

The Puzzle of Sexual Orientation: What is it and How Does it Work?

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THE PUZZLE OF SEXUAL ORIENTATION: WHAT IS IT AND HOW DOES IT WORK?



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CREDITS

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Cover image:
Torrie Groening (Canadian, b. 1961): "Sleep Touch", 1986
Lithograph on paper, 7/8
From the University of Lethbridge Art Collection; gift of Robin and Doug Koehle, 1992

FOREWORD

When I first organized the International Behavioral Development Symposium back in 1995, I had no idea it would continue beyond that date. Back then, I also rather naively thought that once the best and brightest researchers studying sexual orientation had gotten together, they would be able to unravel the main causes of variations in sexual orientation rather quickly, certainly within my lifetime.

As things have turned out, progress in understanding sexual orientation is certainly being made, but more slowly than expected. Fortunately, the Symposium has morphed into a once-every-five-year event. By 2010, it is apparent that even sexual orientation itself is more complex than I used to think, let alone its causes. So it is entirely appropriate that this fourth meeting be focused on better understanding the very nature of sexual orientation before reconsidering its multiple causes.

I had every intention of attending the Lethbridge conference, but contractual agreements with the University of Malaya, where I am currently a visiting professor, were slightly misaligned relative to the dates for the conference. So making the trip will not be possible.

Having organized the first three conferences, my feelings are a little like a parent giving up a child for adoption, but I know that the Lethbridge meeting is in good hands. I wish the organizers, presenters, and participants great success, and I am looking forward to reading the conference proceedings when they appear in a future issue of the *Archives of Sexual Behavior*.

Lee Ellis
Department of Anthropology and Sociology
University of Malaya
Kuala Lumpur, Malaysia

PREFACE

In 1995, with the financial support of the Eugene Garfield Foundation, Lee Ellis organized the first *International Behavioral Development Symposium on the Biological Basis of Sexual Orientation, Gender Identity, and Sex-Typical Behavior* in Minot (why not?), North Dakota. Word quickly spread that the "Minot Meeting," was *the* meeting to attend among sex researchers whose work was informed by biology. So successful was this first meeting that Lee went on to expand upon and host another one in 2000 and yet another in 2005. The participants were a who's who of many of the world's leading sex researchers, as well as a younger contingent who were up-and-coming. Many of the latter are now established, respected, and innovative sex researchers themselves. The presentations at these meetings were widely touted for their excellent content and polished execution. Invitations were highly coveted. Many participants felt that Minot's relative isolation provided a key ingredient for success. In the absence of any big-city distractions, participants interacted intensively outside of the lecture hall, debating and discussing ideas over meals and even in their pajamas before bedtime in the university dorms that served as housing.

In 2005, anticipating his retirement, Lee Ellis asked Sergio Pellis and Paul Vasey from the University of Lethbridge to take over the running of the meeting. Lethbridge--a small, relatively isolated city on the southern Alberta prairies--seemed like Minot's Canadian doppelganger. The location coupled with the large contingent of sex researchers at University of Lethbridge, which includes Martin Lalumière, made it the ideal location for subsequent meetings. And so the torch was passed to the Lethbians. Early in 2009, Paul Vasey and Martin Lalumière, in consultation with Sergio Pellis, began outlining their vision for a new generation of Lethbridge meetings.

First and foremost, we decided to keep the meeting small and concentrated on a particular research topic. Participants would address this topic from the standpoint of their particular research program. It was felt that by implementing a small workshop model with roundtable discussions we could maximize the productive exchange of

ideas. In the process of choosing a unifying topic for the workshop, we came to realize through informal discussions that many of our colleagues were rethinking what was meant by "sexual orientation" and in doing so, stretching this concept far beyond its original meaning. We believed that this nascent re-conceptualizing of sexual orientation held great theoretical promise and the potential to prompt all of us to rethink and possibly even reconfigure our research programs. As such we settled upon *The Puzzle of Sexual Orientation: What Is it and How Does it Work?* as the theme for our three-day workshop.

Over the course of this workshop, we aim to more accurately identify what "sexual orientation" encompasses, so that we can then characterize the component parts of this phenomenon in an accurate and authentic fashion. Some of the questions we hope to address include: How can sexual orientation best be measured? Why are genital arousal and subjective sexual arousal not concordant in some people, and especially in women? Can sexual orientation change on its own, or can it be changed via some sort of intervention? What is the relationship between love (and hate) and sexual desire? How do we characterize the sexual orientation of individuals whose peak sexual arousal and satisfaction results from unusual objects, activities, or locations? Does everyone have a sexual orientation? Are sexual preferences different from sexual orientation and, if so, how?

In addition, a secondary, but ultimately related question that we will address is "*How does sexual orientation work?*" As such, we will examine how various proximate factors such as genes, hormones, neurobiology, learning, socialization, and culture influence sexual orientation. We will also explore whether atypical sexual interests are disordered, non-pathological, or even adaptive. These questions will be examined in light of various definitions of sexual orientation.

Various units at the University of Lethbridge, including the Offices of the President, the Vice-President Academic, the Vice-President Research, the School of Graduate Studies and the Department of Psychology, have generously contributed financial support for the workshop. We are extremely grateful for the support and encouragement that sex research enjoys at the University of Lethbridge. In addition, we were awarded an Aid-to-Research Workshop Grant by the Social Sciences and Humanities Research Council (SSHRC) of Canada, which, among other things, allowed us to significantly offset the participants' travel costs. Federal support for this workshop in tough economic times leaves us hopeful that sex research has a bright future in Canada. By readily pledging to publish the workshop proceedings in a special issue of the *Archives of Sexual Behavior*, the Editor, Ken Zucker gave us important leverage in our pursuit of funding. It deserves special mention that one of our doctoral students, Kelly Suschinsky, was instrumental in helping to organize our successful SSRHC application and this workshop, in general. She deserves our hearty thanks for going above and beyond in this regard. Leanne Wehlage in the Department of Psychology provided key administrative support.

By the end of the workshop, we hope to have made some movement toward the development of an integrated framework that will permit us to more precisely define sexual orientation, and better conceptualize future etiological questions. To this end, it is our sincere hope that the Lethbridge *Puzzle of Sexual Orientation* workshop furnishes an atmosphere in which participants feel comfortable thinking out loud, tossing around "crazy" ideas, and brainstorming.

Welcome to Lethbridge!

Paul Vasey, Martin Lalumière, and Sergio Pellis



*The Puzzle of Sexual Orientation Workshop
Lethbridge, 2010*

Back row (L to R): Simon LeVay, Charles Roselli, Paul Vasey, Kelly Suschinsky, Martin Lalumière, Michael Seto, Vernon Quinsey, Kim Wallen, Ray Blanchard, Sergio Pellis, Donald Optiz, Richard Lippa, Lee Beckstead, Heather Hoffmann, David Sylva

Middle Row: Grant Harris, Tony Bogaert, Meredith Chivers, James Cantor, Lisa Diamond, Jim Pfaus, Ken Zucker, Bill Cade, Doug VanderLaan, Devita Singh, mystery person, Laura Gothreau, Samantha Dawson, Megan Ebsworth, Deanna Forrester, Eric Vilain, Alan Rosenthal, Alice Dreger

Front Row (L to R): Ritch Savin Williams, Anne Perkins, Annabre Fairweather, Mike Bailey, Lesley Terry, Lance Ren, Adam Safron, Cisco Sanchez, Leanne Wehlage

PRESENTATION ABSTRACTS

What is sexual orientation and do women have one?

J. Michael Bailey
Northwestern University, USA

Recent research has focused increased attention on sex differences in the expression of sexuality, including sexual orientation. There is an emerging consensus that women's sexual partner choices are sometimes made for different reasons than men's. One strong candidate for a primary mechanism underlying these differences is a striking sex difference in sexual arousal patterns. In this talk, I begin by proposing some definitional distinctions in order to clarify what sexual orientation is not. I review research on the male sexual arousal patterns and contend that a man's

category-specific sexual arousal pattern is his sexual orientation. Next, I review recent findings on the fluidity of sexual arousal patterns of women and address some methodological concerns. I conclude with a reconsideration of the idea of women's sexual orientations by raising the question as to whether women have sexual orientations at all.

Can sexual orientation be changed? What we know, what we need to know, and why these questions are important

**Lee Beckstead
University of Utah, USA**

This presentation will provide a comprehensive overview regarding the promise and effort of sexual reorientation and how this knowledge may inform our current understanding of human sexuality. Specifically, a brief history will be given of the interventions used to change a same-sex sexual orientation and the assumptions underlying these interventions. Information will be given regarding which conclusions can be derived from sexual reorientation studies from the 1960s to the present. The limitations of these studies will be explained in order to strengthen future research. In addition, hypotheses will be shared regarding the motivations and needs of those distressed with their same-sex sexual orientation and the impact that the hope of sexual reorientation may have on outcomes and on family members, religious leaders, and policy makers.

In the end, an empirically informed therapeutic framework will be described that may be used (and researched) to help those distressed with their sexual orientation and social identities.

Sexual attraction to others: A comparison of two models of alloerotic responding in men

**Ray Blanchard
Center for Addiction and Mental Health, Toronto, Canada**

The penile response profiles of homosexual and heterosexual pedophiles, hebephiles, and teleiophiles to laboratory stimuli depicting male and female children and adults may be conceptualized as a series of overlapping stimulus generalization gradients. This study used such profile data to compare two models of alloerotic responding (sexual responding to other people) in men. The first model was based on the notion that men respond to a potential sexual object as a compound stimulus made up of an age component and a gender component. The second model was based on the notion that men respond to a potential sexual object as a gestalt, which they evaluate in terms of global similarity to other potential sexual objects. The analytic strategy was to compare the accuracy of these models in predicting a man's penile response to each of his less arousing (nonpreferred) stimulus categories from his response to his most arousing (preferred) stimulus category. Both models based their predictions on the degree of dissimilarity between the preferred stimulus category and a given nonpreferred stimulus category, but each model used its own measure of dissimilarity. According to the first model ("summation model"), penile response should vary inversely as the sum of stimulus differences on separate dimensions of age and gender. According to the second model ("bipolar model"), penile response should vary inversely as the distance between stimulus categories on a single, bipolar dimension of morphological similarity—a dimension on which children are located near the middle, and adult men and women are located at opposite ends. The subjects were 2,278 male patients referred to a specialty clinic for phallometric assessment of their erotic preferences. Comparisons of goodness of fit to the observed data favored the unidimensional bipolar model.

Asexuality and sexual orientation

**Anthony Bogaert
Brock University, Canada**

In this presentation, I discuss asexuality (i.e., a lack sexual attraction and/or sexual desire). First, I review previous theory and empirical studies on asexuality. This literature is sparse, but I expect it will grow substantially in upcoming years. I also discuss whether asexuality should be defined uniquely, as the absence of a sexual orientation, or whether it should be subsumed by one or more of the traditional categories of sexual orientation (e.g., heterosexual; homosexual). Related, I discuss whether asexuality should be defined as a pathological condition needing treatment. Finally, I discuss what it might mean to have no sexual attraction to others, and whether some people who lack sexual attraction for others, but who still have sexual desire (e.g., masturbate) may have a paraphilia.

No, really: Is homosexuality a paraphilia?

**James Cantor
Center for Addiction and Mental Health, Toronto, Canada**

Although the question is easy, even obvious, most discussions about whether homosexuality is a paraphilia are held in a political rather than in a scientific context and provide political rather than scientific assertions. When isolated

from what the answer might *imply*, however, sexologists can begin to explore what the answer *is*.

This discussion will not provide new data. Rather, this discussion will scan the relevant (and largely familiar) individual correlates, informal observations, and other features of homosexuality and of the paraphilias. When correlates are considered individually—birth order, neuroanatomy, sex differences, cognitive profiles, morphological correlates, and behavioral differences—there is some evidence suggesting “yes” and some evidence suggesting “no.” When considered in their entirety, however, an unexpected answer emerges.

Also to be discussed is whether the familiar question “Is homosexuality a paraphilia?” should instead be divided into two questions: Is *male* homosexuality a paraphilia? and Is *female* homosexuality a paraphilia? The existing findings suggest that male homosexuality is caused by different factors than is female homosexuality, and the paraphilias appear to be a phenomenon exclusive to males (with the exception of sexual masochism and possibly autoerotic asphyxia). Although social and political implications will impact what is deemed normal, disordered, or DSM-diagnosable, the natural structure underlying human sexual interests is unaffected by legal or other malleable, societal factors.

Although conclusions to the above will be offered, I expect we will end with a vote.

Measurement issues in research on sexual orientation

Meredith Chivers
Queen’s University, Canada

Sexual orientation can be conceptualized as a rudder, steering sexual thoughts, feelings, arousal, and behaviours toward particular sexual targets or activities. We traditionally operationalize sexual orientation as relative sexual interest in adult men and women, however, sexual preferences can also vary on other dimensions, such as age and sexual activity, as will be discussed in other talks. In this presentation, I will review commonly-used self-report, cognitive, and behavioural measures of sexual attractions to females and males, with a focus on the definition and measurement of sexual orientation in women. Gender differences in sexual psychophysiology will be used as an example of how operational definitions of female sexual orientation based on male models of sexuality fail to explain women’s nonspecific sexual response. New data examining the role of relationship context and sexual activity in women’s sexual response will be presented as examples of how women’s sexual interests might be differently organized.

Dear diary: Sexual fantasies and the menstrual cycle

Samantha Dawson, Kelly Suschinsky, & Martin Lalumière
University of Lethbridge, Canada

Sexual fantasies are frequently experienced phenomena. Some have suggested that they are more indicative of sexual desire than actual sexual behaviour. Researchers have found that some aspects of sexual behaviour and sexual arousal vary as a function of the menstrual cycle, such that facets of women’s sexuality become more male-like during the most fertile phase of the menstrual cycle. The purpose of this study was to investigate whether similar changes occur with regard to sexual fantasy and viewing-times during one entire menstrual cycle. Twenty-seven heterosexual women completed a month-long electronic daily diary and participated in three viewing-time sessions to explore the effect of ovulation on sexual fantasy and category-specificity of sexual interest. Overall, the results showed that not all aspects of women’s sexuality become more male-like. Rather, it seems that women adopt a mixed-mating strategy over the course of the menstrual cycle.

The “Desire Disorder” in research on female sexual orientation: Potential contributions of Dynamical Systems Theory

Lisa Diamond
University of Utah, USA

In recent years, numerous studies have suggested fundamental differences between male and female sexual orientation, primarily revolving around women’s greater sexual fluidity or plasticity (or in other parlance, men’s greater propensity for “category-specific” sexual desires). Some have interpreted these differences to suggest that although sexual orientation is categorical for men, it might be fundamentally “bisexual” or even “un-oriented” for women. Such a conclusion may be woefully premature, given our vastly underdeveloped understanding of the nature, dynamics, and phenomenology of female (and male!) sexual desire. Up until now, researchers studying sexual orientation have largely taken same-sex desires for granted as relatively straightforward diagnostic indicators of same-sex orientation. Yet even a brief examination of the contemporary clinical literature on women’s “desire disorders” demonstrates that many basic questions regarding the nature, development, determinants, and phenomenology of female sexual desire remain unanswered. We cannot produce valid psychobiological models of the nature and development of female sexual orientation without first answering these questions. Toward this end, I

argue for the application of *dynamical systems theory* to the study of female sexual desire and (by extension) female sexual orientation. These flexible models (derived originally in the physical sciences, but increasingly applied to social, psychological, and biological phenomena) seek to explain how complex biobehavioral phenomena emerge, stabilize, change, and restabilize over time. I review findings from my own program of research suggesting that female sexuality possesses the emblematic features of a dynamical system, and I demonstrate how a dynamical systems approach can help us to develop more accurate models of the determinants and expression of female sexual desire, which will in turn yield more accurate models of the *orientation* of these desires toward same-sex and/or other-sex partners.

Viewing time as a measure of bisexual sexual interest

Meg Ebsworth & Martin Lalumière
University of Lethbridge, Canada

Studies of bisexual sexual interest have focused mostly on genital arousal in bisexual men; other aspects of sexual interest have received little consideration, and bisexual women have rarely been studied. The existent studies have led to the conclusion that male bisexuality probably does not exist. In this study we examined another facet of sexual interest. Before genital response comes visual fixation (or aesthetic response), and recording an individual's 'viewing time' to a visual stimulus provides a different yet accurate measure of sexual interest. We examined the viewing times of 19 bisexual women, 15 bisexual men, 15 heterosexual women, 15 heterosexual men, 10 homosexual women, and 15 homosexual men to slides of nude and clothed males and females of all Tanner stages of development, and to videos depicting various sexually explicit acts with adult male or female actors (or both). Results suggest that bisexual men and women show a distinctly different—or bisexual—pattern of sexual interest. Interestingly, heterosexual and homosexual women, but not heterosexual and homosexual men, also showed a bisexual pattern of arousal, in line with recent studies of genital arousal.

Nudity as a disinhibiting cue in a date rape analogue

Annabree Fairweather & Martin Lalumière
University of Lethbridge, Canada

The purpose of my research is to better understand the contextual factors involved in date rape. Following the *Inhibition Model of Sexual Arousal*, this research addresses the question: Can we observe sexual arousal disinhibition to nonconsensual cues in sexually nonaggressive men by introducing a strong excitatory cue, that is, female nudity? In the first study, 20 heterosexual men between the ages of 18 and 25 were presented with two-minute audio stories depicting consenting sexual interactions, nonconsenting sexual interactions, and nonsexual interactions between a man and a woman. While listening to the audio stories, participants were presented with still images depicting clothed and nude women using a factorial within-subjects design. The second study replicated the first but used videos depicting clothed and nude women exercising. Results suggest that although nudity is indeed an excitatory cue, it does not overcome or disrupt inhibition to nonconsenting cues.

Cross-cultural evidence that separation anxiety is linked to male androphilia

Laura Gothreau, Doug VanderLaan, Nancy Bartlett, & Paul Vasey
Mount Saint Vincent University &
University of Lethbridge, Canada

Separation anxiety during childhood (i.e., anxiety in response to separation from significant attachment figures) occurs more often among girls than boys. However, boys who exhibit extreme feminine behavior exhibit elevated separation anxiety during childhood. Such boys have a greater than average chance of being androphilic (i.e., sexually attracted to/aroused by adult males) in adulthood. Given that male androphilia is associated with certain types of female-typical psychology and behavior (e.g., childhood play behavior), we hypothesized that male androphilia, as opposed to male femininity, per se, is associated with elevated separation anxiety during childhood. We examined sex and sexual orientation differences in retrospective reports of childhood separation anxiety in two cultures, Canada ($N = 399$) and Samoa ($N = 444$). Canadian participants included 105 androphilic males, 88 gynephilic (i.e., sexual attraction/arousal to adult females) males, 111 androphilic females, and 95 gynephilic females. Canadian participants were recruited from Gay, Lesbian, Bisexual and Transsexual Community Organizations, sports teams, and university organizations across Canada. Samoan participants included 170 gynephilic males, 123 androphilic females, and 151 *fa'afafine* (i.e., transgendered, androphilic males). Participants reported the level of distress experienced from ages 6 to 12, inclusive, in response to each of the items used in the *DSM-IV-TR* to diagnose Separation Anxiety Disorder. In both cultures, females reported elevated separation anxiety during childhood compared to gynephilic males, and androphilic males showed a more female typical pattern. These results suggest male sexual orientation is associated with separation anxiety during childhood, and that this association is cross-culturally universal.

Learning processes and sexual preference

Heather Hoffmann

Knox College, USA

How do sexual arousal patterns arise? How specific are sexual predispositions? It seems likely that any predisposition would at least be refined if not potentially shaped and/or expanded by experience. Numerous experimental studies have demonstrated that learning processes such as imprinting, mere exposure, classical and operant conditioning, and observational and verbal learning can impact a wide range of sexual behaviors across a variety of species. Although demonstrations of human sexual conditioning are not numerous nor are they robust, sexual arousal is conditionable in women and men. Further, with modern developments in learning theory (e.g., expectancy learning, Rescorla, 1988; affective learning, De Houwer, Thomas, & Baeyens, 2001; Behavioral Systems Theory, Timberlake, 2001) it seems appropriate to renew the investigation of contributions and limitations of conditioning processes to explaining how cues acquire erotic meaning and to attempt some integration between the sexual conditioning literature and research on sexual preference.

A sexual orientation for rapists?

Martin Lalumière & Grant Harris
University of Lethbridge &
Mental Health Centre Penetanguishene, Canada

The question of whether sexual assaulters display a sexual arousal pattern that differs from those of other men has been a contentious topic of research since Gene Abel's original work in the 1970s. Meta-analytic work has confirmed that a significant proportion of sexual assaulters—60% in our studies—show a pattern of sexual arousal in the laboratory that is rarely observed among other groups of men: Many sexual assaulters show equal or greater arousal to sexual stimuli depicting non-consensual sexual activities relative to stimuli depicting consensual activities. The next questions, then, involve determining whether this pattern of arousal reflects a unique sexual preference, and if so, determining the nature of this preference. Are rapists attracted to non-consent (biastophilia), violence and suffering (sadism), or are they simply indifferent to cues of non-consent and violence (lack of inhibition or revulsion). We hope to discuss the interplay between attraction, indifference, and revulsion in human sexuality in general, and in the sexual arousal patterns of rapists, in particular.

An update on gender-related interests &

A new photo-rating paradigm to assess the category-specificity of sexual attraction

Richard Lippa
California State University, Fullerton, USA

Part 1: I update research on gender-related interests and discuss recent findings on sex and sexual orientation differences in interests and on the development, cross-cultural consistency, and cross-species consistency of gender-related interests.

Part 2: I describe a new paradigm to assess the category-specificity of sexual attraction: Participants rate their sexual attraction to photographed male and female "swimsuit models" and participants' viewing times to photos are recorded. Preliminary results document large sex differences—e.g., heterosexual men are more attracted to female than male models and spend much more time viewing female than male models, particularly when models are highly attractive; in contrast, heterosexual women report sexual attraction to both female and male models—with attraction to both sexes increasing with models' attractiveness—and women's viewing times are better predicted by model attractiveness than by model sex. New results are reported that compare the category-specificity of heterosexual and homosexual individuals within each sex. The paradigm described here provides a relatively easy way to assess sexual category-specificity in cross-cultural research and in studies of unique populations (e.g., transsexual and asexual individuals).

Experiential factors in the development of sexual preferences: Lessons from the lowly and allegedly polygamous rat

James Pfaus, Tod Kippin, Genaro Coria-Avila, Nafissa Ismail, Shann Ménard, Hélène Gelez, & Mayte Parada
Concordia University, Canada

Sexual behavior is orchestrated by hormone and neurochemical actions in the brain; however, sexual experience allows animals to form instrumental and Pavlovian associations that predict sexual outcomes and thereby direct the strength of sexual responding. Although the study of animal sexual behavior has traditionally been concerned with mechanisms of copulatory responding, more recent use of conditioning and preference paradigms, and a focus on environmental circumstances and experience, is beginning to reveal how sexual preferences for stimuli predictive of sexual reward develop and are maintained.

This presentation will describe how experience with sexual reward strengthens the development of sexual partner preferences in rats. Male or female rats given their early sexual experience with partners scented with a neutral odor

(almond or lemon) prefer to copulate with scented partners when given a choice of potential partners in an open field. These preferences can also be induced in males by injections of morphine or oxytocin prior to their first sexual experience with scented females, indicating that pharmacological activation of opioid or oxytocin receptors can “stand in” for the sexual reward-related neurochemical processes normally activated by sexual stimulation. These conditioned preferences can be blocked by the opioid receptor antagonist naloxone, which also blocks the development of sexual conditioned place preference. Placing the conditioned odor on a sexually nonreceptive partner increases attempts to solicit or mount the nonreceptive partner in females or males, respectively, and removal of the odor on a receptive female reduces the proportion of paired males that copulate. Noxious odors, such as cadaverine, can be made conditionally appetitive if paired with sexual reward states. Finally, pairing a somatosensory cue (a rodent jacket) with sexual reward comes to elicit a necessary state of sexual arousal in male rats. Paired rats without the jacket show dramatic copulatory deficits, indicating that the cue is now required in those rats for normal copulatory responding.

We propose that endogenous opioid systems form the core of sexual reward. Opioid activation feeds forward to sensitize hypothalamic and mesolimbic dopamine systems in the presence of cues that predict sexual reward. Those systems act to focus attention on, and activate goal-directed behavior toward, reward-related stimuli, thus forming a necessary core of sexual desire. We hypothesize that a critical period of sexual learning exists during an individual's early sexual experience that creates a “love map” or Gestalt of features, movements, feelings, and interpersonal interactions associated with sexual reward. Features not associated with sexual reward, or which are associated explicitly with sexual nonreward, are either not preferred, or can generate avoidance.

Are paraphilias pathologies?

Vernon Quinsey
Queen's University, Canada

Darwinian theory provides principles that can be used to determine whether particular variations of male sexual preference are manifestations of pathology. Two variations of sexual preference, pedophilia and coercive paraphilic disorder, will be used to illustrate this approach because the former is currently classified as a paraphilia in the DSM and the latter is not. Although both conditions are associated with atypical sexual preferences, only pedophilic preferences are likely to reduce the fitness of affected individuals. Interestingly, however, it is possible and even likely, that coercive sexual preferences enhance the fitness of affected men while reducing population fitness. Anomalous sexual preferences illustrate the complex interplay of science and values that underlie psychiatric diagnostic schemes. Changes in values and advances in scientific understanding will continue to produce changes in taxonomy for the foreseeable future, as I will illustrate with a novel diagnostic category of paraphilia.

Is sexual partner preference in rams ‘hard-wired’ prenatally by gonadal steroids?

Charles Roselli
Oregon Health & Science University, USA

The preference of individual rams for male versus female sexual partners correlates directly with the volume of the ovine sexually dimorphic nucleus (oSDN) of the preoptic area/anterior hypothalamus. The ovine oSDN is smaller in male-oriented rams than in female-oriented rams and similar in size to ewes. Exposure of fetal female lambs to exogenous testosterone from day 30-90 of gestation resulted in an enlarged or masculinized oSDN typical of genetic males. Within this broad critical period, we found that separate critical periods exist for androgenization of the genitalia and the brain. Specifically, masculinization of the genitalia occurred between day 30-60 of gestation, while masculinization of the oSDN occurred between day 60-90. Neurons of the oSDN showed abundant aromatase expression that is also reduced in male-oriented rams compared to their female-oriented conspecifics. In order to determine if estrogen plays a role in male-typical differentiation of sexual partner preference (SPP), we blocked aromatase activity with [1,4,6-androstatrien-3,17-dione](#) (ATD) in male fetuses during midgestation. In two separate experiments, ATD treatments were given from day 50-80 and day 30-90 of gestation. Both regimens failed to alter masculinization of SPP, male copulatory behavior, or oSDN volume. These treatments also did not interfere with defeminization of receptive behavior or the LH surge mechanism suggesting that androgen exposure alone can masculinize sheep brain and behavior. Over the past year we studied rams that were exposed to the androgen receptor antagonist flutamide (Flu) throughout the midgestation critical period (i.e. day 30-90 of gestation). We found that Flu exposure blocked genital masculinization, but did not disrupt male-typical SPP. The external genitalia of Flu-exposed rams were phenotypically female. Although these rams exhibited precopulatory and mounting behaviors, they could not intromit and ejaculate. Flu-exposed rams exhibited greater mounting behavior than controls, but mount latencies were significantly longer, suggesting that motivational pathways may be altered in Flu males. Flu-exposed rams did not respond to estrogen treatments with either displays of female-typical sexual behaviors or LH surge responses. We have not yet analyzed the effect of Flu exposure on oSDN volume. However, in the absence of long-term behavioral and neuroendocrine consequences in response to either aromatase inhibition or androgen antagonism, one is left to conclude that male-typical sexual preferences and neuroendocrine feedback control mechanisms are not organized exclusively by either androgen receptor or estrogen receptor mechanisms and that one steroid pathway might compensate for the other. Supported by NIH grant R01 RR014270.

Evidence for male bisexuality: Sexual arousal patterns of bisexual men revisited

Allen Rosenthal, David Sylva, Adam Safron, & J. Michael Bailey

Male sexual orientation is category-specific with respect to patterns of sexual arousal. Homosexual men typically exhibit significantly and substantially greater genital responses to male sexual stimuli than to female sexual stimuli, whereas heterosexual men have the opposite pattern. Further, this category-specific pattern also obtains for subjective sexual arousal. Although self-identified bisexual men report high subjective arousal to both male and female stimuli, prior research has not observed them to have a bisexual pattern of genital arousal. A criticism of past research on bisexual arousal patterns has been whether inclusion criteria have been sufficiently stringent to ensure that bisexual men have had adequate sexual and romantic interest in both men and women. The purpose of the present study was to determine whether bisexual men who met stringent romantic and sexual criteria showed bisexual genital and subjective arousal patterns to male and female sexual stimuli. Furthermore, we included "bisexual" stimulus in which a man engaged in sex simultaneously with both another man and a woman. Based on the work of other investigators, we predicted that bisexual men would find such stimuli more arousing than homosexual and heterosexual men. Findings of this investigation will be reported and discussed.

The Butch Ideal: Concerns over masculine norms and psychological distress among gay men

**Francisco Sánchez & Eric Vilain
UCLA School of Medicine, USA**

Societal conceptions of masculinity and femininity play a prominent role in gay men's lives. In particular, many gay men report that it is important to them that they appear stereotypically masculine in public and that they only seek out platonic and romantic relationships with such gay men. Preliminary results from our lab have quantitatively shown that such attitudes reflect negative feelings about being gay. Given that negative feelings about the self adversely affects many people's psychological well-being, it is likely that negative feelings about being gay can predict symptoms of psychological distress. To test this, we are using an Internet-based survey to collect surveys from 1,500 gay men and will employ hierarchical regression analysis. The survey consists of measures that assess concerns with adhering to traditional masculine norms (e.g., Conformity to Masculine Norms Inventory and Gender Role Conflict Scale), measures that assess feelings about being gay (e.g., Negative Gay-Identity Index), and measures that assess symptoms of psychological distress (e.g., the Center for Epidemiological Studies–Depression Scale). Implications for clinical practice and future research will be presented in the poster.

Development of sexual orientation during childhood and adolescence

**Ritch Savin-Williams
Cornell University, USA**

A decade of empirical evidence does not support theoretical models of sexual-minority development. Rather, a perspective that acknowledges diverse developmental trajectories with "milestone" achievements offers a more robust and empirically driven conception. These trajectories are influenced most profoundly by cohort, especially current generations of youth, and whether one is female or male. Other factors that affect these trajectories will be considered, including gender expression, ethnicity, cultural considerations, and sexual orientation classification. I will discuss: (1) the stability and prevalence of sexual orientation categories, (2) sexual orientation development among heterosexual, mostly heterosexual, and bisexual individuals and (3) and methods of assessing sexual orientation relevant at particular ages.

Is pedophilia a sexual orientation?

**Michael Seto
Brockville Mental Health Centre, Integrated Forensic Program, Canada**

Sexual orientation can be defined as how one's sexual thoughts, feelings, arousal, and behaviour are directed. Sexual orientation is legally and commonly defined in terms of another person's gender, but it can also be considered in terms of another person's age, or other physical characteristics. Thus, a person could be described as having sexual orientations, rather than a single orientation. In this presentation, I review evidence that pedophilia can be viewed as a sexual orientation that directs a person's sexual thoughts, feelings, arousal, and behaviour towards prepubescent children (whereas teleiophilia directs a person towards sexually mature adults). I also review what we know about the etiology of pedophilia, its emergence in adolescence, and its stability over the lifespan. I will end by highlighting theoretical and practical implications of considering pedophilia as a sexual orientation in this way.

A follow-up study of boys with gender identity disorder

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This study provided information on the long-term psychosexual outcome of 125 boys who were assessed at a specialized gender identity clinic in childhood. Standardized assessment in childhood (M age = 7.75; range = 3.33-12.99) and at follow-up (M age = 20.27; range = 13.07-35.55) were used to evaluate gender identity and sexual orientation. At follow-up, 108 (86.4%) participants were classified as desisters and 17 (13.6%) were classified as persisters with regard to gender dysphoria. Kinsey ratings were used to classify participants' sexual orientation in relation to their birth sex. Kinsey scores were available for 95 participants. Based on these data, 58 (61.1%) participants were classified as homosexual/bisexual in fantasy (Kinsey 2-6) and 43 (45.3%) were classified as homosexual/bisexual in behavior. The remaining participants were classified as heterosexual (Kinsey 0-1) or asexual. This study also aimed to identify childhood predictors of variation in gender identity and sexual orientation outcome at follow-up. Regarding gender identity, persisters were older at the time of the childhood assessment, had a lower IQ in childhood, were from a lower socio-economic background, had a lower IQ at follow-up, and were more extreme in their cross-gender identification on both self-report and parent-report measures. In regard to variation in sexual orientation outcome, the participants classified as homosexual/bisexual in fantasy had higher IQ in childhood and were older at the follow-up assessment. At the time of the childhood assessment, the homosexual/bisexual participants were more extreme in their cross-gender behaviors as assessed by self-report, parental-report, and play behavior.

Tell me how you feel: Explaining the sex difference in sexual concordance

Kelly Suschinsky & Martin Lalumière
University of Lethbridge, Canada

Sexual concordance refers to the relationship between one's physiological and subjective (or self-reported) sexual arousal. Sex researchers have consistently reported for decades that men, on average, show higher degrees of sexual concordance than women in the laboratory. The difference does not appear to be due to methodological factors (e.g., stimulus content) or participant characteristics (e.g., age). One possible explanation for this sex difference is that men tend to be better than women at detecting their physiological states in the laboratory. To test whether sexual concordance is related to general interoceptive abilities, men and women will have their genital sexual arousal, heart rate, and respiration rate assessed concurrently, and they will be asked to report their current state for each. The results and implications from this study will be discussed.

Sexual arousal patterns in heterosexual and homosexual men and women: Results from neuroimaging

David Sylva, Adam Safron, Paul Reber, & J. Michael Bailey
Northwestern University, USA

Previous work in our laboratory has revealed a large difference in the way that men and women process erotic stimuli (Chivers et al., 2004). Men have a "category-specific" pattern of sexual arousal. Heterosexual men respond much more strongly to female sexual stimuli than to male sexual stimuli, both subjectively and physiologically (genitally). Similarly, homosexual men respond much more strongly to male sexual stimuli than to female stimuli. In contrast, women tend to exhibit a bisexual arousal pattern, regardless of their sexual orientation. In recent years, we have attempted to replicate these results using neuroimaging. We demonstrated the neural basis for male category-specificity in an fMRI study of the sexual arousal patterns of homosexual and heterosexual men (Safron et al., 2007). We just finished a similar neuroimaging study of the sexual arousal patterns of homosexual and heterosexual women (Sylva et al., 2009). The present poster will focus on sex differences in the results of the two studies. Since both studies used the same paradigm, their data was combined and reanalyzed to test for significant sex differences. Findings will be reported and discussed.

Is Feederism an exaggeration of a functional mating strategy?

Lesley Terry, Kelly Suschinsky, Martin Lalumière, & Paul Vasey
University of Lethbridge, Canada

Paraphilias are overwhelmingly a male-typical phenomenon. Sexual masochism appears to be the only paraphilia that has a substantial number of female participants. Feederism, a possible thematic variation of sexual masochism, appears to have a very high prevalence of female participants. Feederism is a fat fetish sub-culture, focused on erotic eating, feeding, and gaining weight. Quinsey and Lalumière (1995) suggested that some paraphilias are exaggerated manifestations of normative and functional mating strategies and preferences. The present study tested whether feederism is an exaggeration of normative sexual arousal derived from receiving food among the general population. Thirty young women and men were presented with aural and visual stimuli depicting sex-related activities, food-related activities, or neutral activities, while their genital and subjective arousal were measured.

Participants did not genitally respond to food related stimuli more than to neutral stimuli. Both men and women, however, subjectively rated feeding stimuli as more sexually arousing than neutral stimuli. The results are discussed both in terms of evolutionary theory and courtship theory.

Is male androphilia familial in non-Western populations? The case of a Samoan village

**Doug VanderLaan & Paul Vasey
University of Lethbridge, Canada**

In Western populations, male androphilia (i.e., male sexual attraction and arousal to adult males) is familial. In other words, on average, probands who exhibit androphilia are more likely to have a male relative (e.g., uncle, cousin, brother) who also exhibits androphilia relative to probands who exhibit gynephilia (i.e., sexual attraction and arousal to adult females). We examined whether male androphilia is likely to be familial in non-Western populations as well. Specifically, we collected detailed information regarding the family trees of 17 androphilic males, known locally as members of a "third" gender category referred to as *fa'afafine*, who all had the same natal village. The ancestries of these 17 *fa'afafine* showed that they belonged to five distinct families. Probability analysis revealed that this pattern of family clustering was statistically significant ($p = .000004$). Hence, data regarding these 17 *fa'afafine* suggests that male androphilia is familial in non-Western populations.

Evolution and male androphilia: Cross-cultural perspectives

**Paul Vasey & Doug VanderLaan
University of Lethbridge**

Research indicates that there is a genetic basis for male androphilia, yet androphilic males reproduce at a much lower rate than gynephilic males. One would expect genes for male gynephilia to have long replaced those for male androphilia given the reproductive benefits associated with the former. Given this, how do genes for male androphilia persist over evolutionary time?

One potential explanation is that the reproductive costs associated with genes for male androphilia are offset by the reproductive benefits that accrue if the same genetic factors result in increased reproductive success among the kin of male androphiles. An alternative explanation (but not a mutually exclusive one) is that genes for male androphilia could be maintained in a population if enhancing one's indirect fitness offset the cost of not reproducing directly. Androphilic males could increase their indirect fitness by directing altruistic behaviour toward close kin, which, in principle, would allow kin to increase their reproductive success.

In Samoa, androphilic males are not identified as "men," but rather as *fa'afafine*. In line with the Balancing Selection Hypothesis, we have shown repeatedly that the mothers of *fa'afafine* are significantly more fecund than those of gynephilic men. In line with the Kin Selection Hypothesis, we have demonstrated repeatedly, and with independent samples, that *fa'afafine* exhibit significantly higher altruistic tendencies toward nieces/nephews (i.e., avuncularity) compared to childless women, mothers, childless gynephilic men, and fathers. In terms of one new behavioural assay, we show that the *fa'afafine*'s elevated avuncularity is manifested in terms of more money given to nieces, compared to women and gynephilic men. In addition, we have shown that, compared to women and gynephilic men, the avuncular cognition of androphilic males appears to be adaptively designed, in that, *fa'afafine* appear to be more focused on maximizing resources directed to nieces/nephews while minimizing resources directed to non-kin children. These cognitive tendencies may have early developmental precursors in the form of elevated attachment to the family. Comparative data collected in Canada suggests that elevated attachment to the family in childhood may be a universal pattern of psychosexual development in androphilic males. In contrast to our Samoan data, research conducted in Western countries has furnished no support for the Kin Selection Hypothesis. We present new data from Japan that similarly fails to support the Kin Selection Hypothesis for male androphilia. In light of our Samoan data, we speculate that the development of elevated avuncularity in adult male androphiles will be dependent upon the appropriate social context and, as such, will be cross-culturally variable in its expression.

Genetics and epigenetics of male sexual orientation

**Eric Vilain
UCLA School of Medicine, USA**

Sexual reproduction plays a critical role in the survival of animal species. Yet, scientists do not fully understand the mechanisms involved in sexual attraction, which often precede reproduction. One unique approach to study human sexual attraction has been to focus on people who are attracted to the same-sex (i.e., homosexuality). Such behavior represents a marked departure from the expected development and has no clear evolutionary purpose.

Twin and family studies examining the occurrence of homosexuality showed that sexual attraction had a genetic component. Subsequent analyses linking genes within families offered specific candidate regions. Yet, over 15 years after the first candidate region (Xq28) was proposed, no definitive causal link has been found.

Thus, we sought to further examine the role that genes play in sexual attraction by studying 34 monozygotic (MZ) male twins reared together who were discordant for sexual orientation. MZ twins share the same genetic code. However, each embryo experiences unique biochemical processes (e.g., DNA methylation and acetylation) after separation, which may modify the expression of the genetic code. Such processes, termed epigenetic, may result in discordant characteristics including one twin identifying as heterosexual and the other as gay.

We will report our findings based on the largest survey of epigenetic patterns in MZ twins to date. The presentation will demonstrate the power and limitations of epigenetic approaches for isolating mechanisms that influence sexual attraction. Additionally, it will highlight how the genome is responsive to environmental cues.

Is the human pattern of sexual orientation unique among primates?

Kim Wallen
Emory University, USA

Humans may be unique among hominid primates in that some individuals of both sexes exhibit an exclusive same-sex sexual preference. By contrast, in nonhuman primates, although both sexes are completely capable of displaying the sexual behavior of the other sex, males and females are uniformly bisexual or heterosexual in their sexual orientation. No nonhuman primate species has been found to display an exclusive preference for same-sex individuals. The possible explanation for this disjunction between human and nonhuman primate patterns of sexual orientation may be reflected in differences in sexual orientation between men and women. Unlike homosexual men, lesbian women typically report bisexual sexual experience, which is rare in homosexual men. The sexual orientation pattern of homosexual women is consistent with the nonhuman primate pattern, whereas that of homosexual men is not. This raises the possibility that female bisexuality is part of our primate heritage, whereas primate male homosexuality arose relatively recently in evolutionary history.

Theorizing predictive markers of sexual orientation differentiation

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In this presentation, I will review what is known about predictive markers of sexual orientation differentiation in humans. Such markers, if they exist, can inform the theoretical discourse about the underlying causal mechanisms that lead to sexual orientation development and differentiation. In humans, the strongest predictive empirical marker of sexual orientation pertains to patterns of non-erotic sex-dimorphic behavior during childhood. From follow-up studies of children who show extreme patterns of sex-atypical behavior in childhood, it will be argued that, for boys, such a behavioral pattern is almost isomorphic with the emergence of a later androphilic sexual orientation; for girls, such a behavior pattern is related to the emergence of a later gynephilic sexual orientation, but the degree of predictive correspondence appears to be less strong. It will be argued that non-erotic sex-dimorphic behavior and sex-dimorphic erotic preference are caused by a common underlying factor or set of factors.

