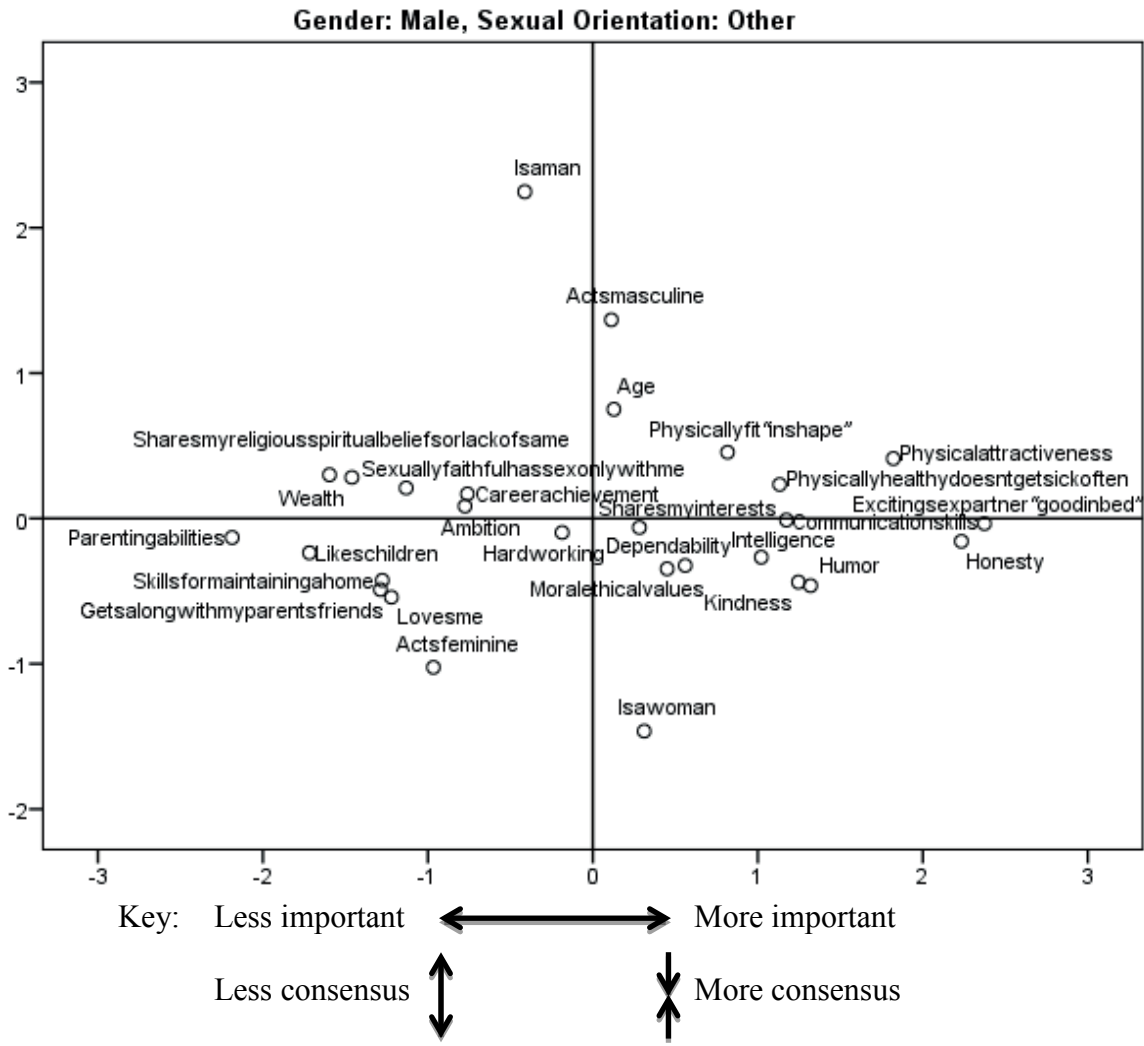


Figure 7. MDS solution map for other-sexual-orientation men's sexual-desire mate selection task. The x-dimension appears to rank items from less preferred (-x) to more preferred (+x). Items closer to the x-axis appear to have greater consensus in rating

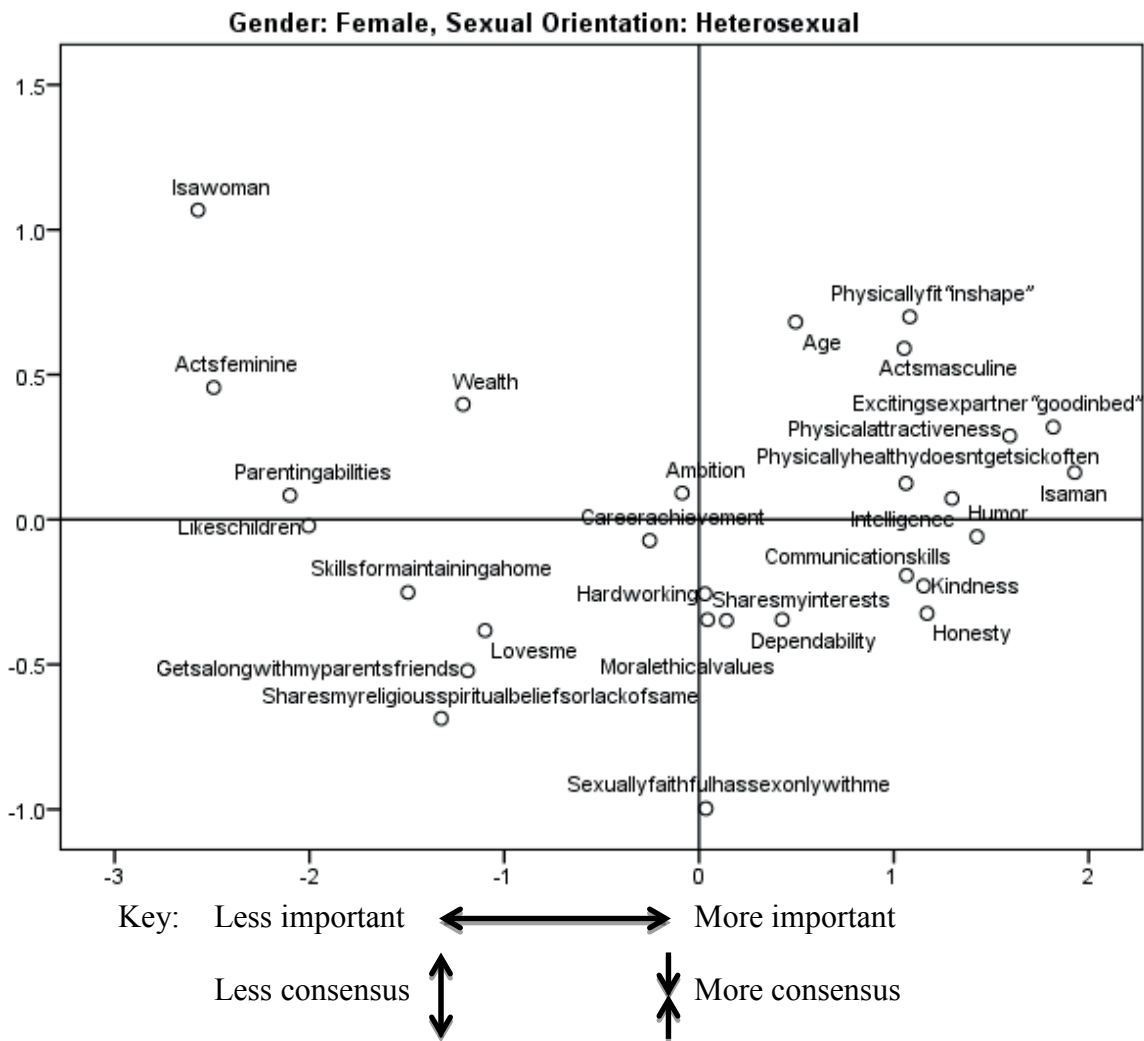


Figure 8. MDS solution map for heterosexual women’s sexual-desire mate selection task.

The x-dimension appears to rank items from less preferred (-x) to more preferred (+x).

Items closer to the x-axis appear to have greater consensus in rating

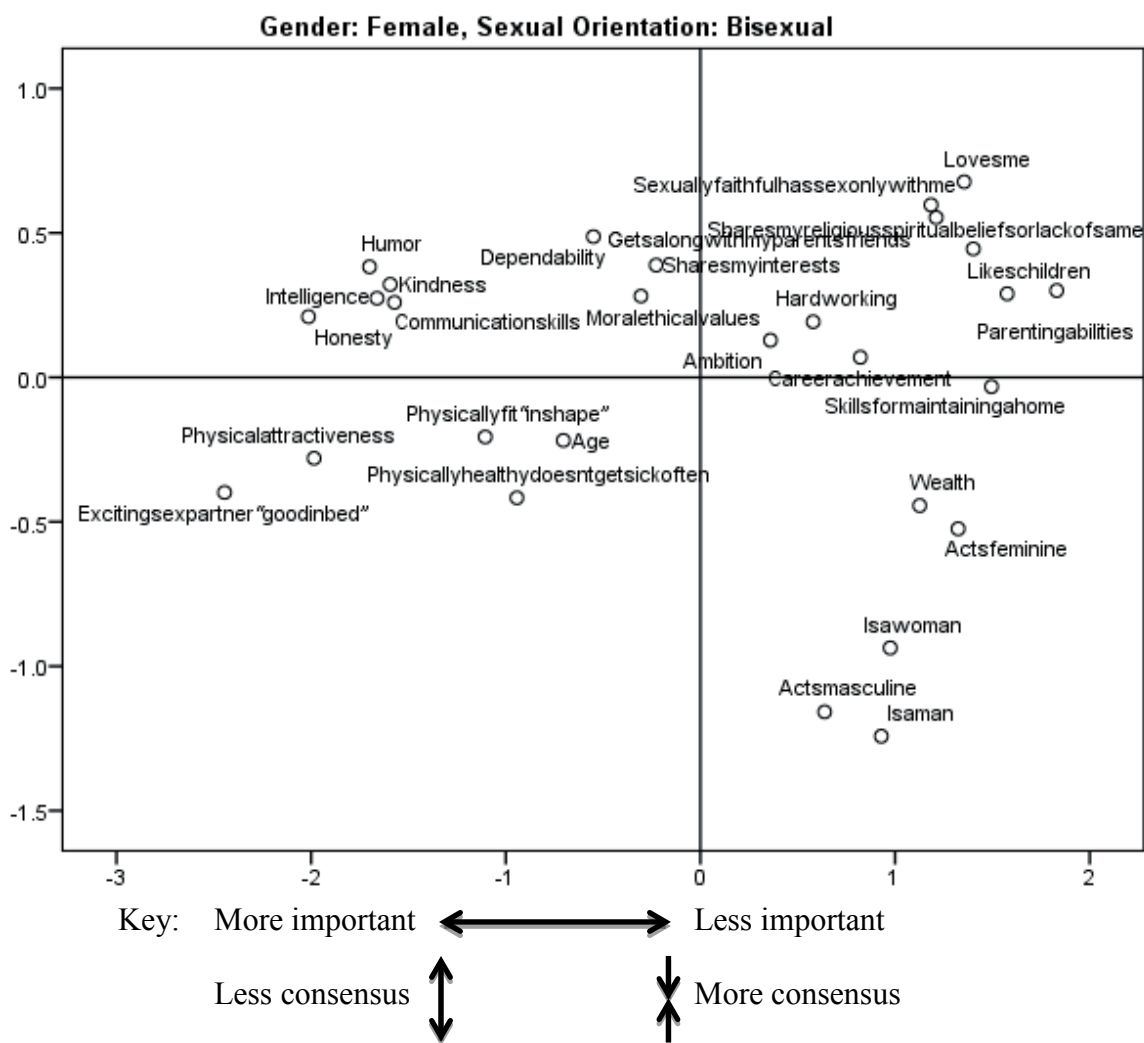


Figure 9. MDS solution map for bisexual women's sexual-desire mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

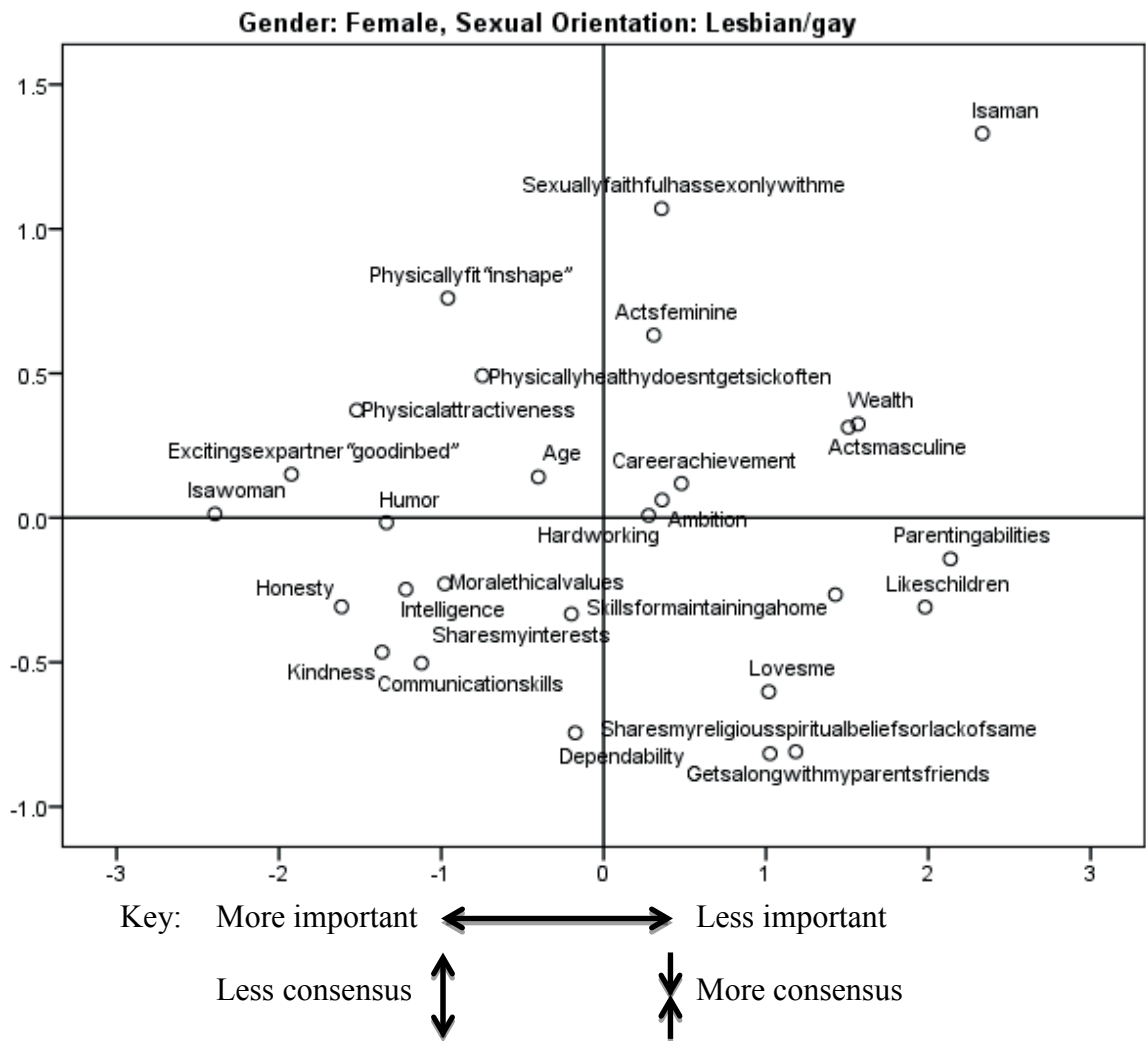


Figure 10. MDS solution map for lesbian women's sexual-desire mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

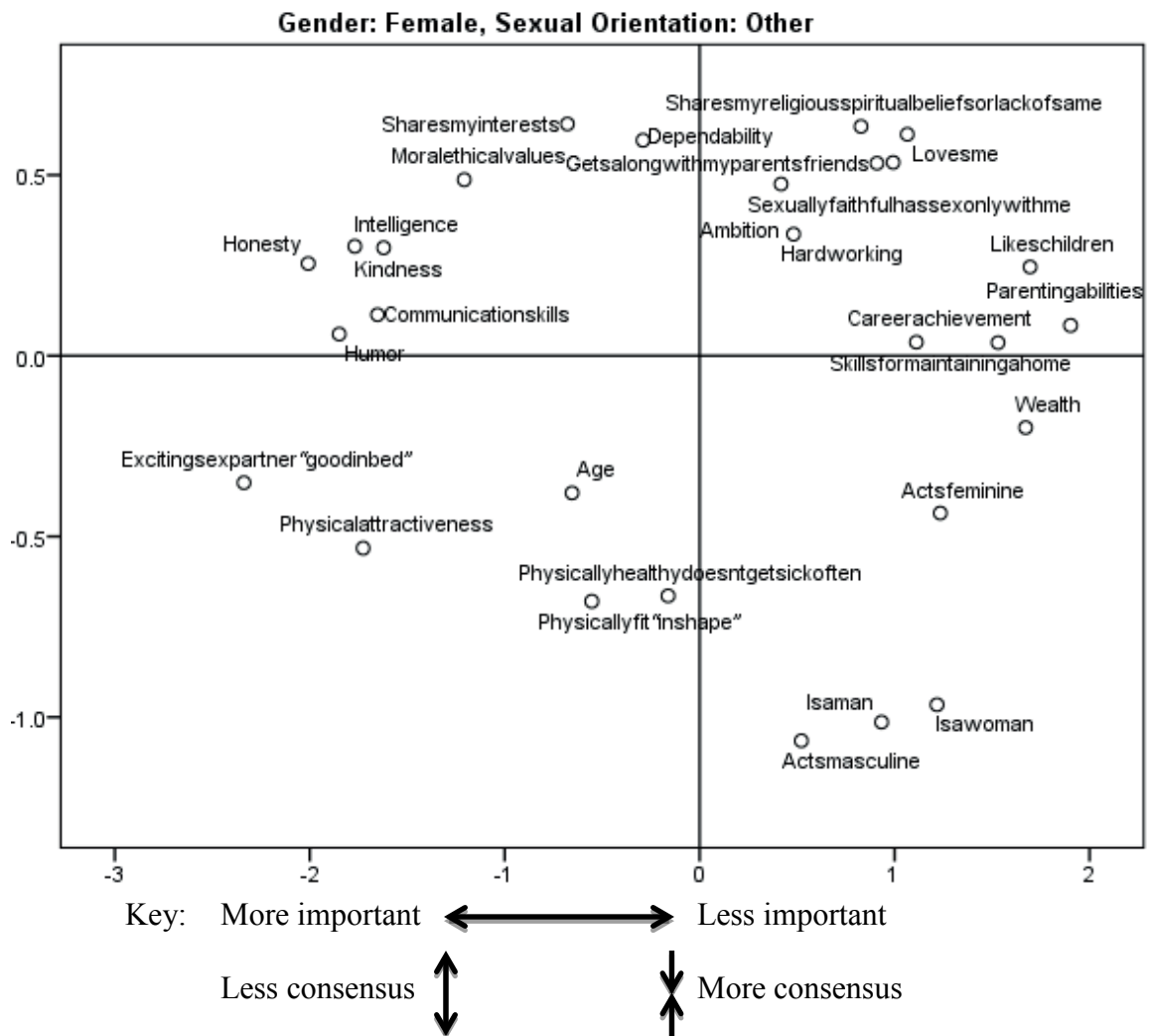


Figure 11. MDS solution map for other-sexual-orientation women's sexual-desire mate selection task. The x -dimension appears to rank items from less preferred ($-x$) to more preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

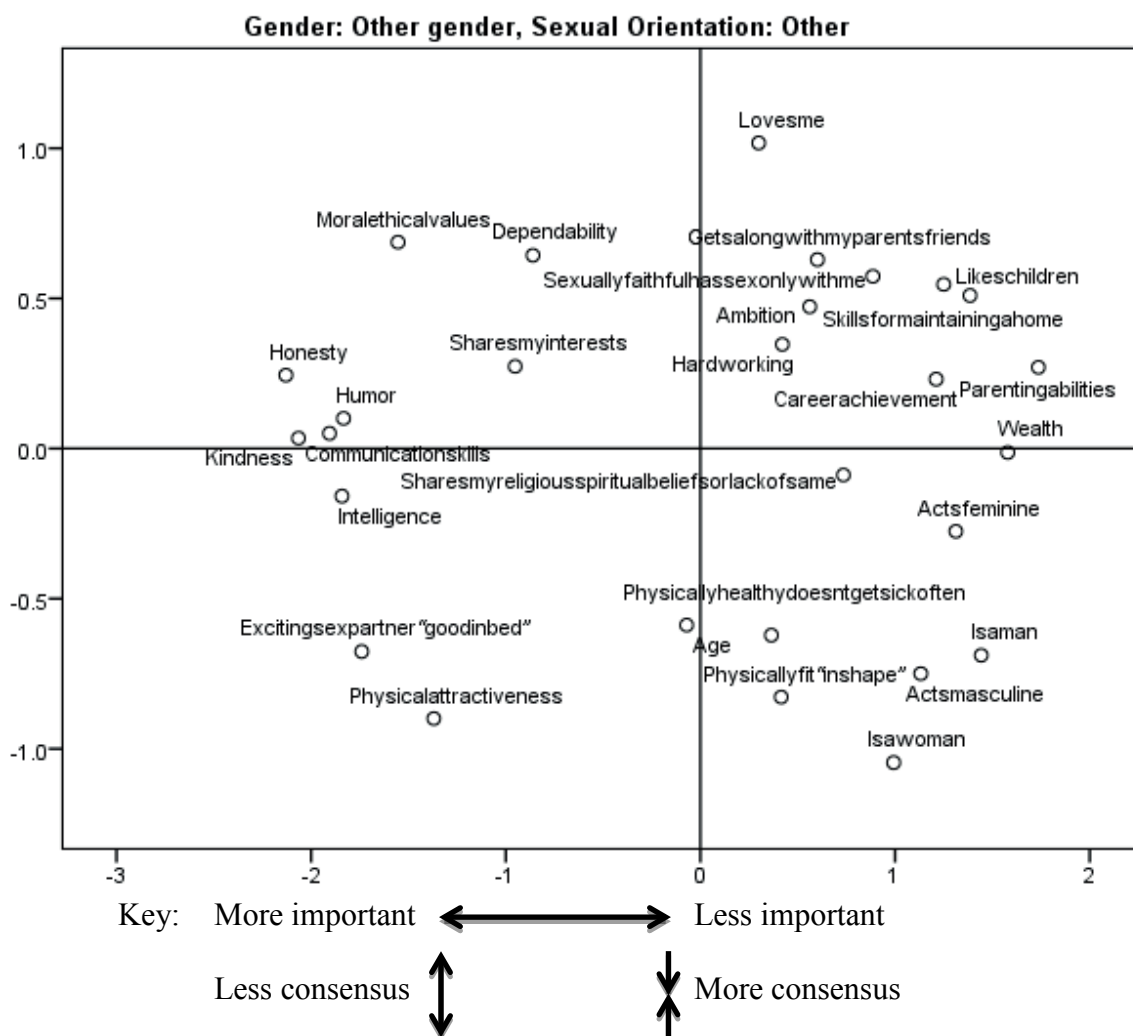


Figure 12. MDS solution map for other-sexual-orientation, other-gender participants' sexual-desire mate selection task. The x-dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x-axis appear to have greater consensus in rating

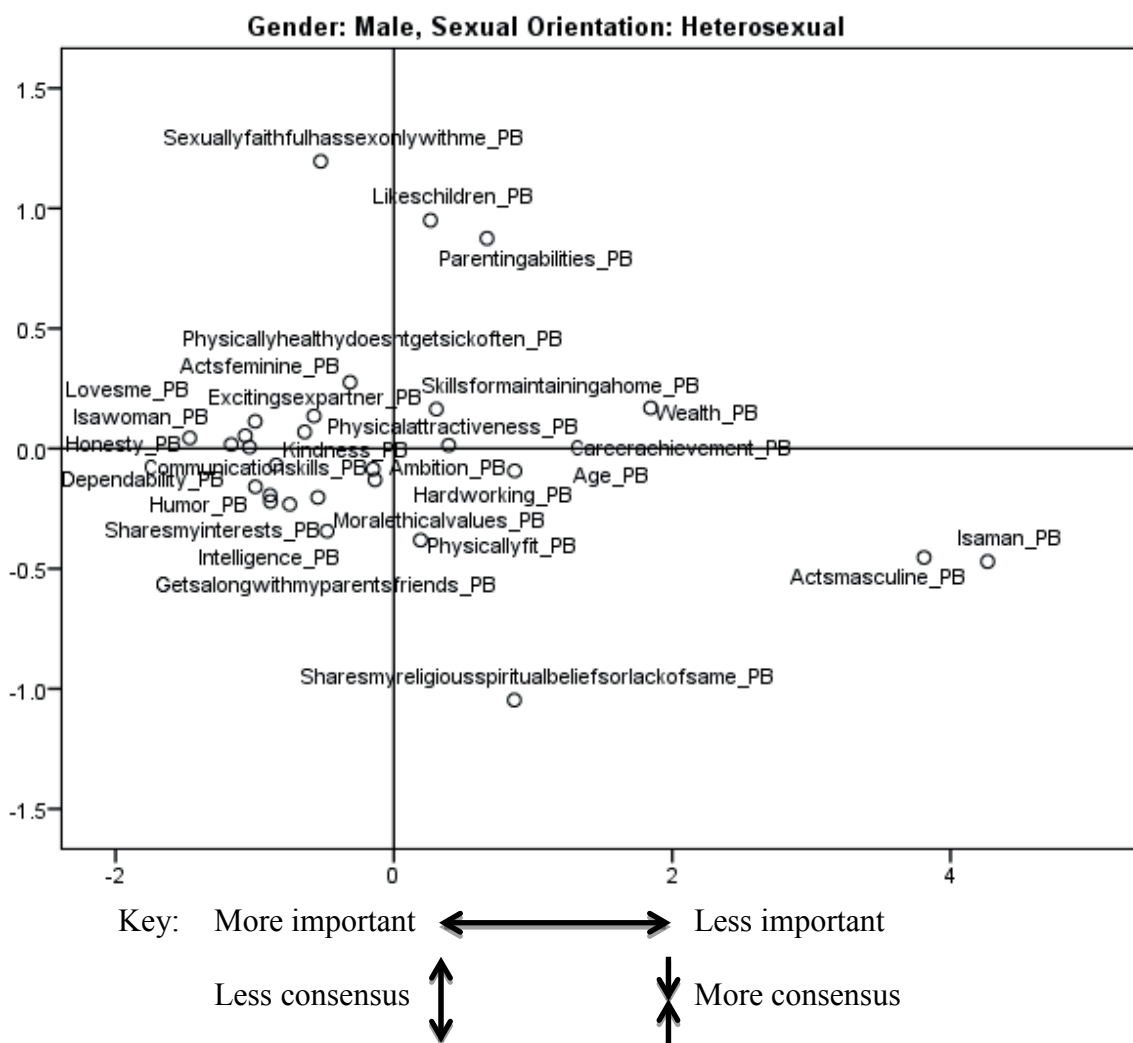


Figure 13. MDS solution map for heterosexual men's pair-bond mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

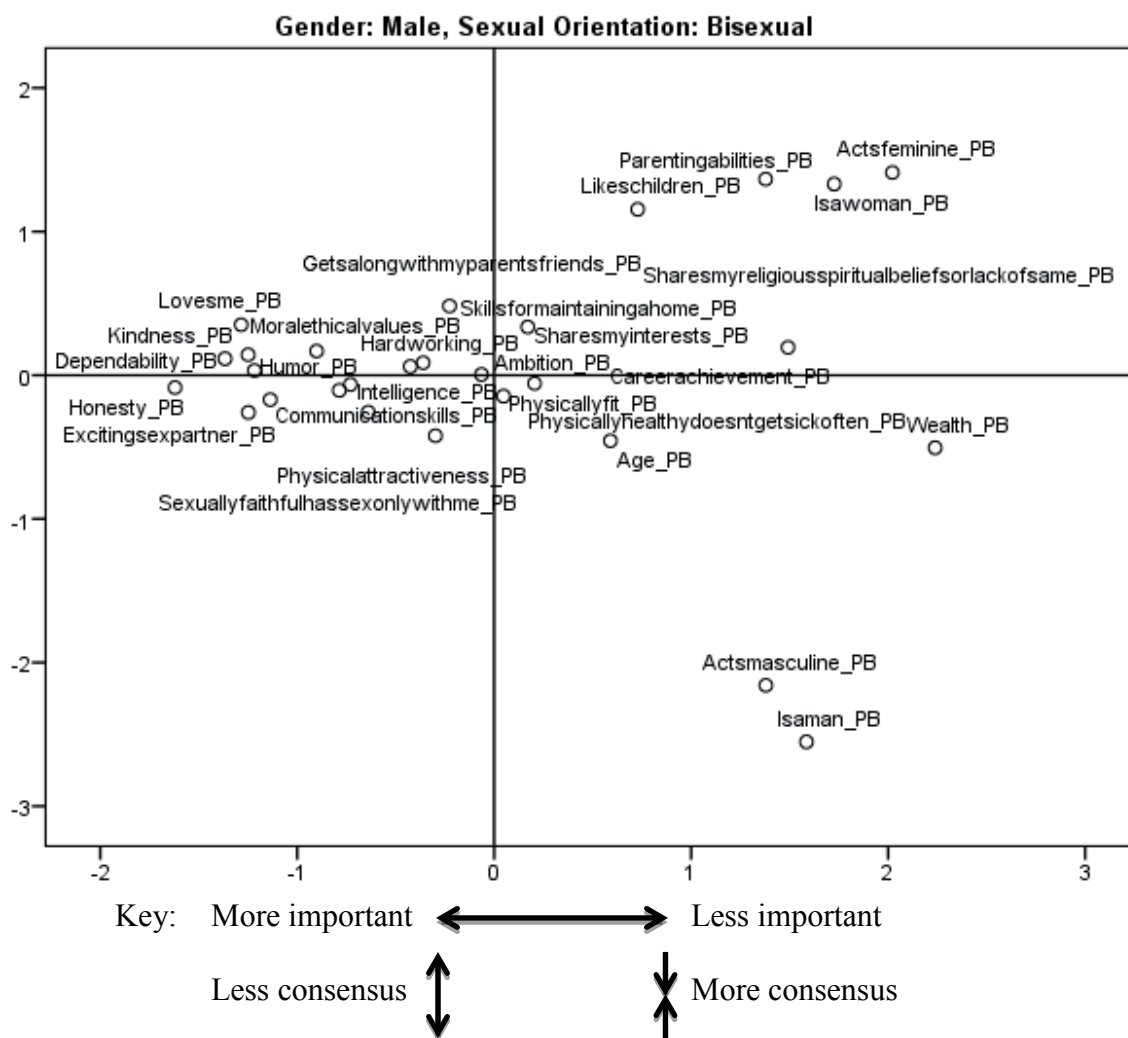


Figure 14. MDS solution map for bisexual men's pair-bond mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

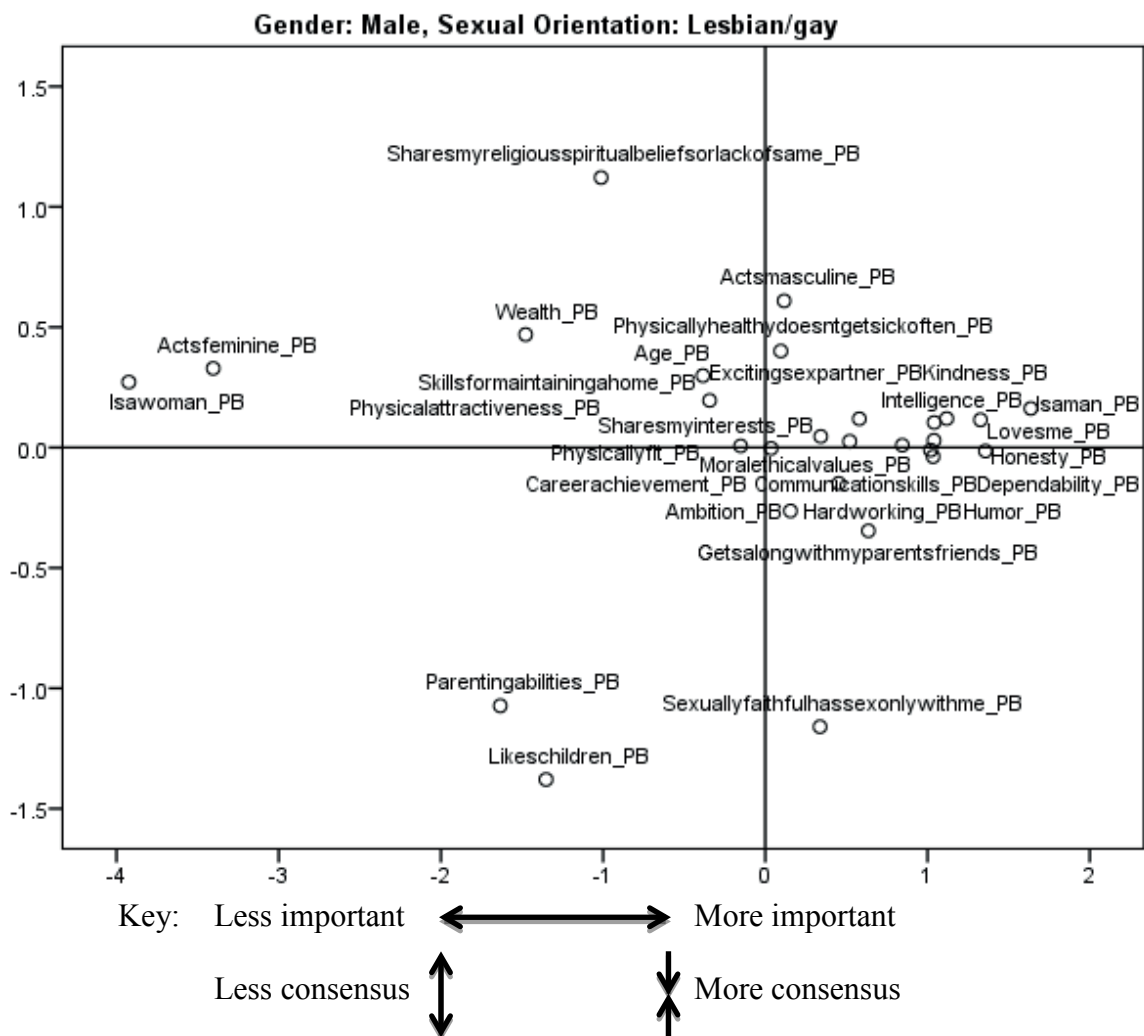


Figure 15. MDS solution map for gay men's pair-bond mate selection task. The x -dimension appears to rank items from less preferred ($-x$) to more preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

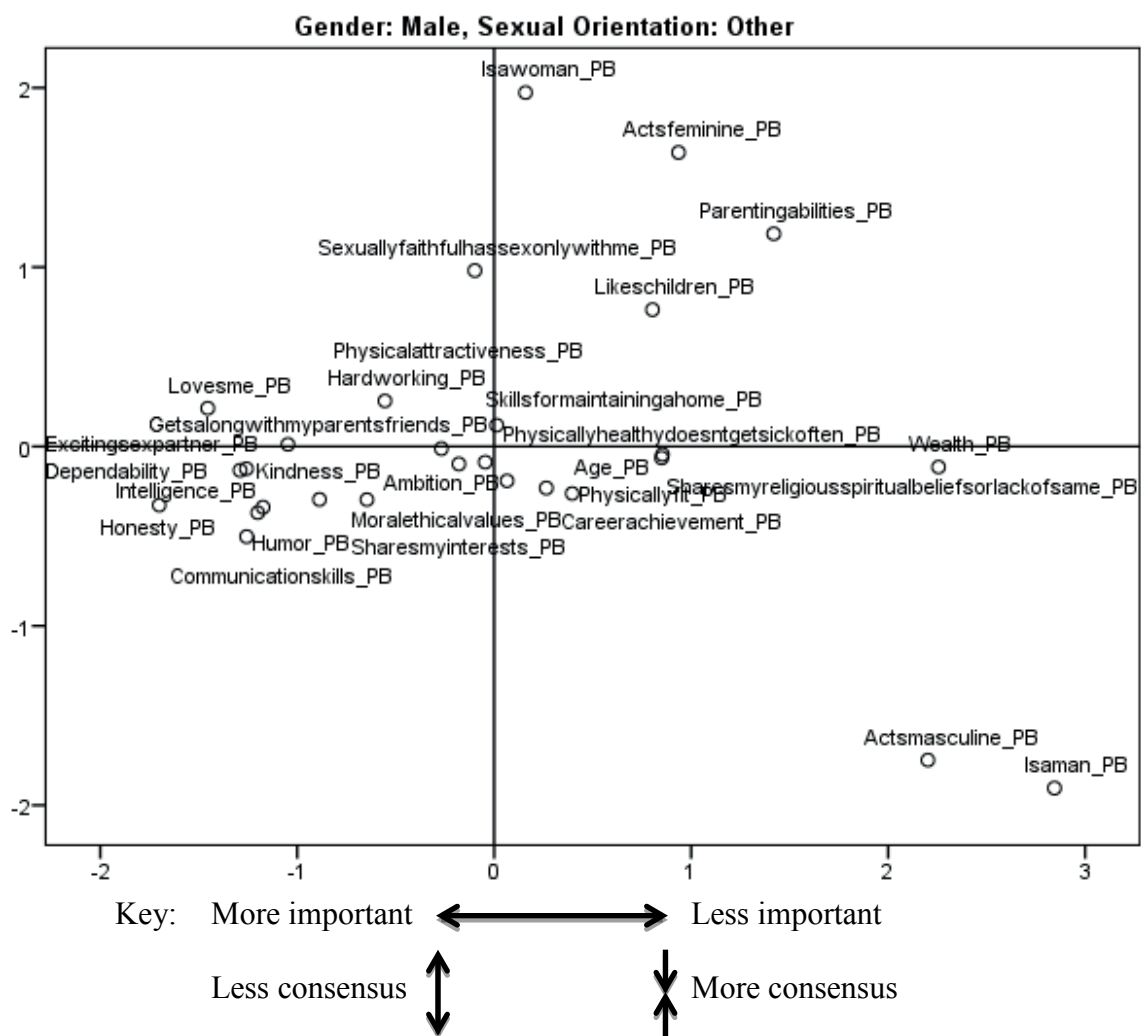


Figure 16. MDS solution map for other-sexual-orientation men's pair-bond mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

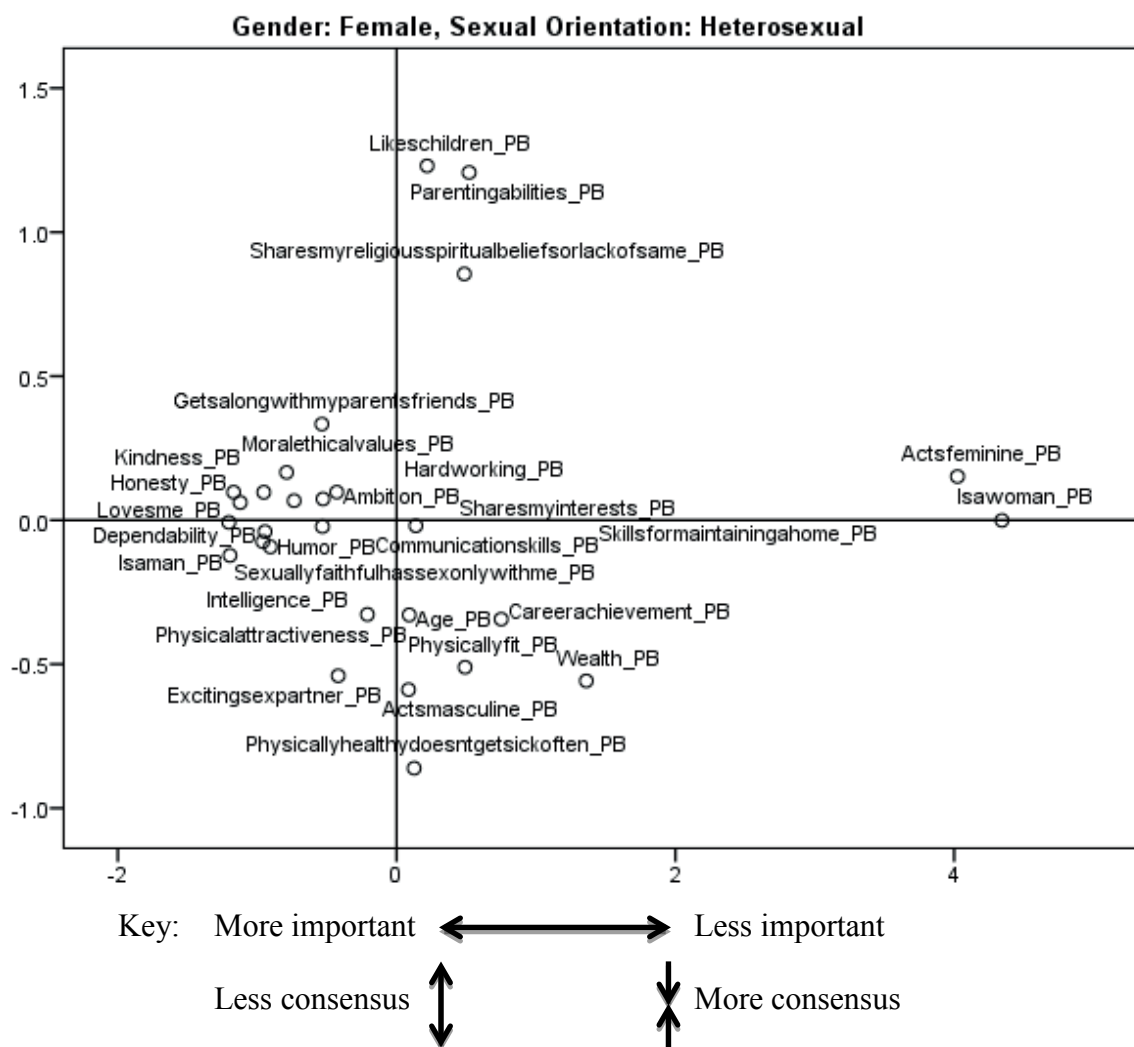


Figure 17. MDS solution map for heterosexual women's pair-bond mate selection task.

The x-dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$).

Items closer to the x-axis appear to have greater consensus in rating

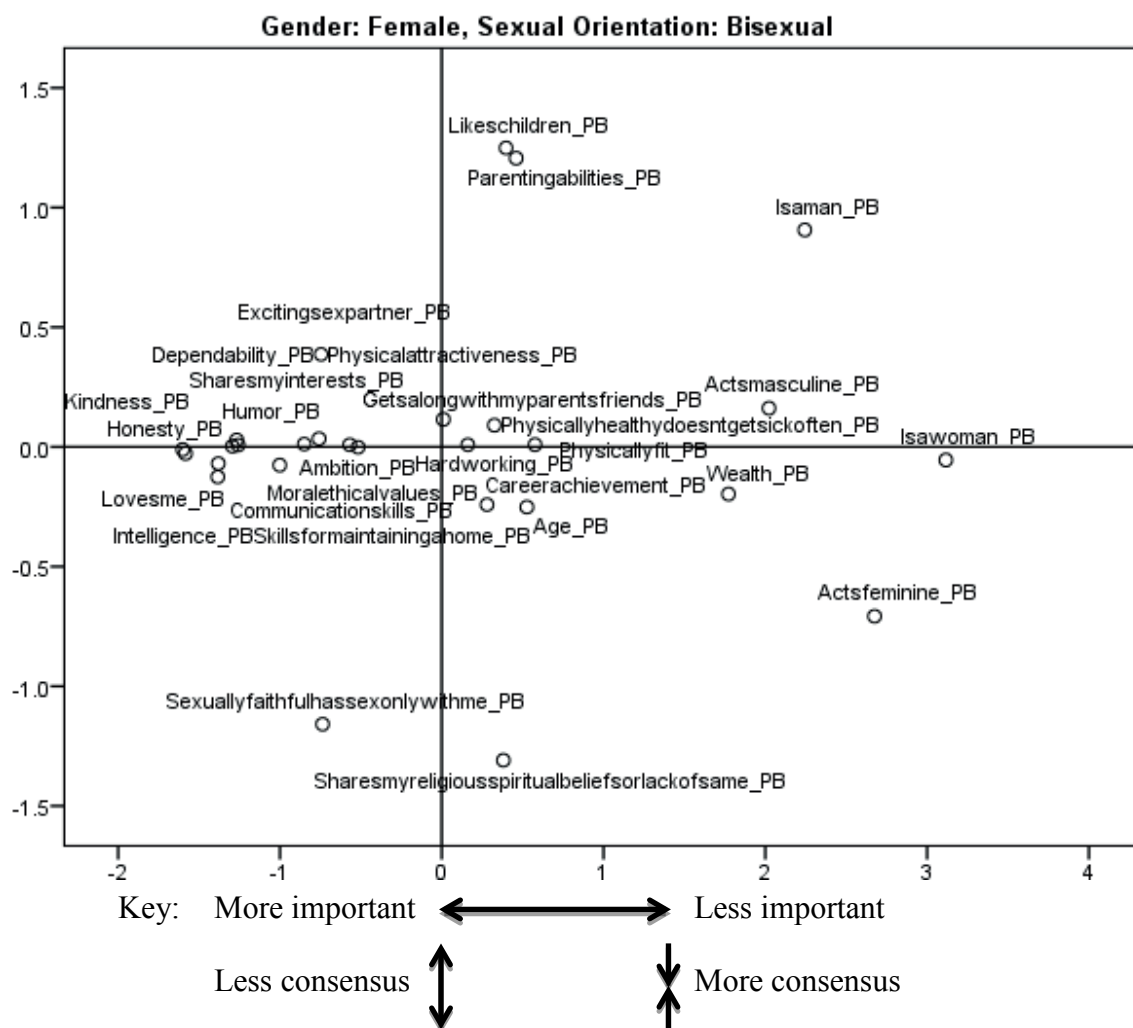


Figure 18. MDS solution map for bisexual women's pair-bond mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

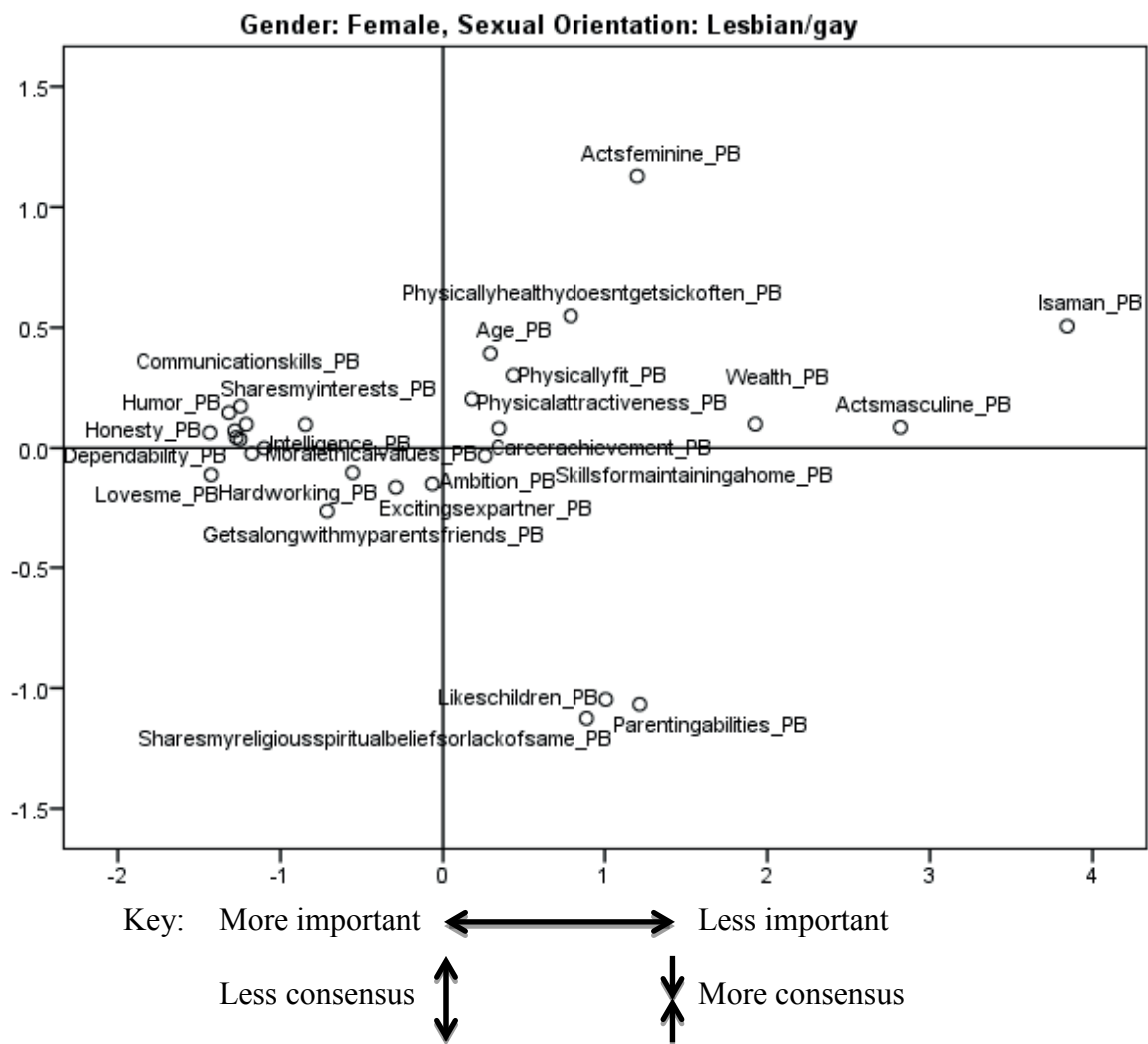


Figure 19. MDS solution map for heterosexual men's pair-bond mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating

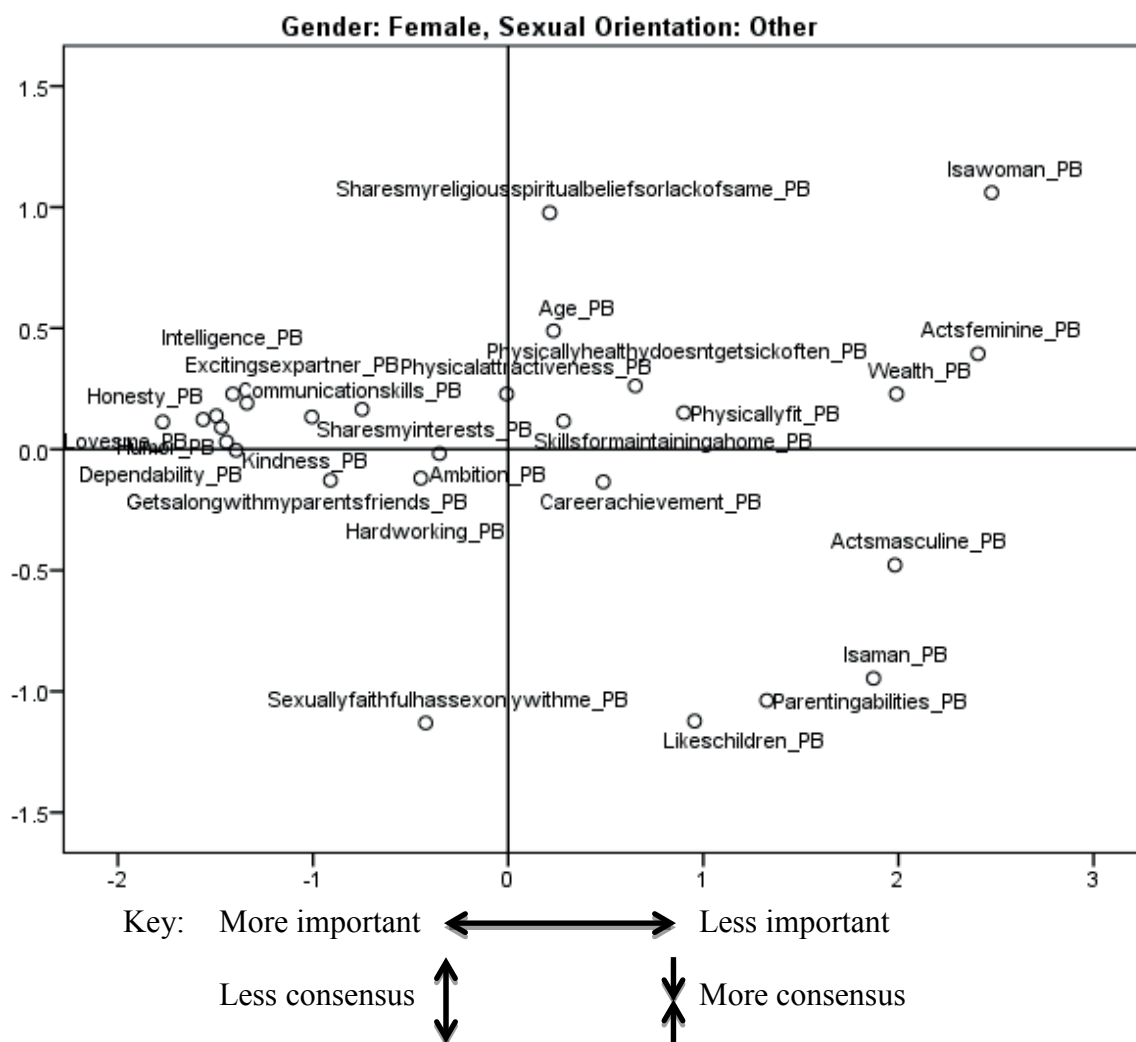


Figure 20. MDS solution map for other-sexual-orientation women's pair-bond mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating.

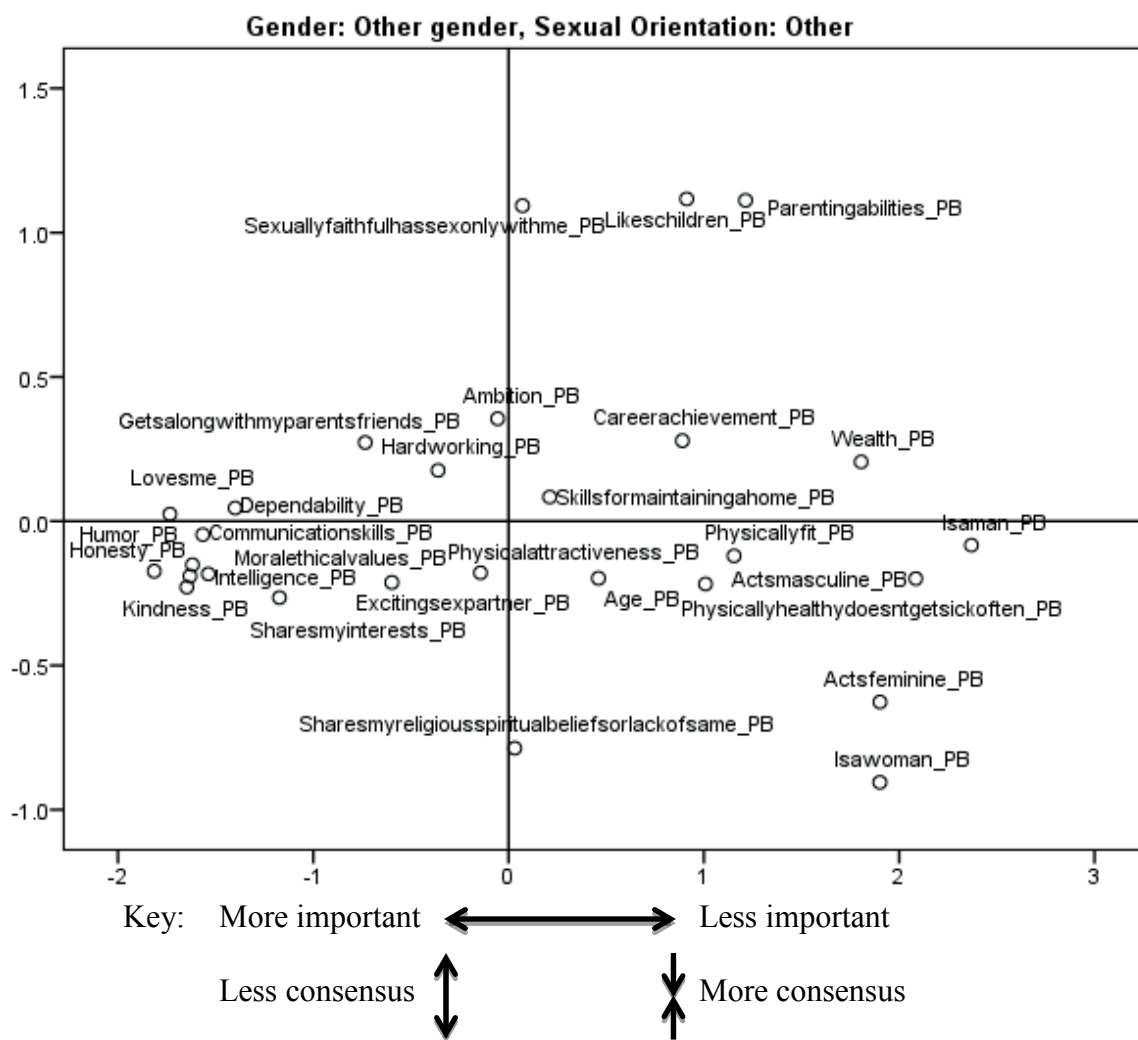


Figure 21. MDS solution map for other-sexual-orientation, other-gender participants' pair-bond mate selection task. The x -dimension appears to rank items from more preferred ($-x$) to less preferred ($+x$). Items closer to the x -axis appear to have greater consensus in rating.

Table 4

Representative means and SDs for whole-sample mate selection attribute ratings, by task type and sexual orientation identity

Attribute	Task type	<i>n</i>	<i>M (SD)</i>
Age	Sexual-desire	726	4.27 (1.70)
	Pair-bond	724	4.50 (1.63)
Ambition	Sexual-desire	725	3.57 (1.93)
	Pair-bond	723	5.22 (1.50)
Exciting sex partner	Sexual-desire	726	6.08 (1.15)
	Pair-bond	724	5.74 (1.30)
Honesty	Sexual-desire	726	5.72 (1.50)
	Pair-bond	723	6.61 (.78)
Intelligence	Sexual-desire	726	5.38 (1.56)
	Pair-bond	723	6.27 (.98)
Kindness	Sexual-desire	726	5.48 (1.41)
	Pair-bond	724	6.33 (.96)
Likes children	Sexual-desire	725	2.35 (1.84)
	Pair-bond	724	4.30 (2.13)
Moral/ethical values	Sexual-desire	726	4.69 (1.84)
	Pair-bond	724	6.09 (1.15)
Sexually faithful	Sexual-desire	725	3.27 (2.16)
	Pair-bond	724	5.40 (2.06)

Note. Ratings are on a scale from 1, *not at all important*, to 7, *extremely important*.

Table 5

Representative means and SDs for men's mate selection attribute ratings, by task type and sexual orientation identity

Attribute	Task type	Heterosexual		Bisexual		Gay		Other	
		<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
Age	Sexual-desire	58	4.10 (1.48)	99	4.10 (1.89)	100	4.46 (1.59)	56	3.86 (1.81)
	Pair-bond	58	4.33 (1.69)	97	4.36 (1.74)	100	4.76 (1.46)	56	4.09 (1.85)
Ambition	Sexual-desire	58	3.90 (1.66)	99	3.68 (1.99)	100	3.84 (1.94)	55	3.20 (1.88)
	Pair-bond	58	5.29 (1.30)	97	5.13 (1.60)	99	5.35 (1.38)	56	4.79 (1.79)
Exciting sex partner	Sexual-desire	58	6.43 (.86)	99	6.26 (.93)	100	6.06 (1.01)	56	6.05 (.98)
	Pair-bond	58	6.12 (1.01)	97	6.11 (1.08)	100	5.78 (1.14)	56	6.00 (1.21)
Honesty	Sexual-desire	58	5.10 (1.68)	99	5.85 (1.32)	100	5.88 (1.37)	56	5.95 (1.51)
	Pair-bond	58	6.36 (1.07)	97	6.42 (.91)	99	6.50 (.87)	56	6.64 (.65)
Intelligence	Sexual-desire	58	5.40 (1.43)	99	5.12 (1.56)	100	5.20 (1.59)	56	4.95 (1.74)
	Pair-bond	58	6.03 (1.18)	97	5.78 (1.34)	98	6.28 (.89)	56	6.12 (.83)
Kindness	Sexual-desire	58	5.00 (1.58)	99	5.45 (1.27)	100	5.41 (1.46)	56	5.20 (1.41)
	Pair-bond	58	6.03 (1.06)	97	6.06 (1.26)	100	6.32 (.93)	56	6.21 (.85)
Likes children	Sexual-desire	58	2.50 (1.90)	99	2.89 (1.98)	100	2.53 (2.08)	56	2.50 (1.91)
	Pair-bond	58	4.98 (1.81)	97	4.40 (2.13)	100	4.03 (2.23)	56	4.25 (2.04)
Moral/ethical values	Sexual-desire	58	3.83 (1.88)	99	4.82 (1.75)	100	4.66 (1.95)	56	4.34 (2.07)
	Pair-bond	58	5.60 (1.43)	97	5.71 (1.45)	100	6.10 (.98)	56	5.91 (1.12)
Sexually faithful	Sexual-desire	58	3.59 (2.01)	99	3.33 (2.14)	100	3.34 (2.20)	56	3.16 (2.10)
	Pair-bond	58	5.71 (1.87)	97	5.28 (2.00)	100	5.28 (1.97)	56	4.84 (2.17)

Note. Ratings are on a scale from 1, *not at all important*, to 7, *extremely important*.

Table 6

Representative means and SDs for women's mate selection attribute ratings, by task type and sexual orientation identity

Attribute	Task type	<u>Heterosexual</u>		<u>Bisexual</u>		<u>Lesbian</u>		<u>Other</u>	
		<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
Age	Sexual-desire	90	4.70 (1.55)	59	4.56 (1.66)	48	4.48 (1.50)	140	4.24 (1.73)
	Pair-bond	90	4.91 (1.43)	59	4.56 (1.49)	48	4.83 (1.58)	140	4.52 (1.62)
Ambition	Sexual-desire	90	4.22 (1.97)	59	3.42 (1.88)	48	3.54 (1.75)	140	3.30 (1.95)
	Pair-bond	90	5.88 (1.21)	59	5.47 (1.28)	48	5.23 (1.61)	140	5.22 (1.37)
Exciting sex partner	Sexual-desire	90	6.23 (1.06)	59	6.32 (1.01)	48	5.69 (1.34)	140	6.16 (1.04)
	Pair-bond	90	5.81 (1.26)	59	5.66 (1.20)	48	5.38 (1.32)	140	5.64 (1.37)
Honesty	Sexual-desire	90	5.58 (1.63)	59	5.75 (1.59)	48	5.46 (1.50)	140	5.85 (1.41)
	Pair-bond	90	6.74 (.65)	58	6.74 (.58)	48	6.52 (.85)	140	6.81 (.50)
Intelligence	Sexual-desire	90	5.71 (1.54)	59	5.61 (1.35)	48	5.19 (1.57)	140	5.51 (1.51)
	Pair-bond	90	6.52 (.81)	59	6.51 (.65)	48	6.31 (.80)	140	6.44 (.78)
Kindness	Sexual-desire	90	5.70 (1.38)	59	5.46 (1.51)	48	5.40 (1.50)	140	5.65 (1.31)
	Pair-bond	90	6.52 (.81)	59	6.44 (.70)	48	6.42 (.87)	140	6.47 (.76)
Likes children	Sexual-desire	89	2.40 (1.76)	59	2.24 (1.83)	48	2.40 (1.94)	140	1.92 (1.57)
	Pair-bond	90	5.27 (1.76)	59	4.54 (2.08)	48	4.31 (1.98)	140	3.96 (2.19)
Moral/ethical values	Sexual-desire	90	4.88 (1.72)	59	4.20 (1.86)	48	5.08 (1.46)	140	4.92 (1.71)
	Pair-bond	90	6.39 (.88)	59	6.12 (.91)	48	6.25 (1.02)	140	6.29 (1.00)
Sexually faithful	Sexual-desire	90	4.42 (2.28)	59	2.69 (1.95)	48	3.67 (2.22)	140	2.79 (1.96)
	Pair-bond	90	6.77 (.82)	59	5.42 (2.13)	48	6.44 (1.11)	140	5.06 (2.20)

Note. Ratings are on a scale from 1, *not at all important*, to 7, *extremely important*.

Table 7

Representative means and SDs for other-gender, other-sexual-orientation participants' mate selection attribute ratings, by task type

Attribute	Task type	<i>n</i>	<i>M (SD)</i>
Age	Sexual-desire	64	3.70 (1.73)
	Pair-bond	64	3.87 (1.73)
Ambition	Sexual-desire	64	2.88 (1.81)
	Pair-bond	64	4.31 (1.68)
Exciting sex partner	Sexual-desire	64	5.30 (1.72)
	Pair-bond	64	5.06 (1.75)
Honesty	Sexual-desire	64	5.89 (1.46)
	Pair-bond	64	6.59 (.92)
Intelligence	Sexual-desire	64	5.53 (1.57)
	Pair-bond	64	6.25 (1.17)
Kindness	Sexual-desire	64	5.78 (1.41)
	Pair-bond	64	6.36 (1.13)
Likes children	Sexual-desire	64	1.94 (1.54)
	Pair-bond	64	3.41 (2.18)
Moral/ethical values	Sexual-desire	64	5.03 (2.01)
	Pair-bond	64	6.23 (1.34)
Sexually faithful	Sexual-desire	64	2.58 (1.99)
	Pair-bond	64	4.27 (2.36)

Note. Ratings are on a scale from 1, *not at all important*, to 7, *extremely important*.

Hypothesis 3

Mate selection strategies have already been observed to differ between men and women, but there will also be an interaction with the sexual-desire/pair-bonding distinction.

Decision rules about both short- and long-term mate selection will differ between men and women in that men will rate physical attractiveness, youth, and health traits more highly than will women, and women will rate character and child-rearing traits higher than will men; but these differences will be larger in the sexual-desire mate selection task than in the pair-bonding mate selection task.

A doubly-multivariate repeated-measures analysis of variance (MANOVA) was performed, treating the two versions of the mate-selection task as a repeated measure, with gender (men vs. women) as the independent variable, (excluding participants with MTF, FTM, and other gender identities), and with the following mate-selection attributes as the dependent variables:

Age	Communication skills	Intelligence
Exciting sex partner	Dependability	Kindness
Physical attractiveness	Hard-working	Moral/ethical values
Physically healthy	Honesty	Likes children
Physically fit	Humor	Parenting abilities

The MANOVA showed a multivariate within-subjects effect of mate-selection task type (sexual-desire vs. pair-bond mate selection), Wilks' $\lambda = .361, F(15, 628) = 74.00, \eta_p^2 = .639, p < .001$. A multivariate between-subjects effect of gender was found, Wilks' $\lambda = .843, F(15, 628) = 7.81, \eta_p^2 = .157, p < .001$. A multivariate interaction

between the effects of gender and task type was found, Wilks' $\lambda = .906, F(15, 628) = 4.37, \eta_p^2 = .094, p < .001$. Univariate means are given in Table 8. Univariate main effects are given in Table 9. The simple effects of gender within each task type were analyzed. Each task type showed a multivariate simple effect of gender: for the sexual-desire task, Wilks' $\lambda = .872, F(15, 628) = 6.17, \eta_p^2 = .128, p < .001$, and for the pair-bond task, Wilks' $\lambda = .826, F(15, 628) = 8.79, \eta_p^2 = .174, p < .001$. Univariate simple effects of gender for each task are given in Table 10, and, for mate characteristics with significant univariate interaction effects, are illustrated in Figures 22–29. Among the physical-attractiveness attributes, women rated “age” as more important than did men in the sexual-desire task, but there was no gender effect in the pair-bond task. Men rated “exciting sex partner,” “physical attractiveness,” “physically healthy,” and “physically fit” as more important than did women in the pair-bond task, and the latter two as more important than did women in the sexual-desire task, but there was no gender effect for the former two characteristics in the sexual-desire task. Similarly, among the character-attractiveness attributes, women rated “communication skills,” “dependability,” “hardworking,” “honesty,” “humor,” “intelligence,” “kindness,” and “moral/ethical values” as more important than men did in the pair-bond task, and the latter five as more important than did men in the sexual-desire task, but there was no gender effect for “communication skills,” “hardworking,” or “honesty” in the sexual-desire task, and men rated “dependability” as more important than did women in the sexual-desire task. Men rated “likes children” and “parenting abilities” as more important than did women in the sexual-desire task, and there was no gender effect for these attributes in the pair-bond task.

Table 8

Univariate means and SDs for mate-selection attributes, by gender and task type

Attribute	Task	Men <i>M</i> (<i>SD</i>)	Women <i>M</i> (<i>SD</i>)
Age	Sexual-desire	4.18 (1.72)	4.45 (1.65)
	Pair-bond	4.44 (1.68)	4.68 (1.54)
Exciting sex partner	Sexual-desire	6.18 (.96)	6.14 (1.10)
	Pair-bond	5.99 (1.12)	5.64 (1.31)
Physical attractiveness	Sexual-desire	5.68 (1.16)	5.69 (1.22)
	Pair-bond	5.50 (1.26)	5.02 (1.24)
Physically healthy	Sexual-desire	5.10 (1.77)	4.50 (1.87)
	Pair-bond	5.36 (1.52)	4.60 (1.72)
Physically fit	Sexual-desire	5.05 (1.50)	4.70 (1.67)
	Pair-bond	4.91 (1.45)	4.36 (1.56)
Communication skills	Sexual-desire	5.23 (1.44)	5.41 (1.52)
	Pair-bond	6.18 (.98)	6.50 (.84)
Dependability	Sexual-desire	4.72 (1.86)	4.26 (1.93)
	Pair-bond	6.20 (1.08)	6.46 (.79)
Hardworking	Sexual-desire	3.83 (1.89)	3.61 (1.89)
	Pair-bond	5.48 (1.37)	5.72 (1.13)
Honesty	Sexual-desire	5.73 (1.47)	5.70 (1.52)
	Pair-bond	6.48 (.89)	6.74 (.62)
Humor	Sexual-desire	5.43 (1.53)	5.68 (1.34)
	Pair-bond	6.13 (1.03)	6.39 (.86)
Intelligence	Sexual-desire	5.17 (1.58)	5.53 (1.50)
	Pair-bond	6.06 (1.11)	6.45 (.77)
Kindness	Sexual-desire	5.32 (1.43)	5.59 (1.39)
	Pair-bond	6.17 (1.05)	6.47 (.78)
Moral/ethical values	Sexual-desire	4.49 (1.93)	4.81 (1.72)
	Pair-bond	5.85 (1.27)	6.28 (.96)
Likes children	Sexual-desire	2.60 (1.97)	2.18 (1.73)
	Pair-bond	4.37 (2.11)	4.44 (2.09)
Parenting abilities	Sexual-desire	2.28 (1.80)	1.87 (1.43)
	Pair-bond	4.06 (2.23)	4.24 (2.14)

Note. *N* = 644.

Table 9

Univariate main effects of task type, gender, and interaction on mate selection attributes

Attribute	Effect	<i>F</i> (1, 642)	η_p^2	<i>p</i>
Age	Task type	17.32	.026	<.001***
	Gender	4.89	.008	.027*
	Interaction	.06	<.001	.805
Exciting sex partner	Task type	63.74	.090	<.001***
	Gender	6.19	.010	.013*
	Interaction	11.66	.018	.001**
Physical attractiveness	Task type	83.84	.116	<.001***
	Gender	8.06	.012	.005**
	Interaction	28.45	.042	<.001***
Physically healthy	Task type	7.81	.012	.005**
	Gender	32.26	.048	<.001***
	Interaction	1.33	.002	.248
Physically fit	Task type	22.86	.034	<.001***
	Gender	15.98	.024	<.001***
	Interaction	4.14	.006	.042*
Communication skills	Task type	298.26	.317	<.001***
	Gender	10.67	.016	.001**
	Interaction	1.41	.002	.236
Dependability	Task type	570.12	.470	<.001***
	Gender	1.38	.002	.241
	Interaction	21.52	.032	<.001***

Attribute	Effect	<i>F</i> (1, 642)	η_p^2	<i>p</i>
Hardworking	Task type	640.04	.491	<.001***
	Gender	.005	<.001	.945
	Interaction	9.84	.015	.002**
Honesty	Task type	249.65	.280	<.001***
	Gender	2.22	.003	.137
	Interaction	7.04	.011	.008**
Humor	Task type	190.84	.229	<.001***
	Gender	10.15	.016	.002**
	Interaction	.01	<.001	.938
Intelligence	Task type	257.98	.287	<.001***
	Gender	20.33	.031	<.001***
	Interaction	.12	<.001	.735
Kindness	Task type	261.54	.289	<.001***
	Gender	13.37	.020	<.001***
	Interaction	.06	<.001	.809
Moral/ethical values	Task type	403.81	.386	<.001***
	Gender	15.07	.023	<.001***
	Interaction	.63	.001	.427
Likes children	Task type	586.26	.477	<.001***
	Gender	1.78	.003	.186
	Interaction	8.80	.014	.003**
Parenting abilities	Task type	571.98	.471	<.001***
	Gender	.83	.001	.362
	Interaction	10.94	.017	.001**

p* < .05. *p* < .01. ****p* < .001.

Note. *N* = 644.

Table 10

Univariate simple effects of gender, by task type, for mate-selection attributes

Attribute	Task	$F(1, 642)$	η_p^2	p
Age	Sexual-desire	4.14	.006	.042*
	Pair-bond	3.59	.006	.058
Exciting sex partner	Sexual-desire	.33	.001	.565
	Pair-bond	12.64	.019	<.001***
Physical attractiveness	Sexual-desire	.011	<.001	.918
	Pair-bond	24.54	.037	<.001***
Physically healthy	Sexual-desire	17.54	.027	<.001***
	Pair-bond	34.56	.051	<.001***
Physically fit	Sexual-desire	2.65	.012	.006**
	Pair-bond	21.11	.032	<.001***
Communication skills	Sexual-desire	2.37	.004	.124
	Pair-bond	19.83	.030	<.001***
Dependability	Sexual-desire	9.58	.015	.002**
	Pair-bond	11.67	.018	.001**
Hardworking	Sexual-desire	2.29	.004	.131
	Pair-bond	5.94	.009	.015*
Honesty	Sexual-desire	.11	<.001	.740
	Pair-bond	18.87	.029	<.001***
Humor	Sexual-desire	5.03	.008	.025*
	Pair-bond	12.29	.019	<.001***
Intelligence	Sexual-desire	8.64	.013	.003**
	Pair-bond	28.02	.042	<.001***
Kindness	Sexual-desire	5.82	.009	.016*
	Pair-bond	16.39	.025	<.001***
Moral/ethical values	Sexual-desire	4.86	.008	.028*
	Pair-bond	23.83	.036	<.001***
Likes children	Sexual-desire	8.38	.013	.004**
	Pair-bond	.19	<.001	.662
Parenting abilities	Sexual-desire	9.88	.015	.002**
	Pair-bond	1.02	.002	.313

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Men $n = 309$; women $n = 335$.

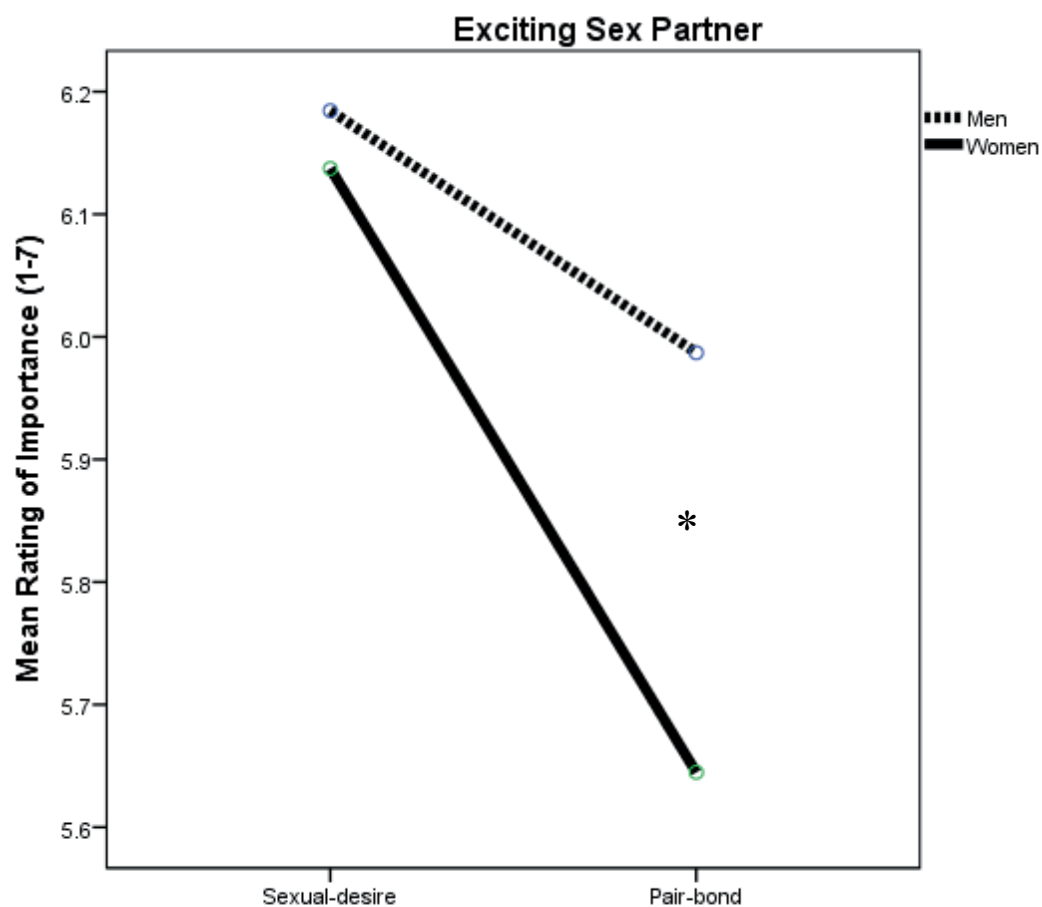


Figure 22. Interaction effect between participant gender and mate-selection task type on ratings of importance of a prospective mate being an exciting sex partner. Asterisks (*) denote significant gender effects.

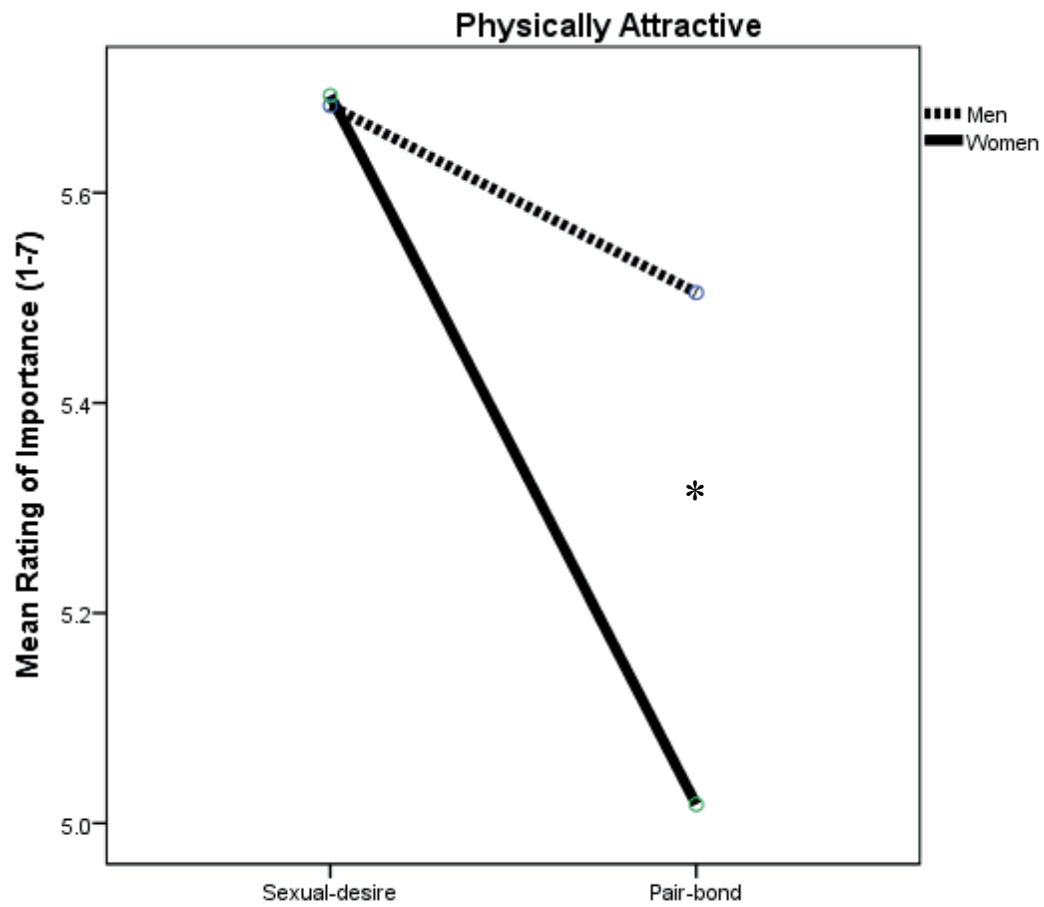


Figure 23. Interaction effect between participant gender and mate-selection task type on ratings of importance of a prospective mate being physically attractive. Asterisks (*) denote significant gender effects.

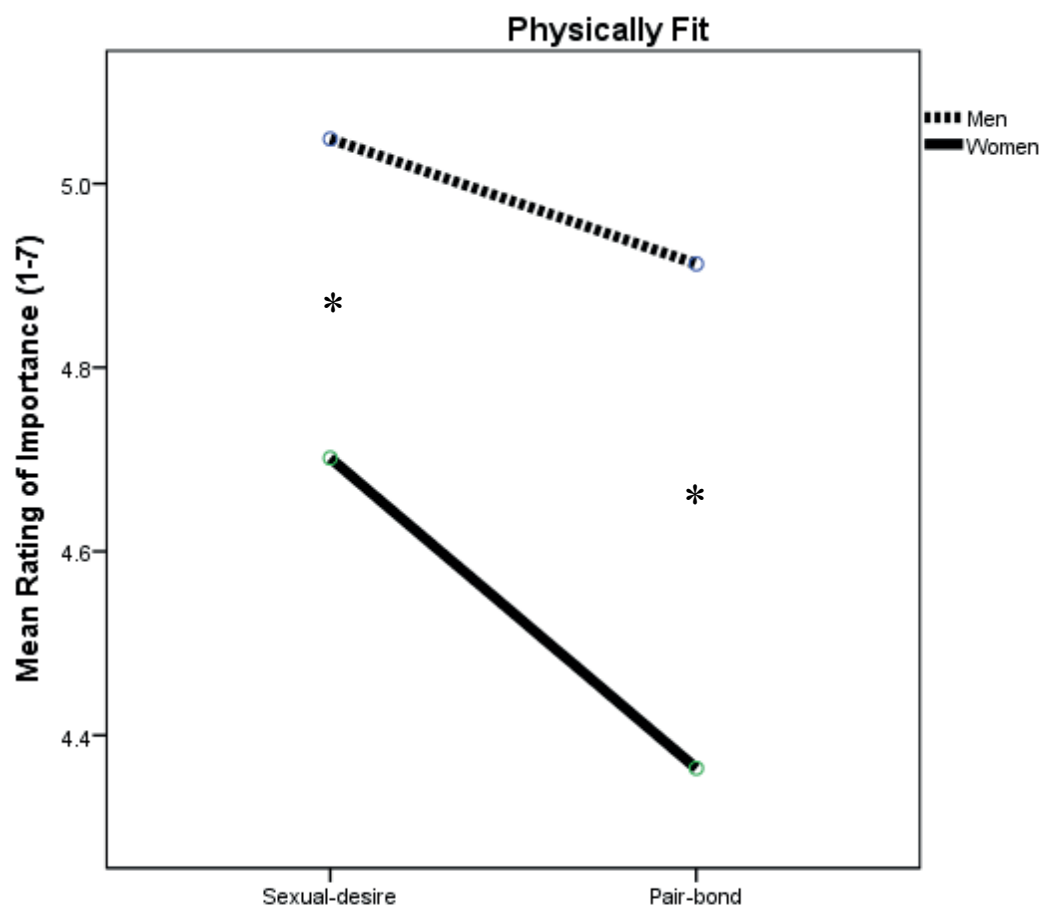


Figure 24. Interaction effect between participant gender and mate-selection task type on ratings of importance of a prospective mate being physically fit. Asterisks (*) denote significant gender effects.

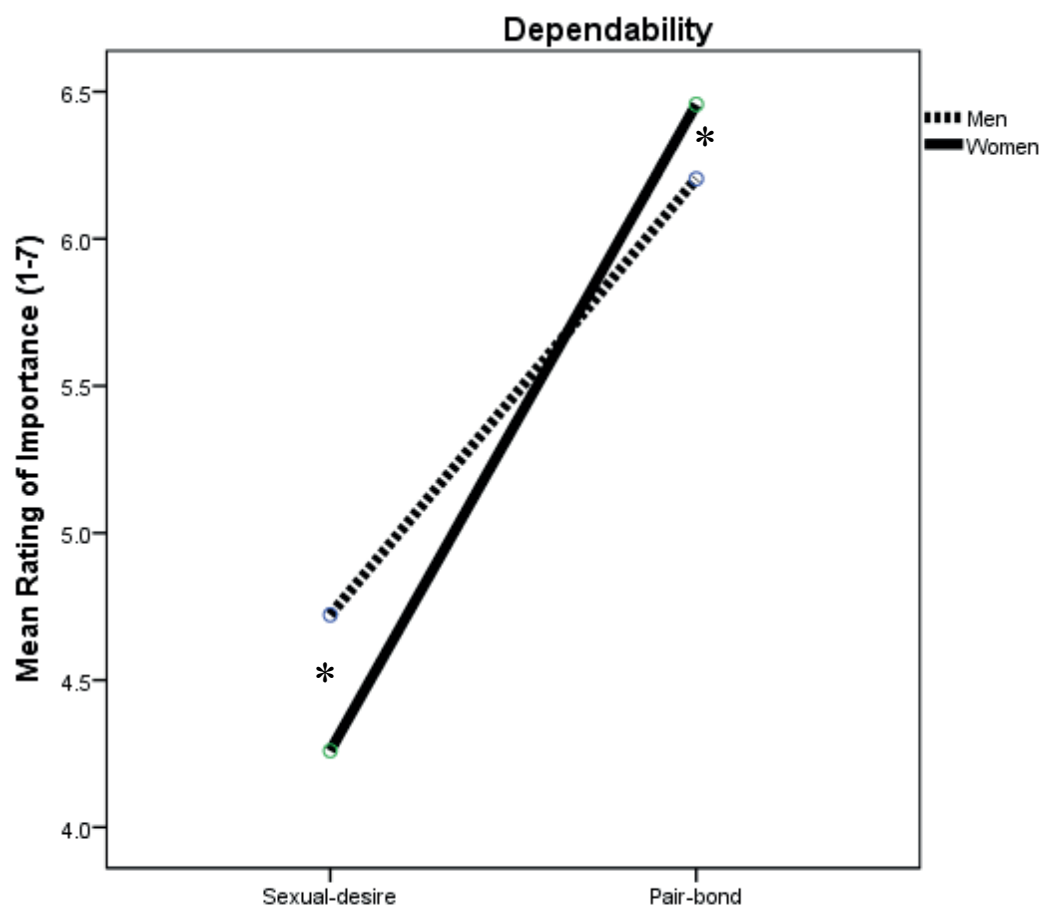


Figure 25. Interaction effect between participant gender and mate-selection task type on ratings of importance of a prospective mate's dependability. Asterisks (*) denote significant gender effects.

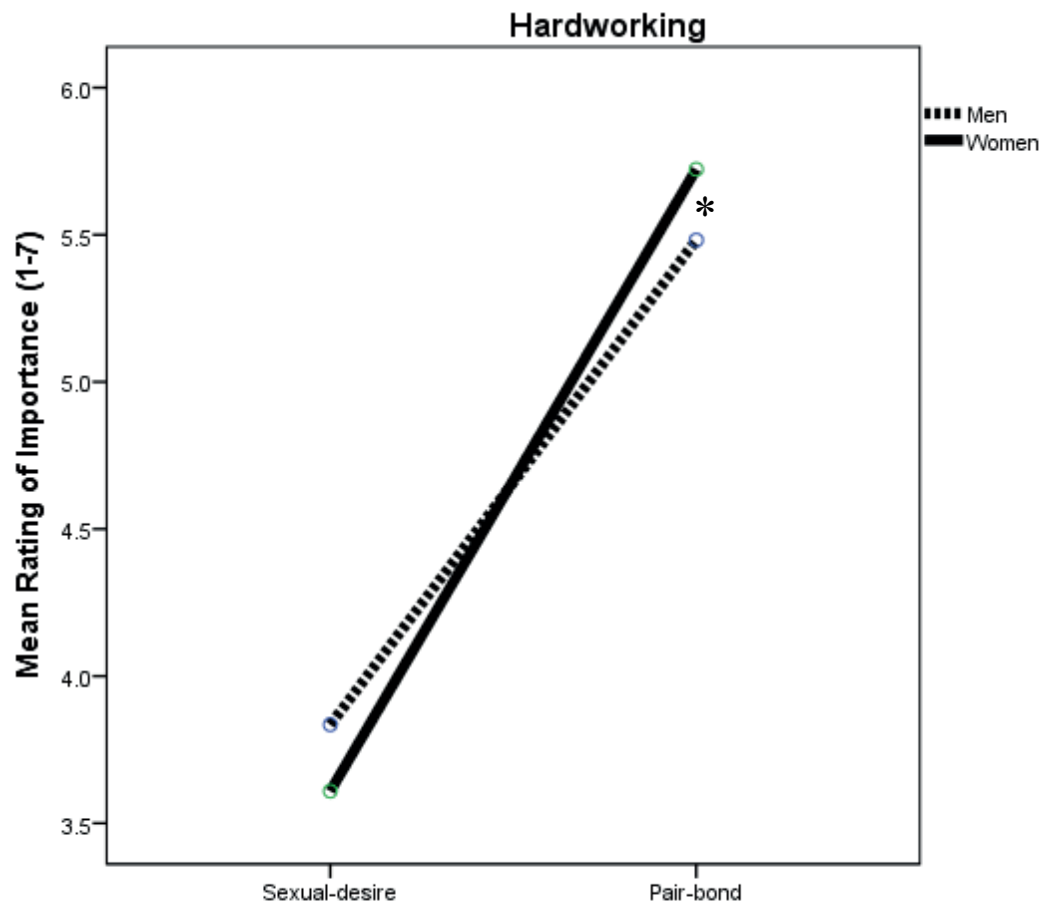


Figure 26. Interaction effect between participant gender and mate-selection task type on ratings of importance of a prospective mate being hardworking. Asterisks (*) denote significant gender effects.

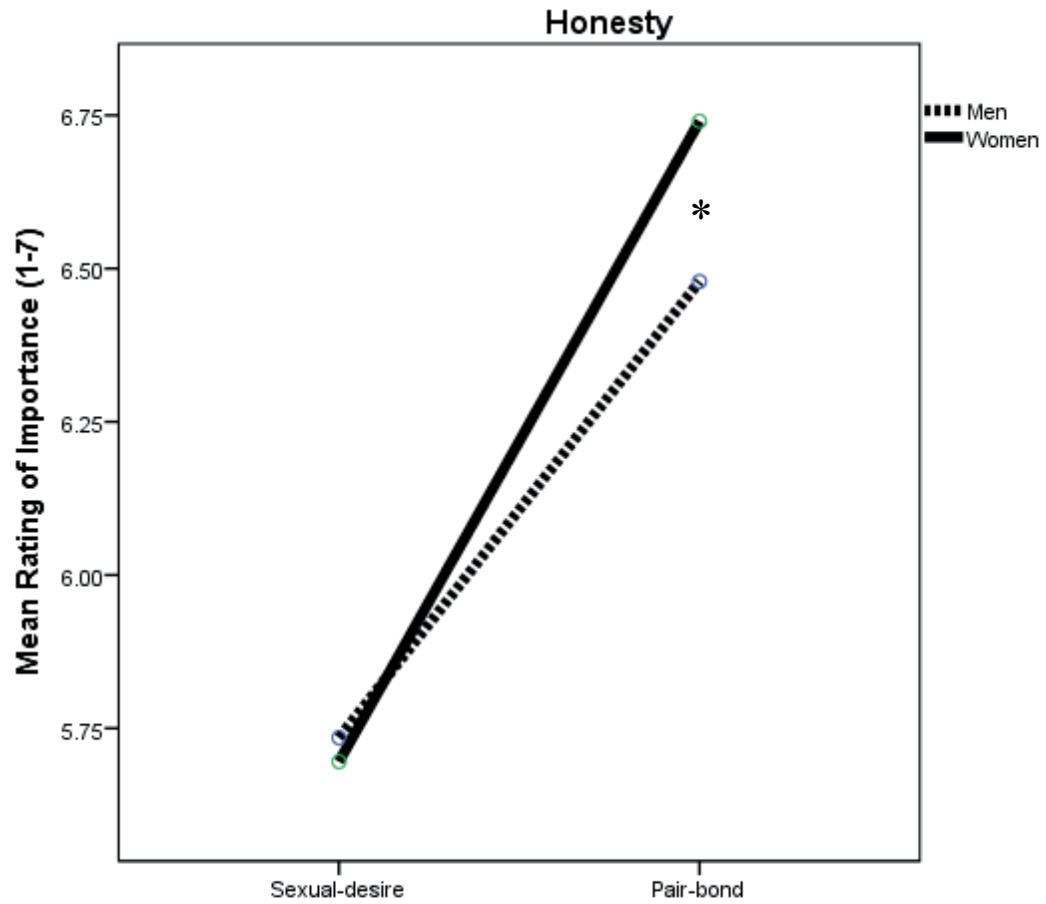


Figure 27. Interaction effect between participant gender and mate-selection task type on ratings of importance of a prospective mate's honesty. Asterisks (*) denote significant gender effects.

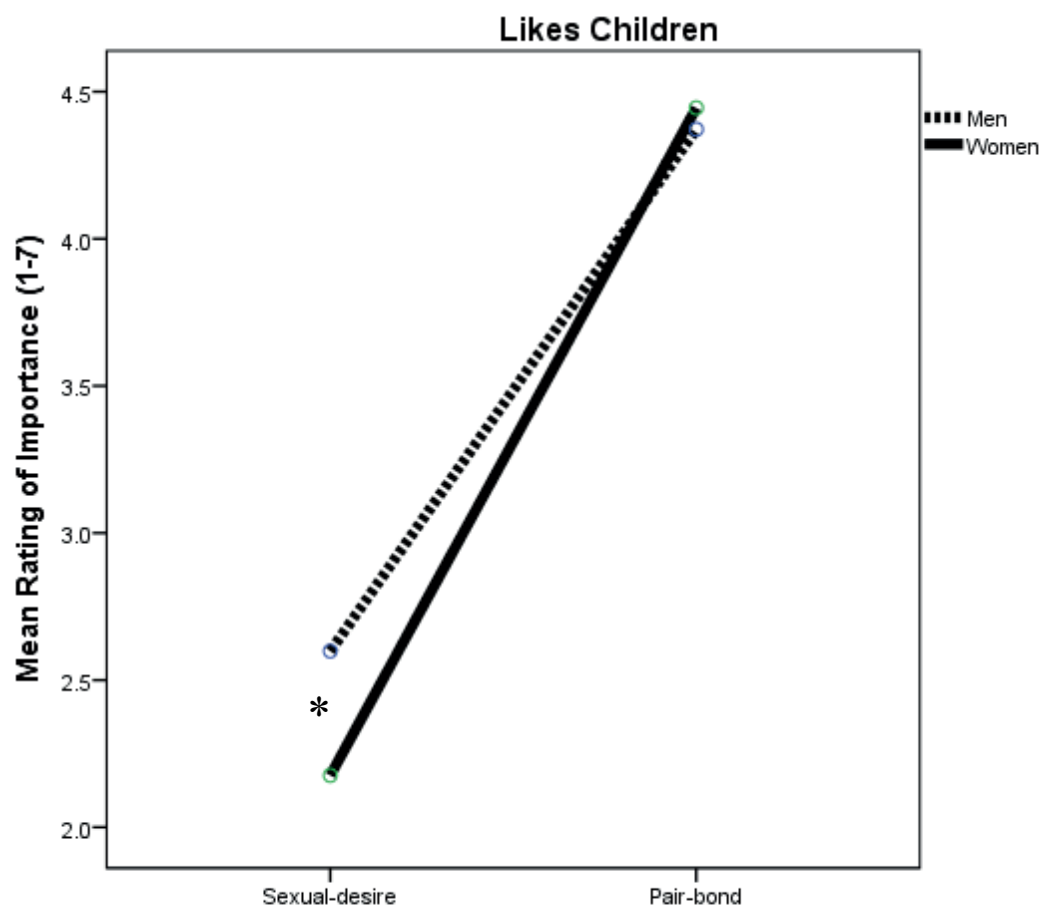


Figure 28. Interaction effect between participant gender and mate-selection task type on ratings of importance of whether a prospective mate likes children. Asterisks (*) denote significant gender effects.

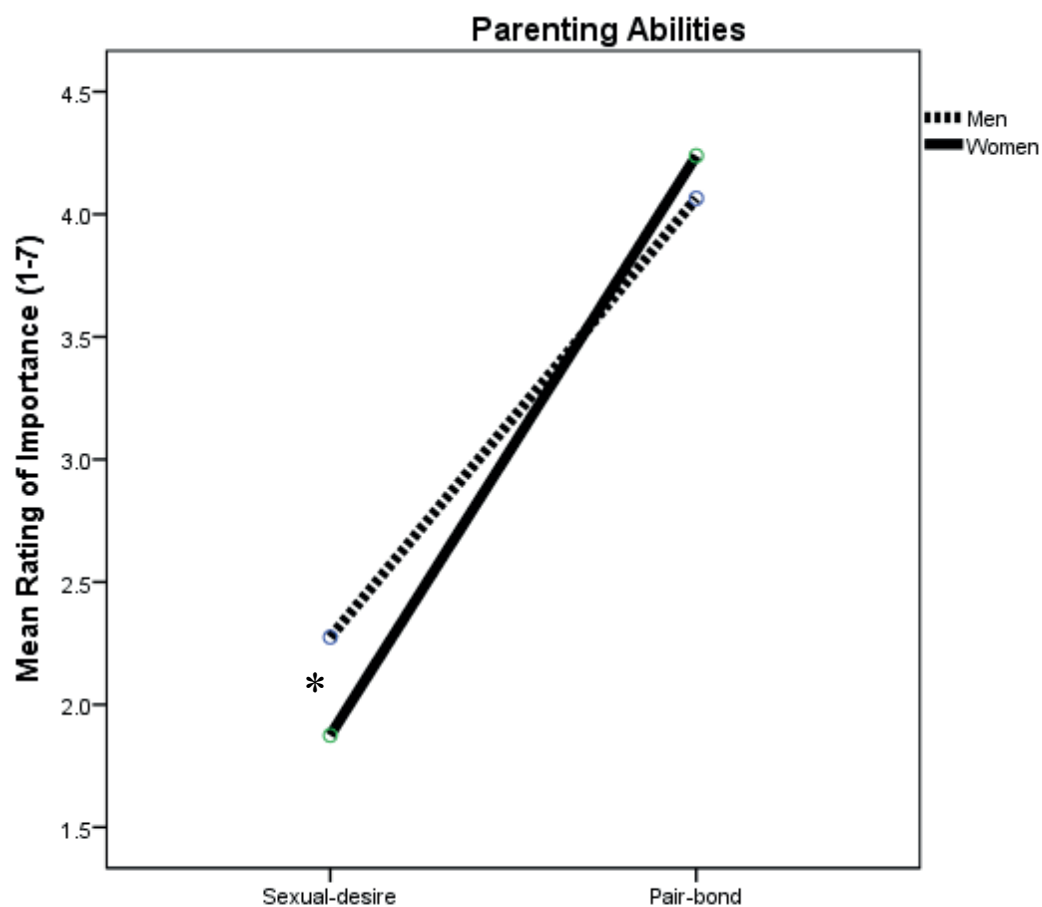


Figure 29. Interaction effect between participant gender and mate-selection task type on ratings of importance of a prospective mate's parenting abilities. Asterisks (*) denote significant gender effects.

Hypothesis 4

Mate selection strategies are related to gender role orientation. Differences similar to those in Hypothesis 3 will emerge between people scoring in the male and female directions on a measure of GD, regardless of whether they are men or women.

The planned analysis for this hypothesis was dropped, due to the fact that relatively few men were classified as women (or vice versa) in the LDFs for the occupational-preference questionnaire and the BSRI. Classification results are given in Table 11.

Table 11

Gender diagnosticity classification results

GD Measure	Predicted Gender	Gender Identity	
		<u>Men</u>	<u>Women</u>
Occupational preference	Men	247 (81%)	72 (22%)
	Women	57 (19%)	261 (78%)
BSRI	Men	259 (85%)	48 (14%)
	Women	47 (15%)	288 (86%)

Hypothesis 5

Bisexuality may be partially explained as lower prioritization of partner gender in mate selection decisions. Bisexually-identified individuals will be less likely than people in other sexual orientation identity categories to rate the sex of partners as “extremely important” in both short- and long-term mate selection.

Four univariate ANOVAs were performed, each separately for men and women. Each ANOVA used sexual orientation (heterosexual vs. bisexual vs. gay/lesbian) as the independent variable. Participants with MTF, FTM, and other gender identities were excluded from this analysis. Participants with unlabeled or other-labeled sexual orientation identities were excluded from this analysis. The four dependent variables used were the “is a man” and “is a woman” items from the sexual-desire and pair-bond mate selection tasks. Pairwise comparisons using the LSD method showed that bisexually-identified men and women rated “is a man” significantly lower than did gay men and heterosexual women, and rated “is a woman” significantly lower than did lesbian women and heterosexual men. Conversely, bisexually-identified men and women rated “is a man” significantly higher than did lesbian women and heterosexual men, and rated “is a woman” significantly higher than did gay men and heterosexual women. All pairwise differences were significant, $ps < .005$. Statistics are given in Table 12.

Table 12

Prioritization of partner gender in mate selection tasks, by gender and sexual orientation

Gender	Task	Heterosexual	Bisexual	Gay/lesbian	<i>N</i>	<i>F</i>	<i>R</i> ²	<i>P</i>
	Partner gender	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>				
Men								
Is a man	Sexual-desire	1.45 (1.49) ^a	4.59 (2.12) ^b	6.81 (.51) ^c	254	220.80	.638	<.001
	Pair-bond	1.05 (.40) ^a	3.82 (2.36) ^b	6.74 (.86) ^c	254	247.25	.663	<.001
Is a woman	Sexual-desire	6.83 (.57) ^a	3.26 (2.15) ^b	1.38 (1.14) ^c	257	230.38	.645	<.001
	Pair-bond	6.76 (.89) ^a	3.98 (2.28) ^b	1.61 (1.58) ^c	255	157.33	.555	<.001
Women								
Is a man	Sexual-desire	6.46 (.98) ^a	2.93 (2.15) ^b	2.00 (1.95) ^c	196	142.02	.595	<.001
	Pair-bond	6.79 (.61) ^a	3.31 (2.28) ^b	1.77 (1.75) ^c	197	185.32	.656	<.001
Is a woman	Sexual-desire	1.59 (1.35) ^a	3.02 (2.06) ^b	6.29 (1.07) ^c	195	144.90	.601	<.001
	Pair-bond	1.37 (1.17) ^a	2.27 (1.58) ^b	6.40 (1.14) ^c	196	240.71	.714	<.001

Note. Ratings are on a 1–7 scale, where 1 indicates low importance and 7 indicates high importance. Different superscripts in a row indicate significant pairwise differences ($p < .005$).

Hypothesis 6

Components of sexual orientation will be differently rated between and within sex and sexual orientation identity groups, as previously observed in Tannenbaum (2006).

- a. *Sexual attraction will be, on average, most highly rated as a determinant of sexual orientation across all groups.*
- b. *Women will rate sexual attraction more highly as a determinant of sexual orientation than will men.*
- c. *Heterosexually-identified individuals will rate sexual behavior more highly as a determinant of sexual orientation than will people in other sexual orientation identity categories.*
- d. *Ratings of gender role orientation as a determinant of sexual orientation will differ between men and women. Men will rate gender role orientation more highly as a determinant of sexual orientation than will women.*
- e. *Ratings of gender role orientation as a determinant of sexual orientation will differ between sexual orientation identity groups. Gay- and lesbian-identified individuals will rate gender role orientation more highly as a determinant of sexual orientation than will bisexually- and heterosexually-identified individuals.*

A MANOVA was performed with a 2 (men vs. women) \times 3 (self-identification as gay/lesbian vs. bisexual vs. heterosexual) design for the independent variables and with the set of sexual orientation component ratings as the dependent variables. Participants with MTF, FTM, and other gender identities were excluded from this analysis.

Participants with unlabeled or other-labeled sexual orientation identities were excluded

from this analysis. A multivariate main effect of gender was found, Wilks' $\lambda = .810$, $F(12,428) = 8.35$, $\eta_p^2 = .190$, $p < .001$. A multivariate main effect of sexual orientation was found, Wilks' $\lambda = .893$, $F(24,858) = 2.07$, $\eta_p^2 = .055$, $p = .002$. A multivariate interaction was found, Wilks' $\lambda = .915$, $F(24,858) = 1.62$, $\eta_p^2 = .044$, $p = .030$. The simple effects of sexual orientation within each gender were analyzed. Each gender showed a multivariate simple effect of sexual orientation: for men, Wilks' $\lambda = .918$, $F(24,858) = 1.56$, $\eta_p^2 = .042$, $p = .044$, and for women, Wilks' $\lambda = .880$, $F(24,858) = 2.35$, $\eta_p^2 = .062$, $p < .001$. Univariate means are given in Table 13. Main effects are given in Table 14. Univariate simple effects are given in Table 15, and univariate pairwise comparisons for sexual orientation categories within each gender are given in Table 16. The simple effects of sexual orientation within each gender, for items with significant univariate interaction effects, are illustrated in Figures 30–32. Sexual attraction had the highest mean rating across all groups, $M = 6.00$, $SD = 1.41$, $N = 445$. A paired-samples t -test against the next highest mean (5.72, for “falling in love”) was significant, $t(452) = 3.88$, $p < .001$. There was no difference between men's and women's ratings of sexual attraction as a determinant of sexual orientation, univariate $p > .05$. A univariate effect of sexual orientation was found for ratings of sexual behavior, univariate $p = .002$. Heterosexual participants rated sexual behavior as more important in determining sexual orientation than did lesbian and gay participants, $LSD p = .027$, but did not differ from bisexual individuals, $LSD p > .05$. Men rated gender role orientation as more important in determining sexual orientation than did women, univariate $p = .011$.

No univariate effect of sexual orientation was found for ratings of gender role orientation, univariate $p > .05$.

Table 13

Ratings of determinants of sexual orientation, by gender and sexual orientation

Determinant	Gender	Heterosexual <i>M (SD)</i>	Bisexual <i>M (SD)</i>	Gay/lesbian <i>M (SD)</i>
Attraction	Men	5.84 (1.58)	5.94 (1.47)	6.03 (1.34)
	Women	5.83 (1.63)	6.19 (1.02)	6.29 (1.09)
Behavior	Men	4.98 (1.81)	5.19 (1.76)	4.90 (1.63)
	Women	4.70 (1.48) ^a	3.79 (1.62) ^b	3.29 (1.91) ^b
Fantasy	Men	4.89 (1.43) ^a	5.27 (1.63) ^b	5.27 (1.73) ^b
	Women	3.85 (1.83) ^a	4.52 (1.69) ^b	4.52 (1.57) ^b
Falling in love	Men	5.33 (1.59)	5.79 (1.38)	5.72 (1.43)
	Women	5.84 (1.33)	5.81 (1.29)	5.71 (1.34)
Sexual orientation identity	Men	5.40 (1.75)	5.05 (1.86)	5.44 (1.79)
	Women	5.64 (1.57)	5.03 (1.69)	5.40 (1.52)
Accepts own sexual orientation	Men	5.39 (1.81)	5.52 (1.60)	5.60 (1.77)
	Women	5.93 (1.55)	5.36 (1.76)	5.23 (1.98)
Gender identity	Men	4.46 (2.00) ^a	4.68 (1.99) ^a	3.61 (2.18) ^b
	Women	4.30 (2.37) ^a	3.22 (2.23) ^b	3.52 (2.48) ^b
Gender role orientation	Men	2.86 (1.84) ^a	3.45 (1.77) ^b	2.70 (1.89) ^a
	Women	2.40 (1.55)	1.90 (1.59)	2.19 (1.82)
Cultural factors	Men	2.53 (1.65)	2.88 (1.92)	2.98 (1.87)
	Women	2.49 (1.59)	2.43 (1.61)	2.46 (1.71)
Social factors	Men	2.91 (1.78)	3.27 (1.89)	3.21 (1.89)
	Women	2.90 (1.83)	2.55 (1.54)	2.50 (1.64)
Changes over time	Men	4.02 (1.61) ^a	4.48 (1.31) ^b	4.32 (1.76) ^b
	Women	3.83 (1.65) ^a	4.16 (1.47) ^b	4.44 (1.52) ^b
Biological factors	Men	4.42 (1.90)	4.84 (1.75)	4.86 (1.91)
	Women	4.66 (1.83)	4.84 (1.71)	4.84 (1.83)

Note. Men $n = 250$; women $n = 195$. Ratings are on a 1–7 scale, where 1 indicates low importance and 7 indicates high importance. Where there is a significant univariate main effect of gender, the higher mean ($p < .05$) is set in **bold type**. The univariate simple effect of sexual orientation is indicated by different superscripts in a row ($p < .05$).

Table 14
Univariate main effects of gender, sexual orientation, and interaction, for hypothesized determinants of sexual orientation

Determinant	Comparison	<i>F</i>	η_p^2	<i>p</i>
Attraction	Gender	1.47	.003	.227
	Sexual orientation	1.90	.009	.150
	Interaction	.42	.002	.659
Behavior	Gender	43.54	.090	<.001***
	Sexual orientation	6.54	.029	.002**
	Interaction	6.07	.027	.003**
Fantasy	Gender	26.26	.056	<.001***
	Sexual orientation	4.43	.020	.012*
	Interaction	.35	.002	.708
Falling in love	Gender	1.55	.004	.213
	Sexual orientation	.83	.004	.438
	Interaction	1.52	.007	.219
Sexual orientation identity	Gender	.12	.000	.730
	Sexual orientation	3.02	.014	.050
	Interaction	.83	.001	.757
Accepts own sexual orientation	Gender	<.01	.000	.969
	Sexual orientation	.84	.004	.434
	Interaction	2.65	.012	.072
Gender identity	Gender	6.86	.015	.009**
	Sexual orientation	4.59	.020	.011*
	Interaction	4.33	.019	.014*
Gender role orientation	Gender	23.85	.052	<.001***
	Sexual orientation	.65	.003	.524
	Interaction	4.40	.020	.013*
Cultural factors	Gender	3.77	.009	.053
	Sexual orientation	.51	.002	.602
	Interaction	.78	.004	.457
Social factors	Gender	7.46	.017	.007**
	Sexual orientation	.04	<.001	.963
	Interaction	1.77	.008	.170
Changes over time	Gender	.72	.002	.396
	Sexual orientation	3.38	.015	.035*
	Interaction	.72	.003	.486
Biological factors	Gender	.14	<.001	.708
	Sexual orientation	1.25	.006	.287
	Interaction	.25	.001	.781

p* < .05. *p* < .01. ****p* < .001.

Note. Gender *F*(1, 439). Sexual orientation *F*(2, 439). Interaction *F*(2, 439).

Table 15
Univariate simple effects of sexual orientation, by gender, for hypothesized determinants of sexual orientation

Determinant	Gender	$F(2, 439)$	η_p^2	p
Attraction	Men	.33	.002	.716
	Women	2.08	.009	.127
Behavior	Men	.75	.003	.473
	Women	12.07	.052	<.001***
Fantasy	Men	1.10	.005	.334
	Women	3.81	.017	.023*
Falling in love	Men	2.08	.009	.126
	Women	.15	.001	.863
Sexual orientation identity	Men	1.39	.006	.250
	Women	2.18	.010	.115
Accepts own sexual orientation	Men	.28	.001	.753
	Women	3.32	.015	.037*
Gender identity	Men	6.19	.027	.002**
	Women	4.71	.021	.010*
Gender role orientation	Men	4.74	.021	.009**
	Women	1.48	.007	.228
Cultural factors	Men	1.26	.006	.286
	Women	.02	<.001	.977
Social factors	Men	.78	.004	.461
	Women	1.04	.005	.353
Changes over time	Men	1.58	.007	.208
	Women	2.43	.011	.089
Biological factors	Men	1.24	.006	.289
	Women	.21	.001	.809

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 16
Univariate pairwise comparisons of sexual orientation categories, by gender, for hypothesized determinants of sexual orientation

Determinant	Gender	Het vs. L/G	Het vs. Bi	Bi vs. L/G
		<i>p</i>	<i>p</i>	<i>p</i>
Attraction	Men	.421	.687	.643
	Women	.068	.131	.710
Behavior	Men	.763	.463	.230
	Women	<.001**	.002**	.128
Fantasy	Men	.185	.178	.972
	Women	.027*	.019*	.991
Falling in love	Men	.093	.051	.746
	Women	.591	.891	.748
Sexual orientation identity	Men	.902	.224	.120
	Women	.428	.038*	.283
Accepts own sexual orientation	Men	.452	.653	.728
	Women	.023*	.050	.693
Gender identity	Men	.022*	.536	.001**
	Women	.048*	.004**	.490
Gender role orientation	Men	.594	.044*	.003**
	Women	.489	.086	.394
Cultural factors	Men	.121	.223	.705
	Women	.909	.830	.936
Social factors	Men	.313	.230	.818
	Women	.215	.252	.883
Changes over time	Men	.253	.076	.458
	Women	.031*	.222	.357
Biological factors	Men	.148	.164	.954
	Women	.644	.551	.927

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note. Het = heterosexual. Bi = bisexual. L/G = lesbian or gay.



Figure 30. Interaction effect between participant gender and participant sexual orientation on ratings of importance of sexual behavior as a determinant of sexual orientation. There is a univariate main effect of gender ($p < .001$). Daggers (†) denote significant pairwise sexual orientation identity effects.

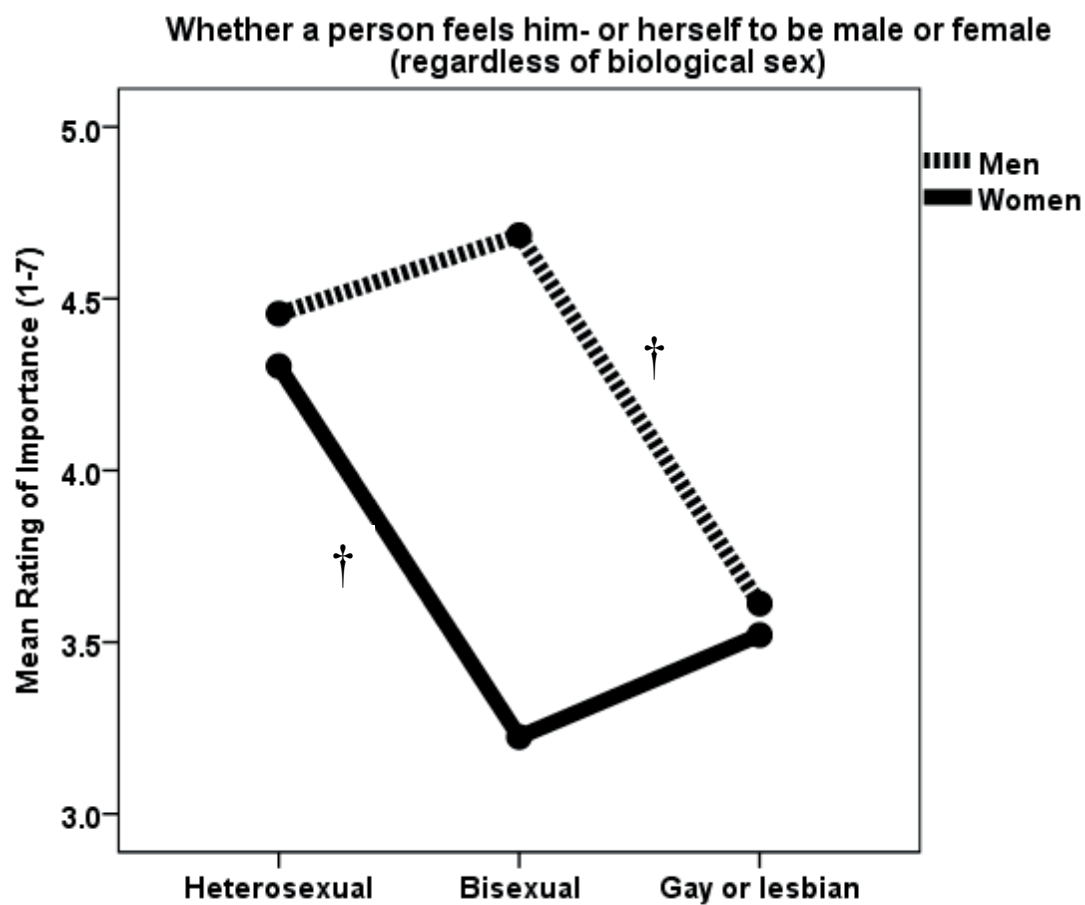


Figure 31. Interaction effect between participant gender and participant sexual orientation on ratings of importance of gender identity as a determinant of sexual orientation. There is a univariate main effect of gender ($p = .009$). Daggers (†) denote significant pairwise sexual orientation identity effects.

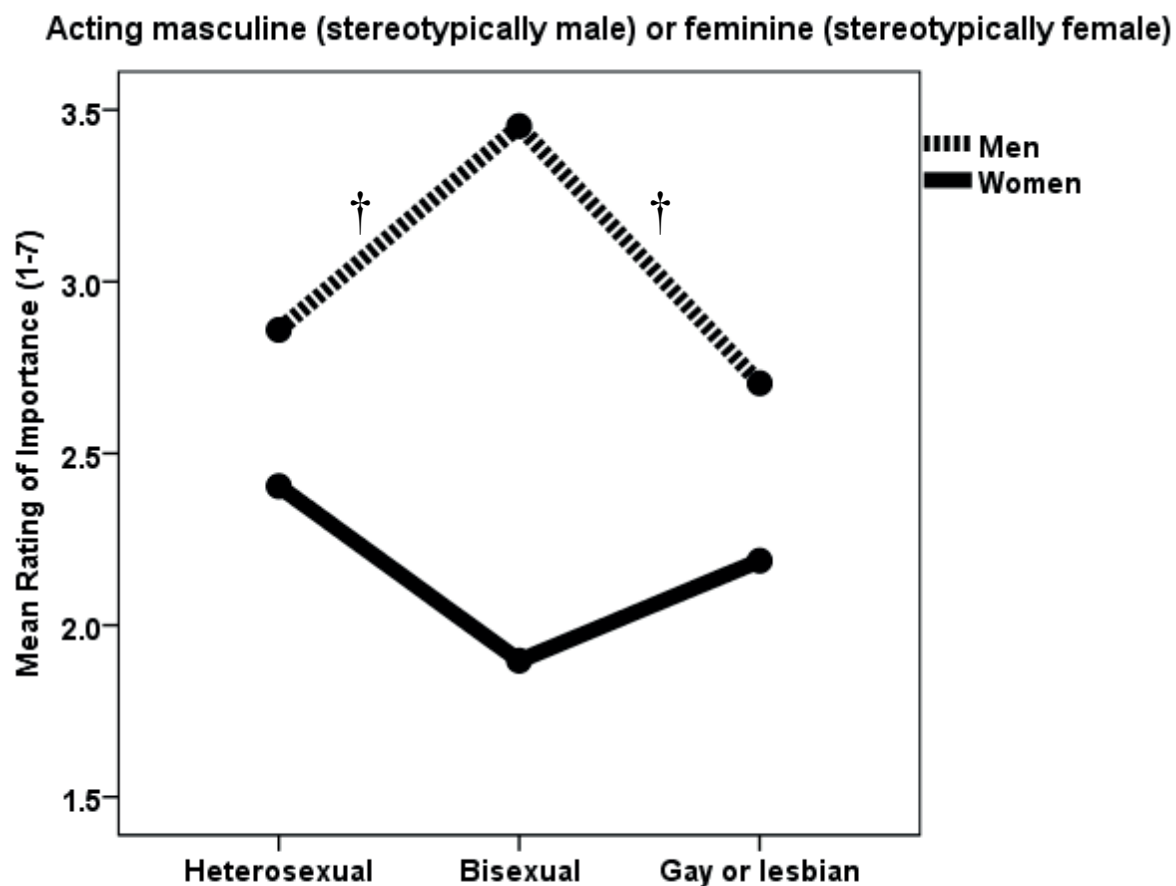


Figure 32. Interaction effect between participant gender and participant sexual orientation on ratings of importance of gender role orientation as a determinant of sexual orientation. There is a univariate main effect of gender ($p < .001$). Dagggers (†) denote significant pairwise sexual orientation identity effects.

Hypothesis 7

Ratings of components of sexual orientation are related to participants' own gender role orientations. People scoring in the male direction on a measure of gender diagnosticity, regardless of sex, will rate sexual attraction more highly as a determinant of sexual orientation than will people scoring in the female direction, regardless of sex.

An ANOVA was performed with gender diagnosticity category (predicted to be men vs. predicted to be women, from the occupational-preference questionnaire) as the independent variable and with individuals' ratings of sexual attraction as a determinant of sexual orientation as the dependent variable. Participants with MTF, FTM, and other gender identities were excluded from the original GD analysis and were therefore also excluded from this analysis. Predicted men and predicted women did not differ in their ratings of sexual attraction as a determinant of sexual orientation, $F(1, 708) = 1.82$, $\eta_p^2 = .003$, $p = .939$.

Hypothesis 8

As suggested in L. M. Diamond (2003b), men and women will have different histories of pair-bond relationships and sexual fluidity related to those pair-bond relationships.

- a. *Heterosexual women will be more likely than heterosexual men to report a history of same-sex nonsexual pair-bond friendships, and lesbian women will be more likely than gay men to report a history of opposite-sex pair-bond friendships.*
- b. *Heterosexual women will be more likely than heterosexual men to report a history of same-sex nonsexual pair-bond friendships becoming sexual, and*

lesbian women will be more likely than gay men to report a history of same-sex pair-bond friendships becoming sexual.

Two items in the sexual-partner and pair-bonding history questionnaire queried the number of participants' pair-bond friendships, with men and women respectively. Another pair queried the presence/absence of pair-bond friendships that became sexual with men and women. The former pair was recoded to a presence/absence binary, and then both sets of binaries were recoded for same-sex vs. opposite-sex relationships (rather than relationships with men vs. relationships with women.) Eight chi-square analyses were performed with appropriate sexual orientation/gender groups (heterosexual men vs. heterosexual women; gay men vs. lesbian women) as the independent variable. Participants with MTF, FTM, and other gender identities were excluded from this analysis. Participants with unlabeled or other-labeled sexual orientation identities were excluded from this analysis. The dependent variables, respectively, were presence/absence of same-sex pair-bond friendships; presence/absence of opposite-sex pair-bond friendships; presence/absence of same-sex pair-bond friendships that became sexual; and presence/absence of opposite-sex pair-bond friendships that became sexual. All dependent variables were coded 0 for no such relationships reported or 1 for one or more such relationships reported. Heterosexual women were likelier than heterosexual men to have had at least one same-sex pair-bond friendship, $\chi^2(1, N = 129) = 24.30$, $p < .001$, and to have had at least one opposite-sex pair-bond friendship become sexual, $\chi^2(1, N = 129) = 12.10$, $p = .001$. No other effects were found in the analysis. Statistics are given in Table 17.

Table 17

History of same- and opposite-sex pair-bond relationships, and of those relationships becoming sexual, by gender within sexual orientation groups

Relationship	Sexual orientation	Gender	<i>n</i> no	<i>n</i> yes	χ^2 (1)	<i>p</i>																																																																		
Opposite-sex pair bond	Heterosexual	Men	3	51	.64	.423																																																																		
		Women	8	78				Gay/lesbian	Men	24	64	2.31	.129	Women	6	34	Opposite-sex pair bond becoming sexual	Heterosexual	Men	4	47	12.10	.001**	Women	27	51		Gay/lesbian	Men	45	19	.32	.570	Women	22	12	Same-sex pair bond	Heterosexual	Men	28	17	24.30	<.001***	Women	16	68		Gay/lesbian	Men	2	97	<.01	.966	Women	1	46	Same-sex pair bond becoming sexual	Heterosexual	Men	16	1	.71	.400	Women	59	9		Gay/lesbian	Men	37	60	1.34
	Gay/lesbian	Men	24	64	2.31	.129																																																																		
		Women	6	34			Opposite-sex pair bond becoming sexual	Heterosexual	Men	4	47	12.10	.001**	Women	27	51		Gay/lesbian	Men	45	19	.32	.570	Women	22	12	Same-sex pair bond	Heterosexual	Men	28	17	24.30	<.001***	Women	16	68		Gay/lesbian	Men	2	97	<.01	.966	Women	1	46	Same-sex pair bond becoming sexual	Heterosexual	Men	16	1	.71	.400	Women	59	9		Gay/lesbian	Men	37	60	1.34	.247	Women	13	33						
Opposite-sex pair bond becoming sexual	Heterosexual	Men	4	47	12.10	.001**																																																																		
		Women	27	51				Gay/lesbian	Men	45	19	.32	.570	Women	22	12	Same-sex pair bond	Heterosexual	Men	28	17	24.30	<.001***	Women	16	68		Gay/lesbian	Men	2	97	<.01	.966	Women	1	46	Same-sex pair bond becoming sexual	Heterosexual	Men	16	1	.71	.400	Women	59	9		Gay/lesbian	Men	37	60	1.34	.247	Women	13	33																
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		Women	22	12			Same-sex pair bond	Heterosexual	Men	28	17	24.30	<.001***	Women	16	68		Gay/lesbian	Men	2	97	<.01	.966	Women	1	46	Same-sex pair bond becoming sexual	Heterosexual	Men	16	1	.71	.400	Women	59	9		Gay/lesbian	Men	37	60	1.34	.247	Women	13	33																										
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	Gay/lesbian	Men	2	97	<.01	.966																																																																		
		Women	1	46			Same-sex pair bond becoming sexual	Heterosexual	Men	16	1	.71	.400	Women	59	9		Gay/lesbian	Men	37	60	1.34	.247	Women	13	33																																														
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	Gay/lesbian	Men	37	60	1.34	.247																																																																		
		Women	13	33																																																																				

p* < .01. *p* < .001.

Hypothesis 9

Heterosexually-identified individuals who have same-sex attractions, fantasies, and/or behaviors will show less identity commitment and more identity exploration and uncertainty than will heterosexually-identified individuals without any same-sex attractions, fantasies and/or behaviors.

Heterosexually-identified participants who reported any same-sex attraction, fantasy, or behavior were classified as “H+,” and those who did not report any same-sex attraction, fantasy, or behavior were classified as “H,” following Morales Knight and Hope (2012). Participants with MTF, FTM, and other gender identities were excluded from this analysis. A MANOVA was performed with H/H+ status as the independent variable and the sexual orientation identity commitment, exploration, and uncertainty items as the dependent variables. A multivariate effect was found, Wilks’ $\lambda = .835$, $F(9,141) = 3.09, \eta_p^2 = .165, p = .002$. Univariate follow-ups are given in Table 18.

H+ participants endorsed somewhat greater sexual orientation identity uncertainty, and greater exploration, than did H participants. No group effects were found for sexual orientation commitment items.

Table 18

Ratings of sexual orientation uncertainty, exploration, and commitment, by H/H+ status

Item	H <i>M (SD)</i>	H+ <i>M (SD)</i>	<i>F</i> (1, 149)	η_p^2	<i>p</i>
I went through a period in my life when I was questioning or exploring my sexual orientation.	2.17 (1.67)	2.25 (1.56)	.08	.001	.777
I am currently questioning or exploring my sexual orientation.	1.41 (.96)	1.52 (1.19)	.37	.002	.546
I sometimes feel uncertain about my sexual orientation.	1.40 (.96)	1.61 (1.16)	1.48	.010	.226
My sexual orientation is quite clear to me.	5.81 (.72)	5.39 (1.26)	5.75	.037	.018*
I am comfortable with my sexual orientation.	5.71 (.75)	5.77 (.64)	.27	.002	.607
My sexual orientation is compatible with all of the other aspects of my sexuality.	5.41 (1.04)	5.61 (.77)	1.87	.012	.174
I am actively trying to learn more about my own sexual orientation.	2.60 (1.66)	2.83 (1.88)	.59	.004	.446
My sexual orientation will always be open to exploration.	2.40 (1.55)	3.05 (1.73)	5.62	.036	.019*
My sexual orientation may continue to change over time.	2.05 (1.28)	2.83 (1.71)	9.41	.059	.003**

* $p < .05$. ** $p < .01$.

Note. H $n = 66$; H+ $n = 83$. Ratings are on a 1-6 scale, where 1 = “very uncharacteristic of me” and 6 = “very characteristic of me.”

Discussion

The aim of the present work was to explore six avenues for improvement of research into sexual orientation:

1. The mate selection task;
2. Bisexuality as lower prioritization of partner gender in mate selection;
3. Gender diagnosticity and its promise for connecting gender role orientation, sexual orientation, and mate selection;
4. Individuals' conceptualizations of sexual orientation and how those conceptualizations vary across gender and sexual orientation identities;
5. Diamond's bibehavioral model;
6. A cross-category sexual identity development theory as a method for explaining variations in heterosexual identity.

The implications of the present findings for each of these avenues are here discussed, followed by discussions of the spam problem and the unexpected diversity of gender and sexual orientation identities observed in the sample. A more general discussion is then given of the three major assertions of the literature review:

1. Definitions of sexual orientation are inconsistent.
2. Theories of sexual orientation are flawed.
3. Measurements of sexual orientation are without theory or evidence.

Consideration of the limitations of the present study and ideas for future work is given next. The discussion ends with a general conclusion.

The Mate Selection Task

Differences between men's and women's ratings of various mate characteristics were observed, such that women valued character-attractiveness traits more than did men, and men valued sexual-attractiveness traits more than did women. These differences have been observed in previous work (e.g., Lippa, 2007), but, contrary to the hypothesis, these differences were more often observed in the pair-bond mate selection task than in the sexual-desire task. It seems likely that the gender effects observed to date have resulted from participants interpreting the mate-selection task as a pair-bond mate selection task rather than as a sexual-desire mate selection task. One particularly interesting result was that men rated "likes children" and "parenting abilities" higher than did women in the sexual-desire task (although both ratings were low relative to the Likert scale itself), but there were no gender effects in ratings for these variables on the pair-bond task. It is possible that sexual-desire mate selection involves at least some consideration of a potential partner's reproductive fitness, and that men consider these attributes to be related to reproductive fitness. It is difficult to argue that this effect is related to heterosexual men's strong preference for feminine women: the men and women in this sample were unevenly distributed across sexual orientation identity categories, with distinctly fewer men identifying as heterosexual ($n = 58$) than otherwise (bisexual $n = 99$; gay $n = 100$; other $n = 56$). Women were similarly unevenly distributed (heterosexual $n = 90$; bisexual $n = 59$; lesbian $n = 48$; other $n = 131$). This uneven distribution may have more generally affected the results of the analysis, although exactly how it may have done so is not known.

In general, the results suggest that the mate selection task, particularly when distinguished between short- and long-term mate selection decisions, is a profitable method for exploring variations in and between gender and sexual orientation identity groups.

Bisexuality as Lower Prioritization of Partner Gender in Mate Selection

The hypothesis that bisexually-identified individuals place, on average, lower priority on partners' gender in mate selection decisions than do individuals with other sexual orientation identities was thoroughly supported (and further reinforced by the data from the multidimensional modeling solutions discussed above). Bisexually-identified men and women had mean ratings of "is a man" and "is a woman" that were significantly different from heterosexual, gay, and lesbian men's and women's ratings. This difference held true both in the sexual-desire and pair-bond mate selection tasks. In fact, differences in prioritization of partner gender and gender presentation comprised the only real difference (within each type of mate selection task) across gender and sexual orientation identities. Although the idea that bisexuality may be conceptualized as relatively low prioritization of partner gender has received little discussion in the literature since the 1980s, it appears that further investigation is in order. Further analyses including participants with nontraditional sexual orientation will be performed on the current sample.

Gender Diagnosticity

The gender diagnosticity (GD) approach was found to be generally valid for sorting men from women, and for finding men and women who differ from the average GD scores for their sex, generally replicating Lippa's work (Lippa & Connelly, 1990;

Lippa, 1991, 2000, 2002). Interestingly, the GD calculation from the BSRI provided more accurate classification of participants as men and women than did the GD calculation from Lippa's own (2002) occupational-preference task, despite the fact that the BSRI is currently thought to measure instrumentality and expressiveness more than it measures masculinity and femininity (Spence & Helmreich, 1993). The reason for this discrepancy is not clear, but highlights the need to identify valid and reliable GD measures to further validate this approach.

Most GD scores did not correlate with sexual orientation identity, except that men scoring in the female direction on the BSRI were more likely to identify as LGB than were men who scored in the male direction. In this, the GD calculations mostly failed to support Lippa's (2000, 2002) conclusion that GD predicts sexual orientation, although a specific "heterosexual-homosexual diagnosticity" calculation was not attempted. However, GD scores from the BSRI did correlate with attraction to men and women in the ways expected by Lippa (2000, 2002). Perhaps the reason for these differing results is that, in this sample, sexual orientation identity was a particularly poor proxy for sexual attractions to men and women. Overall, a connection between adult gender atypicality and adult sexual orientation was shown to exist in this sample. However, no effect of GD-predicted gender on ratings of attraction as a determinant of sexual orientation was found, perhaps because there was not enough GD variability in the sample to discover such a difference.

The fact that each GD calculation is anchored in the instant sample hampers cross-sample comparisons except in so far as the samples to be compared are equivalently representative of the same population. "Homosexual-heterosexual

diagnosticity” was not attempted in the present study. Future work should address the question of finding valid and reliable sources of GD and sexual orientation diagnosticity data and further test Lippa’s theory, which appears not to have been tested outside of his own research group.

Individuals’ Conceptualizations of Sexual Orientation

The hypothesis that sexual orientation would be differently conceptualized by people of different gender and sexual orientation identities was generally supported, though some of the specific sub-hypotheses were only partially supported. Sexual attraction was the most highly rated determinant of sexual attraction across all groups, but men and women did not rate it differently. Heterosexual women rated sexual behavior as more important in determining sexual orientation than did lesbian or bisexual women, but there was no effect of sexual orientation among men. Men rated gender identity more highly than did women, but there were differing effects of sexual orientation within each category, such that heterosexual women rated it as more important than did bisexual and lesbian women, while gay men rated it as less important than heterosexual and bisexual men. Men rated gender role orientation more highly than did women, but bisexual men rated more highly than did heterosexual or gay men. There was general agreement among participants on the relative importance of (e.g.) sexual attraction and falling in love, and on the relative unimportance of (e.g.) biological factors (*contra* many researchers, it should be remembered) in defining sexual orientation. However, it was equally clear that sexual orientation is differently conceptualized across gender and sexual orientation identity categories—and that difference is interactive: e.g., heterosexual men and women agree that gender identity is a relatively important part of sexual orientation, and gay and

lesbian men and women agree that it is not very important, but bisexual men and women disagree strongly on this point. These observed differences in conceptualization of sexual orientation should serve as an important caution for researchers attempting to construct valid and reliable measures of sexual orientation.

Diamond's Biobehavioral Model

Participants used different decision rules in mate selection depending on whether the task involved a sexual-desire-driven relationship or a pair-bond relationship. For sexual-desire-driven mate selection, a clear preference for physical- and character-attractiveness attributes over social-attractiveness attributes (relationship, family, career, and home skills) was shown, with physical attractiveness clearly preferred to character attractiveness. In contrast, the pair-bond task results showed that participants had a preference for character-attractiveness traits while also highly valuing sexual-attractiveness traits. This general pattern held true across most gender and sexual orientation identity categories, lending strong support to L. M. Diamond's (2003b) biobehavioral model arguing that sexual desire and pair bonding are separate functions that have separate evolutionary histories. Overall, the distinction between sexual-desire and pair-bond relationships was very strongly supported in the data and should become a standard concept in the study of sexual relationships. For example, future work could focus on whether people construct their sexual orientation differently depending on which type of relationship is in play. A foreshadowing of what such work might find is visible in the present dataset, in that the correlations between participants' sexual attractions to men and women and experiences of falling in love with men and women

were high—for target men, $r(726) = .673, p < .001$, and for target women, $r(725) = .633, p < .001$ —but far from identity.

The hypothesis that women and men would have different histories of pair-bond friendships with people of the gender they would not ordinarily be sexually attracted to, and of those friendships becoming sexual, was not borne out in the present analysis.

While heterosexual women were observed to be more likely than heterosexual men to report having had same-sex pair-bond friendships, there was no corresponding difference between lesbian women and gay men’s opposite-sex pair-bond friendships. Nor were any gender effects observed in histories of those friendships becoming sexual. The likeliest explanation for the absence of these effects is that the base rate of their occurrence is low and/or that members of this sample, which was relatively young, on average, had not lived long enough for these events to occur. Future work with larger samples, or with older samples, or with longitudinal designs, may be helpful for estimating the base rate of these relationships in the population, and/or establishing gender and sexual orientation effects.

Explaining Variations in Heterosexual Identity

As hypothesized, H+ participants endorsed greater sexual orientation identity uncertainty, and greater exploration, than did H participants. However, no group differences were found for identity commitment. This result broadly agrees with Worthington and colleagues’ (2002) idea that some heterosexually-identified individuals experience an “active exploration” phase in their sexual orientation identity development. It is not clear whether this group falls into the “mostly straight” group observed in Thompson and Morgan (2008) and Vrangalova and Savin-Williams (2012). Further

analyses should focus on H+ participants' self-ratings and relationship histories, to determine whether they truly do constitute a distinct group from H individuals—as well as the degree to which they differ from individuals who use nontraditional labels, or no label, for their sexual orientation identity.

Unfortunately, the test of Worthington et al.'s (2008) cross-orientation theory of sexual orientation identity development was incomplete due to the decision to include only a subset of (reworded) MoSIEC items in the final questionnaire. That decision came as the obvious difficulties with the MoSIEC, and the burdens it would have imposed on our sample, were weighed against the size and burden of the entire questionnaire, which took pilot participants an average of about 40 minutes to complete. However, the available data did suggest that at least some H+ participants may be exploring, or at least remaining open-minded about, their future sexual orientation identities.

The Spam Problem

Almost twice as many responses were eliminated as spam ($n = 1254$) as were retained for preliminary analyses ($n = 731$). This fact alone should cast some doubt, for the critical reader, on the validity of the data that was retained. The truth of the matter is that the magnitude of the spam problem was not foreseen. Once the problem became clear, the data were searched for indicators that a response had been entered solely in order to gain access to the \$5 reward, a process that has been documented above. Perhaps the most important developments here were (a) the observation of a very large number of very short completion times in the data collection; (b) the observation that large numbers of suspect responses came from specific IP address blocks; and (c) the observation that a

large number of reward registrations involved clearly randomly generated email addresses.

Some of the decision rules used to classify responses as spam were arbitrary, such as the imposition of a cutoff of -1.5 *SDs* relative to the mean completion time in the pilot sample, or the guilt-by-association rule for certain IP blocks, or the “spammy email” rule. However, the literature offers very little guidance in dealing with spam responses. A popular textbook on the subject (Dillman et al., 2008) addresses “spam” only in the sense that email recruitment messages may be blocked as spam by recipient’s email providers. Gosling, Vazire, Srivastava, and John (2004) briefly discuss the problem (and point out that traditional paper-based surveys have always been subject to false or nonserious responding), but offer solutions that themselves appear somewhat nonserious, such as including an item asking whether the participant has taken the questionnaire already! The vendor of the backend software for the present survey (Qualtrics) offers an option to block multiple responses from any single IP address, which is a barrier to obtaining data from multiple members of the same household, or from university students who might be accessing the survey from the same computer in the same computer lab. Gosling and colleagues’ most workable suggestion is to analyze multiple responses from the same IP to make sure that ostensibly different responses have different demographic information and different response patterns; this approach was taken in the present data, but cannot guard against scripts (brief computer programs) written so as to randomize or semi-randomize responses, which is suspected to have taken place in the present sample, particularly in generating the responses with extremely short completion times.

It is not clear whether the rate of apparent spam responding was unusually high for Internet samples. No literature on this point could be located. However, it is logical to assume that the rate was unusually high compared to paper-based surveys: It would have been infeasible to complete this survey in a paper format as quickly as many of the spam responders did.

It seems likely that the availability of an assured, if small, reward, rather than the opportunity to enter a raffle for a reward of, or worth, perhaps \$250 or \$500 was a motivation for spam responding. The use of such a reward is known empirically to increase response rates (e.g., Dillman et al., 2008), which is why it was employed. Unfortunately, it very likely also increased the rate of spam responding.

Some methods that might have sharply reduced the rate of spam responding were not used in this sample, generally because the focus of the data collection design was on maintaining participant anonymity and maximizing ease of response, given the sensitive and potentially stigmatizing nature of the questions, and the vulnerable nature of the population surveyed. Requiring participants to use an access code or password was rejected on the grounds that it would have been unwieldy and error-prone, constituting a bar to data collection more than a safeguard against spam. Requiring participants to provide a unique identifier, such as a Social Security number (SSN), was not employed due to concerns about anonymity, and checking SSNs for validity would have been infeasible. Requiring participants to provide a valid mailing address (and then using that address to send remuneration) was considered, and might have been successful in reducing the number of spam responses, but was rejected due to anonymity concerns. However, it is not clear to what degree the insistence on anonymity affected either the

rate of spam responding or the degree of freedom participants felt in providing answers to sensitive questions.

In the end, however, devising a set of spam-identification rules served to increase confidence that valid data were retained. Retained responses had credible response durations, observed at least a minimal amount of per-item time on lengthy measures, and responded to Turing-test items in a human-like manner, all of which arguably reflect that an acceptable degree of attention was paid in retained responses. The observed internal-consistency statistics for the BSRI and the occupational-preference measure (among others), as well as the fact that many patterns observed in the data replicated existing bodies of literature, also increased confidence that valid data were retained.

The Sample's "Long Tail" Diversity

The survey questionnaire was composed with an eye toward maximizing inclusivity of diverse gender and sexual orientation identities, and seems to have been largely successful in doing so (*pace* a few pointed comments from a small number of very passionate participants). Still, the large number of participants with nontraditional gender and/or sexual orientation identities was truly surprising. Even more surprising was the large number of participants with nontraditional relationship types. A number of qualitative comments describing participants' sexual and romantic orientations and relationships were recorded, but are not included in this manuscript due to concerns that the data may be misused; see, for example, McEwen (2007) and Truth Wins Out (2008). However, these participants' voices deserve to be heard, and appropriate outlets for publication of this data are being sought.

In preliminary analyses of the data, it quickly became clear that gender- and sexual orientation identity diversity (and relationship diversity) in this sample were “long tail” phenomena (Anderson, 2005); in other words, there were a large number of individuals espousing a large number and variety of uncommon identities. The likeliest reason for the emergence of this phenomenon in the data is that the original recruitment notice found its way to corners of the Internet where people with statistically uncommon identities (e.g., asexual, polyamorous, BDSM) congregate. (Given that virtually all selections of “other,” whether in gender identity, race/ethnicity, sexual orientation identity, or relationship type, were accompanied by qualitative comments, it seems less likely that this large contingent included any significant number of spam responses.) In retrospect, it might have been useful to ask participants how they found out about the survey, in order to identify areas for more focused data collection.

Kuper and colleagues (2011) published an online data collection of transgender individuals (with similar demographic characteristics as the present sample) and noted a similar long-tail phenomenon, although in their sample “genderqueer” was the most common gender identity endorsed by their participants, which was not the case in the present sample. They also noted a nexus between non-male, non-female gender identity and nontraditional sexual orientation identity, which was also observed in the present sample. Some of their participants espoused more than one gender identity, which was not an explicit option in the present survey, but which was observed in participants’ comments. Future research on broad samples will need to strike a balance between being intelligible and accessible to majority participants, and demonstrating sensitivity and

cultural awareness to minority participants who are “in the know” about the vast variety of nontraditional gender and sexual orientation and relationship types.

One particular point of interest came in participants’ comments about asexuality, which included espousing identities such as “homoromantic” and “grey-A.” Chasin (2011) provides important background and discussion for understanding the variety of people who may be defined under the umbrella term “asexual.” Intriguingly, Chasin makes the point that asexuality may include a lack of sexual attraction or desire, but does not necessarily imply a lack of desire for pair-bond relationships, further underlining L. M. Diamond’s (2003b) distinction between the two (which Chasin cites). Chasin also noted a nexus between asexuality and gender diversity, which was also observed in the present sample.

Definitions of Sexual Orientation are Inconsistent

As discussed above, self-reported sexual orientation identity is probably the modal method of operationalizing sexual orientation in social science research (Sell, 2007). However, self-reported identity is an inappropriate proxy for sexual orientation, considering that there is often a disconnect between identity and more specific variables such as attraction, fantasy, and/or behavior (Chandra et al., 2011; Laumann et al., 1994; Morales Knight, 2012; Ross et al., 2003; Vrangalova & Savin-Williams, 2010, 2012). The present data bear out this disconnect, particularly in that over half of the self-identified heterosexual participants (58%) were classifiable as H+. The diversity of low-frequency but passionately maintained nontraditional sexual orientation identities in this sample has already been discussed. Again, Savin-Williams and Ream (2007) have suggested that measuring only the specific variables of interest is often an appropriate

route to take. This seems particularly true when attempting to obtain large-scale data, such as prevalence rates of same-sex attraction (e.g., Savin-Williams and Ream, 2007), history of same-sex sexual contact (e.g., Cochran & Mays, 2000a, b), or cohabiting same-sex couples (e.g., Gates, 2010). However, that reductive tactic evades the question of defining the construct “sexual orientation;” i.e., the question of exactly which variables to use in constructing it. Not only have researchers historically disagreed about how to do so (Sell, 2007; Shively et al., 1985), but participants disagree with researchers, and disagree among themselves (Tannenbaum, 2006)! The present results replicate Tannenbaum (2006) in suggesting that different participants themselves define the term in different ways, as witness the differences by gender and sexual orientation in participants’ ratings of the importance of (e.g.) gender identity (which heterosexual men and women, and bisexual men, think is of middling importance, and which bisexual men and gay and lesbian men and women think is relatively unimportant) or gender role orientation (which bisexual men think is rather more important than do heterosexual or gay men) in defining a person’s sexual orientation. Although a relatively narrow construct of sexual orientation might be arrived at by analyzing broad agreement across the sample, it seems difficult, at best, to establish construct validity for a really comprehensive construct of sexual orientation. It may be that the best approach to take, in future work examining “sexual orientation” as a construct, will be a personal-constructs approach (e.g., Kelly, 1955) that allows individuals first to select, or define, the dimensions of their own sexual orientations, and then rate themselves on those dimensions. Such an approach would allow the sample to sort itself into subsamples, avoiding the problem of including participants with divergent constructions of sexual orientation in the same analyses.

Theories of Sexual Orientation are Flawed

The present study does not fully address the flaws (already discussed) in extant theories of sexual orientation. However, the results from the mate selection tasks, and particularly the establishment of a clear difference in decision rules for short- versus long-term mate selection—a difference that holds across gender and sexual orientation identities—lends support to L. M. Diamond’s (2003b) biobehavioral model, as do the results of the pair-bond/sexual-partner history analysis. Diamond’s model suggests a synthesis between evolutionary theories (in that she posits separate evolutionary origins for sexual desire and pair bonding), biological theories (in that she posits relatively strongly determined sexual orientation for at least some people), and learning theories (in that she posits that individuals can learn novel sexual attractions, if not unlearn them). The present results also suggest a role for social-constructionist theories, in that different participants were observed to differently construct the construct of sexual orientation, as discussed immediately above. The general conclusion to be drawn from the present study is that sexual orientation cannot be adequately explained by single-origin theories, whether evolutionary, biological, behavioral, or social-constructionist, and that more synthetic and interactionist approaches, such as Diamond’s, represent the appropriate path for future work.

Measurements of Sexual Orientation are Without Theory or Evidence

The present work did not aim to arrive at any new method for measuring sexual orientation, but rather to test certain ideas and pose questions toward the composition of future measurements. As discussed in the Introduction, it is abundantly clear that researchers’ historical failure to measure sexual orientation (whether by omitting to

assess it at all, or by assessing it only through the flawed proxy of sexual orientation identity) obscures important facts about any given sample, and is no longer a viable, defensible, or, in some senses, ethical option for social science researchers. The present data clearly show that previously neglected or unconsidered dimensions, such as relative weighting of partner gender in mate selection; relationship type (sexual-desire vs. pair-bond); and gender role orientation are all important in understanding sexual orientation, and, further, that individuals' opinions about how sexual orientation is defined differ, often widely, from the way researchers conceptualize it.

Researchers who are not investigating sexual orientation itself, particularly researchers collecting large-scale data, might question the incremental utility of collecting additional information from participants. Given that group effects between the traditional sexual orientation identities are already well-attested for many variables of interest, why increase participant burden by asking more questions? The answer, derived from the current state of the literature as well as from the present study, is that the traditional identity categories and the known group effects may obscure other effects that are not yet attested. Consider that heterosexual identity is known to be predictive of lower risk for suicide compared to LGB identity; yet Murphy (2007) found that the subpopulation of heterosexually-identified college students with same-sex attractions or sexual behaviors (SSA/SSB) had three times the risk of suicidal ideation compared to heterosexually-identified students without SSA/SSB, even higher than the risk for LGB-identified students! Even where such dramatic effects are not found, the prospect of reduced error variance should be appealing to researchers.

If further assessment truly is necessary, then, what is the *de minimis* solution for improving sexual orientation assessment? At a bare minimum, researchers should assess sexual orientation identity, including a wider variety of options than has been done traditionally; attraction to same- and other-sex individuals, which in the present sample was generally agreed upon as the most important determinant of sexual orientation; and history of same- and other-sex sexual and romantic partners, in order to capture changes over time and “special relationships” as in L.M. Diamond’s (2003; 2008) biobehavioral model. An extant “best practices” document (Sexual Minority Assessment and Research Team [SMART Team], 2009) provides a good starting point. However, the SMART Team document restricts its discussion to men and women only, and to heterosexual, gay, lesbian, and bisexual sexual identities only, and the recommended sexual-attraction item uses a single bipolar dimension. The accumulated evidence suggests that participant gender and sexual orientation should be assessed in a way that acknowledges, or at least allows for, greater diversity of responses: minimally, with an “other” option that allows for qualitative comment. Some evidence (including some of the comments from the present sample) suggests that “mostly gay/lesbian” and “mostly heterosexual” should probably be included as options in a sexual-orientation-identity item (see esp. Thompson & Morgan, 2008; Vrangalova & Savin-Williams, 2012). An “asexual” option may also be very appropriate in a broad sample, though qualitative comment should probably be available for this option (Chasin, 2011; Kuper et al., 2011; see further discussion below).

Assessment of sexual attraction requires special attention, and more divergence from the SMART Team’s recommendations. Researchers should not use a single bipolar dimension, but should, at a minimum, use two unipolar dimensions, assessing strength of

sexual attraction to men and women separately. Given the usefulness of distinguishing between sexual desire and pair bonding, as already discussed (as well as participants' general agreement that both sexual attraction and "falling in love" are important components of sexual orientation) it would be even more appropriate to use a minimum of four unipolar dimensions, separately assessing desire to have sex with men and women and desire to have romantic relationships with men and women. Making available a qualitative comment space, or allowing participants to construct their own dimensions, would allow for the collection of data on sexual and romantic attractions to people who are not men or women. See esp. Chasin (2011) for discussion on this topic.

It is not clear that assessment of individuals' gender typicality, or of their preferences for partners' gender typicality, is a core concept for assessing sexual orientation. However, the fact that each of these phenomena play a part in at least some individuals' sexual orientations and mate selection decisions is empirically known (e.g., Dunne et al., 2000; Lippa, 2000; Phua, 2002; Smith & Stillman, 2002), and both of these relationships are borne out in the present data. (But see Sánchez & Vilain, 2012, for a discussion of how preferences about partner gender typicality may be driven by stigma considerations.) Future scale development should include room for assessment of gender typicality and preferences for partner gender typicality, at least in preliminary stages.

General Limitations of the Study and Suggestions for Future Research

The sample was not representative of the race/ethnicity composition of the U.S.A., as 89% of participants identified as European American, and the results may not generalize well to members of ethnic minority groups. Future work could avoid this limitation through better-targeted initial recruitment invitation and through inviting

ethnic-minority participants to pass on recruitment notices through their social networks. Stratified sampling, using screening items to limit participation to a priori proportions of participants with particular demographic characteristics, might also be useful for avoiding this limitation.

Most of the present analyses ignored the broader gender and sexual orientation diversity of the sample. As discussed at the outset of the Results section, this decision was made partly due to very small cell *n*s (for nontraditional gender identities) and partly due to the wide intragroup variation (for nontraditional sexual orientation identities). Future analyses are being planned, and will be performed on this dataset, that take that diversity into account.

This study only collected data about participants' gender identity, sexual orientation identity, and relationships at a single time point, and the study design specifically excluded the possibility of follow-up with these participants in order to maximize participant anonymity. However, given the criticality of change over time to understanding sexual orientation, particularly in women (L. M. Diamond, 2012), longitudinal studies of the concepts explored in this study might be very profitable.

This study did not address identity concealment or internalized homonegativity, which are important for drawing a full picture not only of sexual orientation identity, but of individuals' relationships to their identities. A scale such as Mohr and Kendra's (2011) Lesbian, Gay, and Bisexual Identity Scale might be used to assess the constructs addressed in the MoSIEC as well as several others, including responses to social stigma regarding sexual minorities such as identity concealment and internalized homonegativity. However, it is difficult to see how many of the items in such a scale

would be applicable, or appropriate, to heterosexually-identified individuals, who would not be likely to understand how to respond to, e.g., items regarding concealing their sexual orientation. One possibility would be to begin by assessing the presence of same-sex sexual or romantic attraction in heterosexually-identified participants, and then providing LGIBS items reworded to address those attractions rather than “sexual orientation.” Whether this is a viable approach remains to be studied.

One interesting avenue for further research that emerged out of the literature review was the idea of assessing not merely attraction (sexual response), but repulsion (disgust) in response to visual sexual stimuli depicting men and women (Zhang et al., 2011). There is not nearly enough evidence to suggest that this construct should be included in the larger construct of sexual orientation, yet it is logically consistent to suggest that at least some people’s sexual orientations consist not only of attractions to some people and (emotionally neutral) lack of attraction to others, but of active disgust at the idea of sexual interaction with some types of people. However, a great deal of research would be needed here, not only to establish the construct validity of disgust as a component of sexual orientation, but to establish how and when it can be distinguished from socially inculcated attitudes about certain types of sexual activity (see, e.g., Herek, 2000, 2012; Weinstein et al., 2012).

Conclusion

The study of sexual orientation appears to be at something of a crossroads. Researchers face a choice between continuing to classify people, and continuing to reach conclusions about them, based on their response to a single item addressing sexual orientation identity, or changing the ways in which we conceptualize, measure, and make

conclusions about the phenomena we are hoping to understand. The present work argues that the status quo is not a tenable or sustainable choice, and the author would urge researchers toward rethinking sexual orientation and its measurement.

Why should we rethink sexual orientation? The first and most obvious argument here is that society itself continues to rethink sexual orientation, and that researchers, who are necessarily also members of society, have continually found the ground shifting under our feet. We have defined “homosexuality” as aberrant behavior, as mental illness, as congenital error; we have defined it as comprising specific sexual behaviors, in terms of mental states (attraction and fantasy), and in terms of a deliberately chosen and consciously espoused sociopolitical identity written down on paper by participants to surveys. We have defined it as a biologically-based phenomenon and as a social construction. We have defined it as a curable disorder, as a permanent, unchangeable state of being, and as a phenomenon that varies from person to person, developing over time, and changing over the lifespan. It seems that we have yet to reach clarity about what it is we are studying!

More importantly, however, there is a body of empirical evidence showing that the status quo is no longer tenable, a body which the present work joins and reinforces. There is significant intragroup variance within each of the traditional sexual orientation identity categories (gay, lesbian, bisexual, heterosexual) we have been using for the last twenty or thirty years—perhaps more, at least in some respects, than there is between them. New identities (“heteroflexible,” “mostly straight,” “asexual”) appear to be emerging as people discover that the traditional labels do not fit their own lived experience. People are observed to change identity labels as they progress through their

lives. Men and women are observed to have vastly different experiences of sexual orientation development and expression through the lifespan. The components models that many of us subscribe to (attraction, fantasy, behavior, etc.) do not completely fit the way laypersons think about sexual orientation: their definitions vary depending on their own genders and sexual orientations. Finally, it must be understood that sexual orientation identity is an outcome, not a pre-existing condition, and that a conscious sexual identity is reached only by certain people, in certain contexts, and after a process of identity development—a process that differs widely between individuals.

How should we rethink the measurement of sexual orientation? Above all, researchers should seek clarity about exactly what it is we hope to measure, and devise measurement tools that include a variety of phenomena of interest, rather than subsuming them under the proxy variable of sexual orientation identity. Perhaps most critically, future measurement tools must explicitly take into account the participant's age, social context, and life stage, and above all be able to capture different types and magnitudes of changes in participants' sexual orientations. Given the observed differences between men and women in the development and expression of sexual orientation, researchers should consider whether it may be best to develop differently structured, or at least differently normed, measures of sexual orientation for men and women. Future work may very well underline a need for differently normed measures for people with nontraditional gender and sexual orientation identities. Similarly, future measurements must understand the relationship between gender role orientation and sexual orientation, a relationship that has been neglected in recent years but which appears to deserve closer study. It also seems to be the case that the prospective partner's gender role orientation has an impact on mate

selection decisions for at least some subset of people, and that this in turn may have some relationship to sexual orientation. Perhaps very critical for our understanding of the structure of sexual orientation is that bisexuality, at least in some individuals, may be characterized as simply giving a relatively low priority to the sex of a prospective partner when making mate selection decisions. Given that people appear to construct the concept of sexual orientation in different ways, a personal-constructs approach may be called for, at least in an exploratory fashion.

In more strictly methodological terms, researchers should develop their measurement tools using empirically supported methods of scale development, questionnaire design, and quality assurance. Measurement tools should be subjected to systematic, empirical research into their reliability and validity, an approach that has been sadly neglected to date. More broadly, however, researchers should be willing to be more exploratory, particularly where components models of sexual orientation are concerned. Given that the components theorized to comprise the construct “sexual orientation” are multifarious, multiply-determined, and poorly understood, greater use of multivariate statistical models in an exploratory mode seems called for.

Sexual orientation, gender, and their relationship are increasingly understood to have a fractal complexity. This complexity should not daunt researchers in this immensely interesting and rewarding field, but inspire us to work to explore and capture that complexity as best we can, while maintaining an appropriate humility toward, and sense of wonder for, the people and phenomena we hope to describe.

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Appendix A: Survey Prototyping and Piloting

Survey prototyping

Rationale. Since the mate-selection tasks, the gender diagnosticity measure, and the tasks involving ratings of hypothesized components of sexual orientation were heavily modified from previous work; since the demographic questions had some unusual features, including requests for brief qualitative narratives in some instances; and since the set of questions about sexual and pair-bond relationship history was composed *de novo*, it was necessary to gain information about how respondents would understand and respond to the questionnaire items, as well as information about the reliability and validity of the candidate measures.

Prototyping participants. In the prototyping phase, 12 participants were recruited. Nine were recruited via email notice distributed to the University of Nebraska–Lincoln’s (UNL’s) LGBTQNEWS email listserv and three were recruited from the community. Their average age was 35 (range 21–65). Eight (67%) were European American. All had at least some college education. Gender and sexual orientation are summarized in Table A1. Participants were compensated with their choice of a \$10 Amazon.com or \$10 iTunes.com gift card.

Table A1

Prototyping stage sample by self-identified gender and sexual orientation

	Gay/lesbian	Bisexual	Heterosexual	Other
Men	3	1	2	0
Women	1	1	2	0
Other	0	0	1	1

Prototyping method. Prototype versions of the online questionnaire were presented to the participants in the lab, on a desktop computer, or in their homes, on a laptop computer. Think-aloud cognitive interviews (as described in Dillman, Smyth, & Christian, 2009) were completed in order to understand respondents' impressions of the questionnaire and their thought processes as they completed the questionnaire. The interviews were recorded and reviewed for salient comments and themes.

Prototyping results; changes to the questionnaire. The think-aloud cognitive interviews resulted in several minor changes to the questionnaire:

In the mate selection tasks, participants commented that some items were semantically ambiguous. Parenthetical text was added as follows: *Physically healthy (doesn't get sick often)*; *Sexually faithful (has sex only with me)*; *Shares my religious/spiritual beliefs (or lack of same)*. The prompt for the mate-selection task was reworded to clearly define the term "committed relationship," as follows: *"Committed" means that you and your partner have a clear understanding about what constituted sexual "unfaithfulness."*

In the BSRI, participants complained that the questionnaire, at 60 items, was very lengthy. The BSRI was modified to include only the 20 "masculine" and 20 "feminine" items, excluding the 20 "neutral" items, for a total of 40 items.

In the sexual-partner and pair-bonding history questions, participants found the large number of examples of emotional intimacy to be redundant and confusing. The prompt was reworded with fewer examples. One participant noted that the questions about number of sexual partners did not assess for consensuality. Others noted that these questions did not operationally define "having sex." These items were reworded to emphasize that *consensual* sex was being inquired about, and to emphasize both "consensual" and "having sex."

In the self-ratings of sexual orientation components, participants noted that people who had never, or only rarely, had sexual attractions, fantasies, and/or experiences would tend to assign artificially low ratings to these items. The rating scale for these items was reworded to read, for example, “How many of your sexual fantasies are about men?” and the response option anchors were reworded as “0% (None of them); 50% (Half of them); 100% (All of them)”.

In the MoSIEC, several participants commented that the items were redundant, semantically ambiguous, and/or confusing. These comments were noted for further investigation in the pilot study. Reversal items in the MoSIEC were changed slightly; words such as “no” and “none” were set in bold type, to emphasize that these items were to be rated differently than the non-reversal items.

Several of the demographics items included a response option “other,” which, if selected, resulted in the presentation of a text box, allowing participants to specify or explain their selection. Participants noted that this should be signaled at the initial presentation of the question. The text “(you will have a chance to comment on this choice, if you like)” was added to these items. Participants commented that the “some college” option in the questions on own, mother’s, and father’s education was somewhat ambiguous; should it be selected for target persons who were currently in college? The text “(including currently in college)” was added to the “some college” option. Participants asked whether the question on income queried the respondent’s income only, or the respondent’s household income. The text “(do not include partner’s, spouse’s, or parent’s income)” was added to this item. For the item on relationship status, some participants noted that whether they were looking for a new relationship (or not) was orthogonal to the question of what type of relationship they might currently be in. This was recomposed as a separate item.

Survey piloting

Following the prototyping stage, the modified survey was tested for reliability and validity via a pilot study.

Pilot participants. Ninety-five participants were recruited via the Experimetrix subject pool within the UNL Psychology Department. These participants were undergraduate students who received course credit in return for participation. An additional 15 participants were recruited from the local LGBT community via email. These participants received \$5.00 in return for participation. Participants' average age was 22 ($SD = 6.66$; range 18–65). 7% of the sample identified as Hispanic (orthogonal to other race/ethnicity categories); 88% of the sample identified as European American. Gender and sexual orientation are summarized in Table A2.

Table A2

Piloting stage sample by self-identified gender and sexual orientation

	Gay/lesbian	Bisexual	Heterosexual	Different label	No label
Men	7	0	30	3	2
Women	3	4	36	9	4
Transgender (MTF)	0	0	0	0	0
Transgender (FTM)	0	1	0	1	0
Other	0	0	0	1	0

Pilot method. Pilot participants completed the survey in the location of their choice, via the Internet. The survey was hosted on Qualtrics.com, a major provider of Internet research services. The instruments in the survey were analyzed for validity and for internal reliability (Cronbach's α , where appropriate).

Pilot results.

Coding gender and sexual orientation. Because only one respondent identified as other than male or female, gender was coded as male and female only. Similarly, because the various non-heterosexual response options had small cell *ns* in the pilot sample, sexual orientation was coded as heterosexual vs. nonheterosexual only.

Mate selection tasks. MANOVAs were performed separately on the two mate selection tasks (short-term relationship and long-term relationship), with a 2 (gender: male, female) \times 2 (sexual orientation: heterosexual, nonheterosexual) design, and with the set of mate selection items, plus an additional item rating interest in each type of relationship, as the dependent variables.

For the short-term relationship items, the multivariate main effect of gender was significant, Wilks' $\lambda = .418$, $F(29, 65) = 3.12$, $p < .001$, $\eta_p^2 = .582$. The multivariate main effect of sexual orientation was significant, Wilks' $\lambda = .440$, $F(29, 65) = 2.86$, $p < .001$, $\eta_p^2 = .560$. The multivariate interaction was significant, Wilks' $\lambda = .221$, $F(29, 65) = 7.90$, $p < .001$, $\eta_p^2 = .779$. Univariate effects are not displayed for this phase of the study due to low power and presumed unreliability.

For the long-term relationship items, the multivariate main effect of gender was significant, Wilks' $\lambda = .331$, $F(29, 65) = 4.53$, $p < .001$, $\eta_p^2 = .669$. The multivariate main effect of sexual orientation was significant, Wilks' $\lambda = .391$, $F(29, 65) = 3.48$, $p < .001$, $\eta_p^2 = .609$. The multivariate interaction was significant, Wilks' $\lambda = .226$, $F(29, 65) = 7.67$, $p < .001$, $\eta_p^2 = .774$. Univariate effects are not displayed for this phase of the study. The presence of multivariate effects was thought to validate the measure generally.

Multidimensional scaling analyses (MDS) were performed on the two mate selection tasks (short-term relationship and long-term relationship). Separate matrices were created by gender and sexual orientation. The number of dimensions in the analysis was constrained at 2 to facilitate description of patterns in the data. The results showed that preference patterns differed strongly between the short-term and long-term tasks, and differed by sexual orientation more than by gender. More detailed analysis is not given for this phase of the study, though the approach was deemed generally valid.

Gender diagnosticity. Two linear discriminant function (LDF) analyses were performed using the occupational preference items as independent variables. The first LDF used gender as the grouping variable; the second used sexual orientation as the grouping variable.

The first LDF, for gender, resulted in a single function with eigenvalue = 2.79; canonical correlation = .858; Wilks' $\lambda = .264$; $\chi^2(40) = 102.53$; $p < .001$. The function correctly grouped 93.9% of cases. The second LDF, for sexual orientation, resulted in a single function with eigenvalue = 1.54; canonical correlation = .779; Wilks' $\lambda = .393$; $\chi^2(40) = 71.88$; $p < .001$. The function correctly grouped 88.9% of cases. Further analysis was not performed at this stage of the study.

Bem Sex-Role Inventory. To provide a convergent validity check on the diagnosticity approach, an identical pair of LDF analyses was performed using the BSRI items as independent variables.

The first LDF, for gender, resulted in a single function with eigenvalue = 4.78; canonical correlation = .909; Wilks' $\lambda = .173$; $\chi^2(60) = 119.29$; $p < .001$. The function correctly grouped 97.0% of cases. The second LDF, for sexual orientation, resulted in a single function with eigenvalue = 3.53; canonical correlation = .882; Wilks' $\lambda = .221$; $\chi^2(60) = 102.57$; $p = .001$.

The function correctly grouped 98.0 % of cases. Further analysis was not performed at this stage of the study. The diagnosticity approach was judged valid for gender and for sexual orientation.

Sexual-partner and pair-bonding histories. Two ANOVAs were performed with numbers of same-sex pair-bond relationships and numbers of such relationships that became sexual as the dependent variables. In the first, gender was the independent variable; in the second, sexual orientation was the independent variable.

In the gender ANOVA, all results were nonsignificant, $ps > .05$. In the sexual orientation ANOVA, nonheterosexual participants had a greater mean number of same-sex pair-bond relationships ($m = 4.48$, $SD = 3.25$) than did heterosexual participants ($m = 2.37$, $SD = 3.39$), $F(1, 91) = 92.26$, $p = .005$. All other results were nonsignificant, $ps > .05$. However, these null results were likely due to insufficient power. Although 93 respondents had had same-sex pair-bond relationships, only 15 had had such relationships that became sexual. Similarly, although 91 respondents had had opposite-sex pair-bond relationships, only 50 had had such relationships that became sexual.

Ratings of theorized components of sexual orientation. The ratings of theorized components of sexual orientation were analyzed for reliability, resulting in Cronbach's $\alpha = .81$ over the 14 items. Separate analyses by gender and sexual orientation resulted in α s ranging from .66 to .87, suggesting that sexual orientation was defined differently by different subgroups in the sample. A factor analysis was performed as well. For the factor analysis, Kaiser-Meyer-Olkin (KMO) = .72, suggesting an adequate sample. Bartlett's test of sphericity gave $\chi^2(91) = 453.09$, $p < .001$, suggesting that the items were adequately correlated. Principal components analysis with varimax rotation gave a four-factor solution. Analysis of the scree plot suggested that the first factor was likely to be the only important factor. The first factor (eigenvalue = 4.25)

included attraction, fantasy, sexual behavior, falling in love, biological factors, and sexual orientation identity. The other factors (eigenvalues = 1.88, 1.47, 1.10) were difficult to classify on the basis of the items included in each. The conclusion made was that the first factor included the items that were consistently highly rated by most respondents, and that the others were trivial.

To more directly analyze between-group differences in item ratings, a MANOVA was performed with a 2 (gender: male, female) \times 2 (sexual orientation: heterosexual, nonheterosexual) design, and with the set of sexual orientation components as the dependent variables. The multivariate main effect of gender was nonsignificant, $p > .05$. The multivariate main effect of sexual orientation was significant, Wilks' $\lambda = .618$, $F(14, 80) = 3.54$, $p < .001$, $\eta_p^2 = .382$. The multivariate interaction was nonsignificant, $p > .05$. Univariate effects are not displayed for this phase of the study. The presence of multivariate effects was thought to validate the idea that different groups conceptualize sexual orientation differently, and that this measure captures that difference.

Ratings of own levels of theorized components of sexual orientation. Participants' own ratings of attraction, fantasy, sexual interaction, and falling in love with men and women were analyzed for descriptive statistics. Data from one heterosexual male participant who appeared to have misunderstood the items was eliminated from the analysis. A summary is given in Table A3.

Table A3

Means and SDs of self-ratings of sexual orientation components

	H men	NH men	H women	NH women
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
	(<i>n</i> = 29)	(<i>n</i> = 12)	(<i>n</i> = 36)	(<i>n</i> = 20)
Attraction to men	1.14 (.58)	4.83 (2.62)	6.92 (.28)	5.40 (1.90)
Attraction to women	7.00 (.00)	3.75 (2.70)	1.42 (.81)	5.85 (1.46)
Proportion of fantasies about men	1.17 (.66)	5.08 (2.54)	6.61 (.80)	3.45 (1.50)
Proportion of fantasies about women	6.83 (.93)	3.17 (2.69)	1.33 (.59)	4.40 (1.57)
Proportion of sexual experiences with men	1.07 (.37)	5.00 (2.80)	6.72 (1.03)	4.45 (2.14)
Proportion of sexual experiences with women	6.48 (1.62)	3.08 (2.91)	1.14 (.35)	3.00 (1.86)
Proportion of falling in love with men	1.07 (.37)	4.75 (2.67)	6.92 (.28)	4.45 (2.19)
Proportion of falling in love with women	6.86 (.58)	3.25 (2.67)	1.11 (.32)	3.50 (2.07)

H = "heterosexual." NH = "nonheterosexual."

Note. All ratings are on a 1–7 scale. Ratings of attraction are anchored from 1, *Not at all*, to 7, *Very much*. All other ratings are anchored from 1, *0%* to 7, *100%*.

Sexual identity exploration and commitment. A reliability analysis was performed on the MoSIEC items, giving Cronbach's $\alpha = .77$ across the 22 items. Separate analyses by gender and sexual orientation resulted in α s ranging from .66 to .87. Given that Worthington et al. (2008) claimed that the MoSIEC should be appropriate for all sexual orientations, closer analysis was thought to be merited. A second set of separate analyses, by all sexual orientation identity groups, resulted in α s ranging from .48 to .85. Given this variability in reliability, and given the concerns raised in the prototyping stage about respondents' ability to understand the items in the MoSIEC, the measure was dropped in favor of a smaller number of reworded items more directly querying sexual orientation exploration and commitment.

Demographic items. Demographic items were analyzed for frequencies. On the race and ethnicity items, 7% of the pilot sample identified as Hispanic/Latino; 2% as black/African American; 7% as Asian American/Pacific Islander; 6% as American Indian/Native American/Alaska Native; 88% as white/Caucasian/European American; and 6% as Other.¹ Two respondents chose to comment on their selection of "Other." One wrote, "I am Indian. As in Indian from India." The other wrote, "I'm half Spanish, half Mexican."

Most participants described themselves as having "some college" education (73%), most likely due to being currently enrolled in college. Of the remainder, most had a bachelor's (11%) or master's (7%) degree. Two percent held a professional degree, 1% held a two-year degree, and 2% held a high school diploma or GED. No respondents selected "less than high school." Participants described their parents as well-educated. Their mothers were described as holding bachelor's (31%), master's (20%), or two-year degrees (13%), or as having attended some college (14%); 2% were described as holding a professional degree and 1% as holding a

¹ Percentages do not add to 100% due to rounding, due to the fact that multiple selection was allowed, and due to the fact that Hispanic was treated as orthogonal to the other categories.

doctorate. Fifteen percent were described as holding a high school diploma or GED; only 1% as having less than a high school education. Fathers were described as somewhat more educated, with bachelor's (28%), master's (12%), doctoral (8%) or professional degrees (5%). Sixteen percent were described as having some college education; 19% as holding a high school diploma or GED; and 2% as having less than a high school education.

Participants generally described themselves as having little personal income, with fully 81% earning less than \$20,000 per year, likely due to the majority of the sample being currently enrolled as undergraduate students. Nine percent earned \$20,001–\$40,000; 6% earned \$40,001–\$60,000; 1% earned \$60,001–\$80,000; and 3% earned more than \$80,000.

The various relationship-status items yielded some interesting patterns. Almost two-thirds of participants (63%) indicated that they were not seeking a new relationship, regardless of their current relationship status. With respect to current relationship status, 38% indicated that they were currently dating; 10% were living with a partner; 8% were engaged to be married (or to be in a marriage-like relationship); 8% were married (or in a marriage-like relationship); 6% described their relationship status as “Other.” Among this latter group, five respondents commented as follows:

- “I am married but living away from my husband, I am seriously dating a woman, and I am having casual sexual relationships with both men and women.”
- “I'm in relationships with several people. They're all different and evolving.”
- “Looking for a new relationship, but not willing to commit.”
- “Occasionally sleep with people who i have known for a number of years or months, just for fun.”
- “Parents preventing a relationship.”

Participants who indicated that they were currently in a relationship were asked to indicate whether the arrangement was exclusive, open, or “other.” Among participants in a relationship, 78% indicated that it was exclusive, 7% that it was open, and 15% that it was “other”. Among this latter group, two participants commented. The first wrote, “I did not consider it an open relationship because I am not dating any of those people.” The second wrote, “Secret relationship.”

Gender and sexual orientation data have been given above, but participants’ comments on choice of “other” for sexual orientation are recorded here. (No participants commented on choosing “other” for gender.) Comments have been edited for typographical errors.

- “‘Mostly straight’ works, or perhaps, ‘straight but not narrow,’ or ‘straight with crooked bits.’ I’m reluctant to assume ‘traditional’ labels because: a) they don’t quite fit -- not broad enough, or perhaps so broad as to be close to meaningless; b) there seems to be a political (as in power and status) dimension to the issue of sexual orientation that is not fully captured or even acknowledged in current labels -- e.g. I love women, meaning, yes, some women are totally hot and I’d have sex with them if all other conditions were favorable, AND from another aspect of love for women, I stand in solidarity with women who aren’t paid fairly for their work, who are exploited, who are systematically disempowered because of their gender. ‘Lesbian’ doesn’t quite fit all those things.”
- “Asexual”
- “Bi-curious or pansexual”
- “Bi-curious or pansexual. I’m attracted to people regardless of their gender.”

- “I identify as queer because it is important to me that I be recognized as part of the queer community, yet I don't like the restrictiveness of the other sexual orientation labels. I like the term queer because it is flexible and inclusive.”
- “I identify as queer, both in my sexual orientation and gender.”
- “I prefer the label of queer to describe my sexual orientation. As a transman who is married to a woman, I feel that our relationship does not fit into a heterosexual relationship model. I also experience some attraction to men, transmen, transwomen, and genderqueer individuals.”
- “Most of my sexual experiences have been with men, I am a woman. I feel that I do not explore my attractions to women as much I would like to because of the strong expectations that people have about me, or what my friends would react like.”
- “Pansexual”
- “Queer - because I am genderqueer and attracted to people of all genders.”
- “Queer - it's more expressive of the fluidity and ambiguous nature of my sexuality, and my willingness to entertain any flavor of sexual orientation.”
- “Queer, pansexual”
- “Queer. I feel like queer expresses my experiences and view of the world better than gay, which has become a very assimilationist term. To me queer is more flexible and also more political and intellectual.”

Appendix B: Mate Selection Task

Short-term (sexual-desire-motivated) relationship

At present, how interested are you in having a short-term, uncommitted ("one-night stand" or "no strings attached") sexual relationship? (Please answer this even if you are in a relationship of this kind right now.)

Not at all interested Somewhat interested Very interested

● ● ● ● ● ● ●

Think about your sexual desires and what makes a person sexually attractive to you. Think only about a short-term, uncommitted ("one-night stand" or "no strings attached") sexual relationship. In that context, how important are each of the following aspects of a potential short-term sexual partner?

	Not at all important			Somewhat important			Extremely important
Intelligence	●	●	●	●	●	●	●
Age	●	●	●	●	●	●	●
Shares my religious/spiritual beliefs (or lack of same)	●	●	●	●	●	●	●
Shares my interests	●	●	●	●	●	●	●
Physically healthy (doesn't get sick often)	●	●	●	●	●	●	●
Moral/ethical values	●	●	●	●	●	●	●
Humor	●	●	●	●	●	●	●

	Not at all important			Somewhat important			Extremely important
Communication skills	●	●	●	●	●	●	●
Exciting sex partner ("good in bed")	●	●	●	●	●	●	●
Skills for maintaining a home	●	●	●	●	●	●	●
Dependability	●	●	●	●	●	●	●
Career achievement	●	●	●	●	●	●	●
Physically fit ("in shape")	●	●	●	●	●	●	●
Parenting abilities	●	●	●	●	●	●	●
	Not at all important			Somewhat important			Extremely important
Likes children	●	●	●	●	●	●	●
Gets along with my parents/friends	●	●	●	●	●	●	●
Acts masculine	●	●	●	●	●	●	●
Is a woman	●	●	●	●	●	●	●
Acts feminine	●	●	●	●	●	●	●
Kindness	●	●	●	●	●	●	●
Sexually faithful (has sex only with me)	●	●	●	●	●	●	●

	Not at all important			Somewhat important			Extremely important
Hard-working	●	●	●	●	●	●	●
Wealth	●	●	●	●	●	●	●
Physical attractiveness	●	●	●	●	●	●	●
Loves me	●	●	●	●	●	●	●
Honesty	●	●	●	●	●	●	●
Is a man	●	●	●	●	●	●	●
Ambition	●	●	●	●	●	●	●

Long-term (pair-bond) romantic and sexual relationship

At present, how interested are you in having a long-term, committed, romantic and sexual relationship? "Committed" means that you and your partner have a clear understanding about what constituted sexual "unfaithfulness". (Please answer this even if you are in a relationship of this kind right now.)

Not at all interested Somewhat interested Very interested

● ● ● ● ● ●

Think about what you want in a long-term, committed, romantic and sexual relationship. In that context, how important are each of the following aspects of a potential long-term romantic and sexual partner?

[items as above]

Appendix C: Occupational Preference Items for Gender Diagnosticity

Below are 40 occupations. Using the scale shown below, indicate how much you would dislike or like working in each occupation. Don't worry about whether you are currently trained to do a given kind of work, how much money you would make, or whether you would get ahead in that kind of job. Think only about how much you would like to do each kind of work.

	Strongly Dislike	Moderately Dislike	Slightly Dislike	Neither Dislike nor Like	Slightly Like	Moderately Like	Strongly Like
Lawyer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Florist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clerk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Farmer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional athlete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minister, rabbi, clergy person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biologist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly Dislike	Moderately Dislike	Slightly Dislike	Neither Dislike nor Like	Slightly Like	Moderately Like	Strongly Like
Electrical engineer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social worker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manager of a clothing store	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Business executive	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Inventor	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Physician	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Computer programmer	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	Strongly Dislike	Moderately Dislike	Slightly Dislike	Neither Dislike nor Like	Slightly Like	Moderately Like	Strongly Like
Auto mechanic	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Please select "Slightly Like"	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Accountant	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Costume designer	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Mathematician	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Bookkeeper	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Building contractor	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	Strongly Dislike	Moderately Dislike	Slightly Dislike	Neither Dislike nor Like	Slightly Like	Moderately Like	Strongly Like
Chemist	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Beauty consultant	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

	Strongly Dislike	Moderately Dislike	Slightly Dislike	Neither Dislike nor Like	Slightly Like	Moderately Like	Strongly Like
Children's author	●	●	●	●	●	●	●
Editor	●	●	●	●	●	●	●
Art museum director	●	●	●	●	●	●	●
Jet pilot	●	●	●	●	●	●	●
Newspaper reporter	●	●	●	●	●	●	●
Grade school teacher	●	●	●	●	●	●	●
Psychologist	●	●	●	●	●	●	●
Poet	●	●	●	●	●	●	●
Carpenter	●	●	●	●	●	●	●
Fashion model	●	●	●	●	●	●	●
Mechanical engineer	●	●	●	●	●	●	●
Flight attendant	●	●	●	●	●	●	●
Interior decorator	●	●	●	●	●	●	●
Dance teacher	●	●	●	●	●	●	●

Auto sales person



Nurse



Writer of fiction



Librarian



Appendix D: Bem Sex-Role Inventory

Please rate each of the following personality characteristics as to how well it describes you personally.

	Never or almost never true of me			Sometimes true of me			Always or almost always true of me
self-reliant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
yielding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
defends own beliefs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
independent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
shy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
athletic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
affectionate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never or almost never true of me			Sometimes true of me			Always or almost always true of me
assertive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
flatterable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
strong personality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
loyal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

forceful	●	●	●	●	●	●	●
feminine	●	●	●	●	●	●	●
analytical	●	●	●	●	●	●	●
sympathetic	●	●	●	●	●	●	●
	Never or almost never true of me			Sometimes true of me		Always or almost always true of me	
leadership ability	●	●	●	●	●	●	●
sensitive to others' needs	●	●	●	●	●	●	●
willing to take risks	●	●	●	●	●	●	●
understanding	●	●	●	●	●	●	●
makes decisions easily	●	●	●	●	●	●	●
compassionate	●	●	●	●	●	●	●
self-sufficient	●	●	●	●	●	●	●
eager to soothe hurt feelings	●	●	●	●	●	●	●
	Never or almost never true of me			Sometimes true of me		Always or almost always true of me	
dominant	●	●	●	●	●	●	●

soft spoken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
masculine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
willing to take a stand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
aggressive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
gullible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never or almost never true of me			Sometimes true of me		Always or almost always true of me	
acts as a leader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
childlike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
individualistic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
does not use harsh language	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
loves children	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ambitious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
gentle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix E: Sexual-Partner and Pair-Bonding History Questionnaire

The male version of this questionnaire is given here. The questionnaire includes logic such that not all respondents will encounter all of the items. Logic statements are set off with square brackets and are set in italics between items thus: *[Logic statement]*.

Have you ever had any male friends that you would describe as "close friends"?

- Yes
 No

[Display next item if "yes"]

How many male close friends have you had? Please enter a number. If you have not had any male close friends, enter 0 (zero).

Number of close male friends:
 (enter 0 [zero] if you haven't had any)

[Display next item if nonzero]

How many of your close friendships with men would you describe as emotionally intimate? Please think about your closest male friends, men who have been really special in your life, even if only for a short time. You should count friendships in this area if more than two or three of these things were true:

- You didn't like being apart from him;
- You had a deep emotional connection with your friend and usually understood how he was feeling;
- You thought about him a lot of the time;
- You felt calm and secure when you were together with him;
- You often sought him out for emotional comfort;
- You felt a deep and strong affection for him.

Number of emotionally intimate male friends: (enter 0 [zero] if you haven't had any)

[Display next item if nonzero]

Did any of these emotionally intimate relationships with men eventually become sexual? What we are looking for here are relationships that were at first nonsexual, *then* became emotionally intimate, and *then* became sexual, in that order.

- Yes
- No

[Display next item if "Yes"]

How many of your emotionally intimate relationships with men eventually became sexual? Please enter a number. If this has never happened, please enter 0 (zero).

Number of emotionally intimate relationships with men that eventually became sexual: (enter 0 [zero] if this has never happened)

[Next item is displayed to all participants, unless previous item is nonzero– otherwise it would be redundant]

Have you ever had consensual sex with a man? ("Having sex" is defined as anything involving contact with your or your sexual partner's genitals. "Consensual" means you both agreed to have sex.)

- Yes
- No

[Display next item if "yes" or if previous item was nonzero]

How many men have you had consensual sex with? ("Having sex" is defined as anything involving contact with your or your sexual partner's genitals. "Consensual" means you both agreed to have sex.) Please enter a number. If you have never had consensual sex with men, enter 0 (zero).

Number of male sexual partners:
(enter 0 [zero] if you haven't had any)

[Display next item if nonzero]

Have you ever had any short-term, uncommitted ("one-night stand" or "no strings attached") sexual relationships with men?

- Yes
- No

[Display next item if "yes"]

How many short-term, uncommitted ("one-night stand" or "no strings attached") sexual relationships with men have you had? Please enter a number. If you have not had any sexual relationships of this kind with men, enter 0 (zero).

Number of short-term, uncommitted
sexual relationships with men:
(enter 0 [zero] if you haven't had any)

[Display next item if the item on pair-bond relationships becoming sexual is nonzero or if the item on having had sex with men is "yes"]

Have you ever had any long-term, committed romantic relationships with men? ("Committed" means that you and your partner had a clear understanding about what constituted sexual "unfaithfulness".)

- Yes
- No

[Display next item if "yes"]

How many long-term, committed romantic relationships have you had with men? Please enter a number. If you have not had any long-term, committed romantic relationships with men, enter 0 (zero).

Number of committed, romantic relationships with men: (enter 0 [zero] if you haven't had any)

Appendix F: Ratings of Components of Sexual Orientation

Think about sexual orientation (in general, not necessarily your own sexual orientation) as you look at each of the following concepts. How much does each concept *define* a person's sexual orientation?

	Does not define a person's sexual orientation at all			Somewhat defines a person's sexual orientation			Very strongly defines a person's sexual orientation
Sexual attractions to men, women, or both	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A history of sexual experiences with men, women, or both	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sexual daydreams, sexual dreams, and/or sexual thoughts during masturbation featuring men, women, or both	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Falling in love with men, women, or both	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identifying as "gay," "lesbian," "bisexual," "heterosexual," or some similar label	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Accepting and feeling comfortable with one's identity as "gay," "lesbian," "bisexual," heterosexual," or some similar label

Whether a person feels him- or herself to be male or female (regardless of biological sex)

Acting masculine (stereotypically male) or feminine (stereotypically female)

Please choose "Somewhat defines a person's sexual orientation" to answer this item.

Cultural factors like a person's race, ethnicity, and/or beliefs about sexual behavior and sexual orientation

Social experiences like oppression, discrimination, education, and/or homophobia/heterosexism

Changes over time in attractions, fantasies, behaviors, identity, or other factors in this list

Biological factors such as genetics, brain chemistry or anatomy, or hormones

Appendix G: Ratings of Own Levels of Components of Sexual Orientation

Think about *yourself* and rate *yourself* on each of the following items:

	Not at all			Some what			Very much
How sexually attracted are you to men?	●	●	●	●	●	●	●
How sexually attracted are you to women?	●	●	●	●	●	●	●

Think about *yourself* and rate *yourself* on each of the following items:

	0% (None of them)			50% (Half of them)			100% (All of them)
How many of your sexual fantasies are about men?	●	●	●	●	●	●	●
How many of your sexual fantasies are about women?	●	●	●	●	●	●	●
How many of your sexual experiences have been with men?	●	●	●	●	●	●	●
How many of your sexual experiences have been with women?	●	●	●	●	●	●	●

	0% (None of them)			50% (Half of them)			100% (All of them)
--	----------------------------	--	--	-----------------------------	--	--	--------------------------

When you have fallen in love, how often has it been with a man? (This is regardless of whether you got involved in a relationship – the question is about your feelings of falling in love.)



When you have fallen in love, how often has it been with a woman? (This is regardless of whether you got involved in a relationship – the question is about your feelings of falling in love.)



Appendix H: Sexual Identity Exploration and Commitment

Please read each statement carefully and rate how well it describes you (how characteristic it is of you).

	Very uncharacteristic of me					Very characteristic of me
I went through a period in my life when I was questioning or exploring my sexual orientation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am currently questioning or exploring my sexual orientation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I sometimes feel uncertain about my sexual orientation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sexual orientation is quite clear to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am comfortable with my sexual orientation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sexual orientation is compatible with all of the other aspects of my sexuality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am actively trying to learn more about my own sexual orientation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sexual orientation will always be open to exploration.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sexual orientation may continue to change over time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix I: Demographics Items

How old are you?

Please enter your age in years:

Would you describe yourself as:

- Male
- Female
- Transgender (MtF)
- Transgender (FtM)
- Other (you will have a chance to comment on this choice, if you like)

[Display comment box if "other" is selected]

Since you selected "other" in the last question, would you please provide a brief explanation of your choice?

Do you consider yourself to be Hispanic, Latino/Latina, or Chicana/Chicano?

- Yes
- No

How would you describe your race or ethnicity? (Check all that apply.)

- Black / African American
- Asian American / Pacific Islander
- American Indian / Native American / Alaska Native
- White / Caucasian / European American
- Other (you will have a chance to comment on this choice, if you like)

[Display comment box if "other" is selected]

Since you selected "other" for your race or ethnicity, you're welcome to comment on why you did so.

What is the **highest** level of education you have completed? (select only **one**.)

- less than high school
- high school (diploma or GED)
- some college (including currently in college)
- vocational or technical degree (welding school, beauty school, or similar)
- associate's or 2 year degree (A.A., A.S., or similar)
- bachelor's or 4 year degree (B.A., B.S., teaching credential, or similar)
- master's degree (M.A., M.S., Ed.S., Engineer, or similar)
- doctoral degree (Ph.D., Ed.D., Psy.D., or similar)
- professional degree (M.D., D.D.S., D.V.M., LL.B., or similar)

What is the **highest** level of education your **mother** completed? (select only **one**.)

- less than high school
- high school (diploma or GED)
- some college (including currently in college)
- vocational or technical degree (welding school, beauty school, or similar)
- associate's or 2 year degree (A.A., A.S., or similar)
- bachelor's or 4 year degree (B.A., B.S., teaching credential, or similar)
- master's degree (M.A., M.S., Ed.S., Engineer, or similar)
- doctoral degree (Ph.D., Ed.D., Psy.D., or similar)
- professional degree (M.D., D.D.S., D.V.M., LL.B., or similar)

What is the **highest** level of education your **father** completed? (select only **one**.)

- less than high school
- high school (diploma or GED)
- some college (including currently in college)
- vocational or technical degree (welding school, beauty school, or similar)
- associate's or 2 year degree (A.A., A.S., or similar)
- bachelor's or 4 year degree (B.A., B.S., teaching credential, or similar)
- master's degree (M.A., M.S., Ed.S., Engineer, or similar)
- doctoral degree (Ph.D., Ed.D., Psy.D., or similar)
- professional degree (M.D., D.D.S., D.V.M., LL.B., or similar)

Income level: What is your total **personal, individual** annual income? (do **not** include partner's, spouse's, or parent's income)

- Between \$0 and \$20,000
- Between \$20,001 and \$40,000
- Between \$40,001 and \$60,000
- Between \$60,001 and \$80,000
- More than \$80,000

Would you describe the place where you live as "rural" (in the country) or "urban" (in or near a city)?

- I live in a rural area (I live in the country)
- I live in an urban area (I live in a city)

We'd like to know where our survey participants are located. Would you please enter your ZIP code here? (If you don't feel comfortable providing your complete ZIP code, you can enter just the first 3 digits, if you like.)

5-digit ZIP code
(or just first 3 digits):

Are you currently looking for a new relationship? Please answer this even if you are currently in a relationship.

- I am **not** looking for a new relationship
- I am looking for a new relationship

How would you describe your current relationship status? (Check all that apply):

- Not currently in a relationship
- Dating
- Living with partner
- Engaged to be married/to be in a marriage-like relationship
- Married/In a marriage-like relationship
- Other (including multiple relationships) (you will have a chance to comment on this choice, if you like)

[Display comment box if "other" is selected]

Since you selected "other (including multiple relationships)" for your relationship status, would you please provide a brief explanation of your choice?

You have indicated that you are in a relationship. How would you describe this relationship? (Check one):

- In an exclusive relationship
- In an open relationship
- Some other arrangement

[Display comment box if "other" is selected]

Since you selected "some other arrangement" to describe your current relationship/s, you're welcome to comment on why you did so.

Do you consider yourself to be:

- heterosexual or straight
- bisexual
- gay or lesbian
- I prefer a different label (examples: "mostly straight"; "bi-curious"; "pansexual"; "queer"; "questioning") (you will have a chance to comment on this choice, if you like)
- I don't use any label for my sexual orientation

[Display comment box if "other" is selected]

Since you selected "I prefer a different label" for your sexual orientation, would you please provide the label you do prefer? We would also be interested to hear why you prefer this label for your sexual orientation.