GENETIC ATTRIBUTIONS AND GENDER DIFFERENCES

THE EFFECT OF SCIENTIFIC THEORIES ON EVALUATIONS OF SEXUAL BEHAVIORS

by

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Abstract

Much scientific and media attention has been devoted to the growing body of research into the genetic correlates of human phenomena. However, many of the resulting reports lead to a deterministic interpretation of the role of genes, and involve fundamental misunderstandings of genetics and heredity. Hence, questions arise regarding the ways in which people make sense of the behavioural genetics research they encounter in everyday life. Furthermore, essentialist accounts are often embedded within popular understanding of politically sensitive topics, such as eugenics, race, and sex, and therefore it is important to examine how people comprehend genetic influences on behaviour.

In this dissertation, I review current findings regarding the effects of genetic attributions on beliefs, attitudes, and behaviours in the context of the social world. Particular attention is paid to such effects in the context of gender issues. Specifically, in three studies I examine the effects of exposure to scientific theories concerning human sexuality on attitudes towards and evaluations of men’s dubious sexual behaviors. The results indicate that among men exposure to evolutionary psychology arguments leads to more lenient evaluations and judgments of an array of dubious sexual behaviors, compared with exposure to social constructivist arguments. It also seems that men implicitly hold nativist perceptions with regards to male sexuality and promiscuity. The findings were less conclusive among women, with some indication that women are less affected by such exposure as well as less likely to naturally hold a nativist perspective in the context of human sexuality. This empirical research has direct implications for previously suggested intervention programs and adds to the incurrent resurgence of interest in the effects of
genetic theories. Finally, I identify areas where further exploration is needed, suggest potential solutions for specific problems, and evaluate related individual and social implications.
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List of Abbreviations

ANCOVA- analysis of covariance
ANOVA- analysis of variance
BGD- Belief in Genetic Determinism Scale
DNA- deoxyribonucleic acid
EMM- estimated marginal mean
HGDP- Human Genome Diversity Project
IPT- implicit person theories
IQ- Intelligence Quotient
IRMAS- Illinois Rape Myths Acceptance Scale
M- mean
RaE- race and ethnicity
SD- standard deviation
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Preface

Study 1 was presented at the symposium, “Shackled by the DNA: Some Consequences of Psychological Essentialism and Thinking about Genes” (I. Dar Nimrod, Chair) at the annual Conference of the Society for Personality and Social Psychology (2008, February). The presentation was authored by I. Dar Nimrod and S. J. Heine and was honored with a Student Travel Award from the society ($500). Studies 1 and 2 were discussed in more depth at the Canadian Psychological Association’s Section on Women and Psychology Pre-Convention Institute (2008, June). The presentation was authored by I. Dar Nimrod, S. J. Heine, and C. Markel and was honored with the Best Student Paper Award ($500). The empirical studies were designed by the author of the dissertation in collaboration with S. J. Heine and M. Schaller. All writing and analyses for the above studies were conducted solely by the author of this dissertation, under the supervision of S. J. Heine.
Introduction

“(N)o new born should be declared human until it has passed certain tests regarding its genetic endowment.”

Sir Francis Crick (Schaeffer & Koop, 1979, p. 73)

On August 16, 2006, the Associated Press reported “Scientists find brain evolution gene.” While the headline seemed to promise that the new gene might hold the key to later human evolution, the article itself, which was also featured in the New York Times Science section, was more cautious in its statements. Nevertheless, it indicated that scientists believe the HAR1F gene has a key role in explaining our evolution from a primate-like ancestor. The article was based on a paper that appeared in Nature (Pollard et al., 2006) the same week. Pollard et al. argued that HAR1F had a more limited role, suggesting that although it is potentially one of the crucial genes involved in human evolution, much research remains to be done: “Our comparative genomic approach to identify the most dramatically changed segments of DNA in the human genome has identified a number of new candidate regions to test for clues in the attempt to decode the key events in human evolution” (p. 5).

The above example is far from being uncharacteristic or incidental. The mainstream media seems to cover cutting-edge genetics-related scientific discoveries with remarkable zeal (Conrad, 1997, 1999, 2002; Conrad & Gabe, 1999; Nelkin & Lindee, 1995). Terms such as “gay gene” and “fat gene” are already being used extensively to reflect human characteristics that may involve our DNA even when scientific support for such connections is both preliminary and limited. Human behaviors are often treated in the same way: a couple of decades ago, the so-
called “discovery” of the “criminal gene” received broad coverage from numerous media outlets just to be largely dismissed a few years later (Conrad & Markens, 2001).

While extensive philosophical, sociological, and legal scholarly attention has been directed towards the study of the individual and social implications of hereditary research, the purpose of this paper is to assess the psychological effects of exposure to scientific and popular genetics accounts. I suggest that the human tendency towards psychological essentialism, perceiving certain categories as having an underlying nature that make the category members what they are (Gelman, 2003: Medin & Ortony, 1989), is strengthened by popular representations of genes. I term the outcome of this process Genetic Essentialism.

Scientific inquiry into the inheritance of traits is not a new development. The search for the reasons underlying various human phenomena seems to inspire lay people as much as it does scientists. The daily encounter with tremendous variability in appearance, abilities, attitudes, and behaviors displayed by different people generates intuitive interpretations as well as explanatory scientific endeavours. The two poles of scientific theoretical accounts that offer explanations of human diversity stress either biological causes or environmental ones to form the ubiquitous “nature vs. nurture” debate.

The extreme version of the biological account (also termed nativist) claims that people’s basic characteristics (e.g., personality, attitudes, temperament) are inherited and experience can only account for a limited amount of basic human behavior. According to this reductionist view, we come into this world equipped with a set of characteristics that define us, although some may not be revealed until later in the course of development. According to the biological perspective, circumstances, although valuable in explaining our behavior in certain situations (e.g., Jane ran when she saw a lion but not when she was gathering roots), do not provide a meaningful
underlying framework (i.e., Jane ran when she saw the lion because she inherited a fight or flight reaction mechanism that is triggered in times of danger). Luther Burbank (1907, p. 83) summed up this view when he asserted that “stored within heredity are all joys, sorrows, loves, hates, music, art… and all the mysteries of the universe.”

On the opposite end, according to the extreme version of the environmental perspective, a human being is a product of his or her environment. A person arrives in this world as a “tabula rasa,” a clean slate, and her experiences mould her into whatever she will become. John Watson’s (1930) famous quotation captures this belief:

Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors.

Although nowadays most scientists place themselves along the continuum that stretches between the biological/nativist and environmental poles, the biological pole seems at present to have an appeal not equaled by its counterpart (Conrad, 1997, 1999, 2002; Nelkin & Lindee, 1995).

The Present Dissertation

The purpose of this dissertation is neither to champion one camp of the nature vs. nurture debate nor to undermine the other. There is an overwhelming amount of evidence to support the notion that there are interactive relationships between our genes and our environment, and that
complex human behaviors, attitudes, and characteristics are the products of such relationships (for a review, see Ridley, 2003); this accumulated evidence counters one-sided and extreme explanations.

Instead, the dissertation contains two components. In the first part I explore the relationships between perceived genetic underpinnings (i.e., genetic attributions) for complex human phenomena and people’s attitudes, beliefs, and behaviors. For this purpose I assess the effects of the rise in the acceptability of biological accounts to explain human diversity in recent history. I provide a brief review of the eugenics movement (focusing on the United States.) from its conception to its decline (or, as some would say, transformation). I then address the effects of perceived genetic foundations for social categorization by examining attitudes with regard to sexual orientation, race, and criminality.

In the second part I focus on the correlations between perceived genetic foundations and gender with regard to attitudes and behaviors. I first examine previous research into this subject. I then focus on the highly contentious debate about sex differences and human sexuality between nativists, who promote evolutionary psychology accounts, and environmentalists, who promote sociocultural accounts. I explore empirically the effects of exposure to scientific theories that propose genetic roots for such gender differences (i.e., evolutionary psychology) and scientific theories that propose sociocultural roots for the same differences (i.e., social constructivism) on people’s evaluations of men’s deviant sexual behaviors. Finally, I discuss some of the implications of this research, and suggest areas for potential future research based on relevant questions that were left unsolved.
PART I: THE EMERGENCE OF GENETIC ESSENTIALISM

Historical Account of the Social Aspects of Human Heredity Research

Two and a half millennia ago, Plato suggested an analogy between the role of the sovereign and the role of animal breeders: the rulers, just like the breeders, should purify the flock they lead. In Plato’s utopian view, expressed in The Republic, rulers should control human reproduction by disposing of “flawed” children. Healthy and talented people should be encouraged to reproduce, while the less talented would be discouraged through various schemes (though this policy should remain hidden from the general population) (Plato, 360 B.C./1956). Other literary accounts through the ages have portrayed breeding programs designed to improve a nation or the whole human race (for more in-depth discussions, see Carden, 1969; Paul, 1995). However, the recurring desire to improve offspring and human generations lacked any scientific basis until the second half of the nineteenth century, when the publication of Darwin’s revolutionary theory provided such a foundation. At the same time, the social changes brought about by the Industrial Revolution (e.g., the growing need for skilled workers, widespread urbanization) created optimal political conditions for the interest in human heredity to take centre stage in both scientific and social circles.

Eugenics

The modern scientific (and pseudoscientific) study of inheritance followed the appearance of Darwin’s theory almost immediately. Sir Francis Galton, Darwin’s cousin and a notable researcher in his own right, proposed to harness the concept of artificial selection to the improvement of human population (Galton, 1869). He coined the term for this new scientific discipline, eugenics, which is an amalgamation of the Greek words eu (good) and genos (birth),


meaning, therefore, “good breeding.” Galton asserted that the evolutionary forces responsible for the advancement of the human race were being undermined by social policies that protected the disadvantaged, who otherwise would perish via natural selection. The prolonged existence and reproduction of undesirable elements in society, he argued, led to the degeneration of that society by propagating dysgenic features.

Borrowing metaphors and scientific findings from animal breeding research, Galton’s ideas sparked growing interest from the scientific community in the late nineteenth and early twentieth centuries. Eminent scientists of the time, among them Karl Pearson, Luther Burbank, and David Starr Jordan were joined by other prominent figures such as Alexander Graham Bell, Bernard Shaw, and Theodore Roosevelt in endorsing eugenic ideas and practices (Black, 2003; Kevles, 1985; Nelkin & Lindee, 1995).

Galton focused on “positive eugenics,” encouraging the union and reproduction of fit individuals, whom, in keeping with the stratified, class-conscious society of Great Britain, he associated with the higher classes. Across the ocean, however, the American eugenic movement, led by Charles Davenport, was increasingly directed towards “negative eugenics,” discouraging reproduction among those who were perceived to be unfit.

Scientific investigations related to eugenics proliferated in the early twentieth century, encompassing thousands of publications (Black, 2003; Nelkin & Lindee, 1995). Many universities and colleges actively endorsed the new discipline. Leading universities in the United States, including Harvard, Yale, and Stanford, offered courses in eugenics for undergraduate and graduate students (Kevles, 1985), as did hundreds of other academic institutions (Nelkin & Lindee, 1995). In those early days, genetics was barely distinguishable from eugenics. The entire
founding editorial board of the American journal *Genetics*, for example, endorsed the eugenic movement (Paul, 1995).

Eugenics was not confined to the ivory tower of academia. The public, especially the middle and upper classes, were increasingly exposed to representations of eugenic ideas in popular books, theatrical plays, newspaper articles, and movies, all of which offered a variety of images that demonstrated the power of the germplasm in generating people’s abilities and behaviors (Nelkin & Lindee, 1995). New organizations, such as the American Eugenic Society and Planned Parenthood, sprung up to endorse eugenic ideology, while established groups such as the American Breeding Association aligned themselves with it (Black, 2003). Popular exposure even reached state fairs, where positive eugenics were encouraged by competitions that offered trophies to the most eugenically fit families, couples, and babies (Paul, 1995).

The involvement of leading eugenicists in policy making advanced hand in hand with the increasing popularity of eugenics among the scientific community. In the U.S. a number of important policies were informed and influenced by eugenic ideology and “scientific data.” The American Immigration Act of 1924 lowered immigration quotas from countries whose citizens were scrutinized by Harry Laughlin, the director of the Eugenic Record Office, for inherited deficiencies in intelligence and morality (Kevles, 1985). By the early 1900s the majority of the states in the U.S.A. had legislated restrictions on marriage for the mentally deficient, explicitly justifying some of these laws on eugenic grounds. The eugenics-based restrictions on marriage were not limited to the mentally challenged for long and were soon extended to limitations on interracial marriages (Black, 2003). One of the most callous policies to emerge from the eugenic ideology was the attempt to control reproduction through sterilization. In the early part of the 20th century many states legalized government controlled forced sterilizations and legal debate
soon ensued. The debate culminated in 1924 when the case of Buck vs. Bell reached the Supreme Court. Upholding the sterilization order against Carrie Buck, who had been judged “feebleminded” on the basis of a Stanford-Binnet IQ score, Justice Oliver Wendell Holmes summed up the case by declaring that “Three generations of imbeciles are enough” (cited in Black, p. 121).

By the late 1920s and early 1930s, the study of eugenics was being increasingly criticized within the U.S. scientific community (Kevles, 1985). Yet the decrease in the popularity of eugenic ideology in the United States was more closely related to the Nazis’ use of the same ideology to justify some of the worst atrocities in human history.

The Nazis wholeheartedly adopted eugenic racial theories. They began by implementing positive eugenic policies, encouraging reproduction between Aryan women and SS soldiers. Special breeding facilities were erected to serve as a production line for ideal Aryan offspring (Fest, 1970). More importantly, however, the Nazis also enforced negative eugenic policies from the mid-1930s until 1945. Restrictions on marriage were just the beginning; sterilization programs of unparalleled magnitude soon followed (Kerr & Shakespeare, 2002). The culmination of Nazi eugenic policy was the systematic extermination of undesirable elements (e.g., Jews, Gypsies, the disabled, homosexuals) that might “taint” the supreme Aryan blood of the “true” German people. Millions of those “undesirables” were led to their death in the gas chambers and other “euthanasia” centers.

The revelation of the magnitude of the carnage committed by the Nazis caused the public and the vast majority of the scientific community to reject eugenic ideology more completely than any scientific refutation ever had (Black, 2003; Kevles, 1985). “Eugenics,” tainted with the blood of millions, became “virtually a dirty word” (Kevles, p. 251). In 1950, the United Nations
Educational, Scientific and Cultural Organization (UNESCO) released their famous “Statement on Race.” The statement was a joint international venture, headed by renowned scientists such as Hermann Muller and Julian Huxley; it asserted that there is no biological foundation for the idea of race and that there is no scientific proof that different groups of mankind diverge in their inherited abilities (UNESCO, 1970).

While the popularity of traditional eugenic ideology plummeted after the Second World War, advances in the science of genetics and its applications were now on the rise. In the first half of the twentieth century many scientific publications on eugenics had been methodologically flawed and ideologically driven (Black, 2003), but post-war molecular genetics researchers apparently held themselves to higher scientific standards. Various advancements, such as the identification of the gene responsible for Phenylketonuria (PKU) on the one hand and in vitro conception on the other, offered hope for people with previously life-threatening or permanent conditions.

These and other landmark advances in genetic science helped to popularize public discourse about genes. The subsequent proliferation of media coverage of and public attention to genetic research raises empirical questions regarding the influence of such discourse on people’s attitudes and behaviors. After examining historical records, theoretical conjunctions, and experimental findings, some researchers have suggested that the public portrayal of genetic research contributes to stereotypical attitudes and beliefs (e.g., Black, 2003; Brescoll & LaFrance, 2004; Keller, 2005; Kitcher, 1996; Nelkin & Lindee, 1995) and even behaviors (Dar-Nimrod & Heine, 2006). This influence, I argue, is facilitated by people’s tendency to essentialize.
**Essentialism**

People show a remarkable tendency to essentialize certain entities they encounter. They perceive “natural” categories such as minerals, chemicals, and especially living organisms as having an underlying, non-trivial, fundamental nature that makes them what they are (e.g., Atran, 1987; Gelman, 2003; Hirschfeld & Gelman, 1994; Medin & Ortony, 1989). According to this process, which was termed “psychological essentialism,” a fundamental nature, or essence, which is underlying, deep, and unobserved (some researchers would say unobservable [Gelman, 2003]) causes natural entities to be what they are by generating the apparent shared characteristics of the members of a particular category. Thus, “essence” constrains visible characteristics but is not defined by them. Changes in observable characteristics, not due to any causal relationship with the underlying essence (Medin & Ortony, 1989), do not imply changes in essence.

While pure essentialism has been dismissed as a metaphysical description of the world (see Medin & Ortony, 1989, for a lucid explanation of this), psychological essentialism has been empirically shown to guide adults’ and children’s categorizations across a variety of cultures (e.g., Gelman, 2003; Sousa, Atran, & Medin, 2002). Thus, as a categorization-enabling cognitive heuristic, psychological essentialism facilitates, and at times determines, category formation.

Although the essence is unobserved, it is presumed to influence a variety of known and yet-to-be-discovered characteristics. Medin and Ortony (1989) argued that the unobservable and indescribable nature of the essence does not undermine the use of such a construct. Medin and Ortony contended that people use an “essence placeholder” (p. 184-5) to overcome the abstractness of the essence. This placeholder allows people to draw causal inferences from the essence to observed characteristics without needing to give the essence a materialistic description,
which would ultimately limit it and may preclude yet-to-be-known, essentialist category-based inferences.

Take for example the ontological category “tigers.” Members of the group “tigers” share a variety of characteristics that presumably reflect an underlying essence that gives rise to the animal’s observable as well as less visible traits. These characteristics include thick, striped fur that covers their bodies, and a set of sharp teeth, including sizable fangs, which are displayed when tigers yawn or invite their prey to become their next meal. In addition, ferocity, aggressiveness, and quickness are some of the traits that make tigers a force to be reckoned with for anyone visiting their habitat. Although this group of characteristics may encapsulate our perception of tigers, it seems rather to be the outcome of identifying an entity as a tiger than the reason to call the entity by such a name. Watching a tiger interacting playfully with its trainer, an observer would still consider the animal’s non-displayed aggressiveness, which is presumably part of the tiger’s essence, before stepping forward to pet the magnificent creature. The essence of a tiger does not change when essence-congruent traits are not apparent in a particular situation.

The causal relationship between essence and expected characteristics is one of the defining elements of essence. Another defining element is stability. The essence of the tiger is presumed to be immutable: it does not change even when observable traits are transformed because of direct physical or environmental alterations. If a tiger were to eat something that changed its appearance and made it resemble a deer, it would nevertheless be a tiger (Rips, 1989). Inside the surgically transformed, deer-like tiger, one would still expect to find the aggressive cat (Keil, 1989). If a tiger were raised by a family of deer, both children and adults would nevertheless expect it to retain the physical appearance and internal organs of a tiger (Gelman & Wellman, 1991; Sousa, Atran, & Medin, 2002). Moreover, people would also expect the animal
to show tiger-like behaviors even for novel, experimentally induced, non-physical properties (Sousa et al., 2002).

The essence of a represented natural-kind category suggests that members of that category are perceived as homogeneous. The unique, unobserved essence of each category affords the perceiver inductive potential regarding individual members (Rothbart & Taylor, 1992). This inductive potential allows one to make specific physiological and behavioral inferences regarding the members of a particular category (Haslam, Bastian, Bain, & Kashima, 2006; Rothbart & Taylor).

Rothbart and Taylor (1992) expanded the relevance of the essentialism heuristic from natural kinds to social groups. They argued that socially constructed groups such as race and gender, while better characterized as human artifacts, are essentialized in the same manner as natural kinds. Gil-White (2001) demonstrated the use of this heuristic among different tribal groups in Mongolia. Gil-White’s informants and subjects associated different tribal ethnies with particular innate capabilities. For example, the Uryankhai are perceived to have the ability to cast potent curses on others. An Uryankhai child adopted at birth by Torguuds (who have no power to curse) is believed to have the power to cast potent curses (although, believing that she is a Torguud, she would be unaware of her own ability).

Essentializing social groups increases both the perceived homogeneity of the members of a group and the tendency to make inferences about group members. An essentialized perspective in general and implied immutability in particular have been shown to be associated with increased stereotypical thinking and attitudes (e.g., Haslam et al., 2006; Haslam, Rothschild, & Ernst, 2000, 2004; Hong, Levy, & Chiu, 2001). Such views also constrain perceived innate potential for group members.
Innate potential has been an important component in the conceptualization of psychological essentialism (Atran, 1987; Haslam et al., 2006; Rothbart & Taylor, 1992; Sousa et al., 2002). Membership in a species, and more controversially in a social group, imposes certain constraints on the abilities and behaviors of the particular category’s members, because the essence of category membership is passed down through biological lineage. The relationship between immutable essence and innateness on the one hand, and innateness and genetics on the other, suggests a reduction in the perceived malleability of the observable characteristics for members who are assumed to share a distinct (or at least relevant) genetic makeup.

The defining elements of psychological essentialism (i.e., natural, fundamental, discrete, homogeneous, unchangeable, indicates innate potential) appear to be similar to people’s perception of genes. Such similarity suggests that members who are assumed to share a distinct genetic makeup are also assumed to share their essence. I therefore argue that one’s DNA may often serve as the essence placeholder, allowing people to infer their own as well as others’ abilities and tendencies based on assumed shared genes leading to Genetic Essentialism—inferring person’s characteristics based on perceived genetic makeup.

Even children may use the notion of genetics to represent their essentializing tendencies. Heyman and Gelman (2000) used Hirschfeld’s (1995) switch-at-birth task (in which a child is switched at birth, never meets his or her birth parents, and is raised by different parents) to examine children’s tendencies to evoke nativist or environmentalist explanations to predict offspring psychological traits. Providing a nativist account to explain why a child who was born to intellectually inferior parents but was raised by intelligent parents would be less intelligent, one elementary school student stated, “It will have trouble. It's in its genes” (p. 672). Thus,
although children may not yet understand the concept of genes, they nevertheless evoke it to explain nativist views.

Adult lay persons’ understanding of genetics has also been shown to be limited (Laine et al., 2004). Arguably, people receive most if not all of their current knowledge of genetics from the popular media (Conrad, 1997). Conrad (1997, 1999, 2002; Conrad & Gabe, 1999) has suggested that the media often reinforces genetically deterministic views by providing simplistic and deterministic nativist accounts of genetic research. Alper and Beckwith (1993) have noted that public discourse on genetics is plagued by genetic fatalism in such a way that any association between genes and behavior implies predetermined, immutable behavior (see also Nelkin & Lindee, 1995). Thus, group-level perceived shared genetic makeup, accompanied by deterministic gene-behavior association, can become fertile ground for stereotyping and prejudice.

An association between essentialism, stereotyping, and perceived genetic origin was found empirically by Bastian and Haslam (2006). In their study, Bastian and Haslam attempted to bridge research on implicit person theories (IPT: Chiu, Hong, & Dweck, 1997; Dweck, Chiu, & Hong, 1995; Dweck & Legget, 1988) with research on essentialism. IPT research has revealed people’s tendency to view certain behaviors and attitudes as more or less malleable. Entity theorists tend to believe that a person’s characteristics, morals, and abilities are fixed and do not change much throughout life. Conversely, incremental theorists believe that these attributes are pliable and can therefore be developed with the right motivation and effort. Research has shown that, compared with incremental theorists, entity theorists persist less on a novel task after failure (Cain & Dweck, 1995), make stronger behavioral predictions based on trait information (Chiu, et al., 1997), and endorse stereotypes more strongly (Levy, Stroessner, &
Dweck, 1998). Bastian and Haslam composed 3 new subscales which, combined with the IPT scale, captured essentialist tendencies. One of the subscales, the biological basis subscale, explicitly tapped into the overlap between genetics and essentialism. For example, one representative item from that scale reads “(t)he kind of person someone is can be largely attributed to their genetic inheritance.” The researchers investigated whether the traditional IPT scale encompassed the full construct of essentialism or alternatively represented only a facet in it. For this purpose they collected data on how much people endorse a wide variety of stereotypes regarding different social groups. They found that, when taken together with the rest of the subscales, as well as relevant individual differences measures, such as right-wing authoritarianism (Altemeyer, 1988) and social dominance orientation (Pratto, Sidanius, Stallworth, & Malle, 1994), the biological basis scale was the strongest predictor ($\beta = .28$) of stereotype endorsement amongst all essentialism subscales, including IPT ($\beta = .18$) (see also Keller, 2005).

Genetic explanations are appealing in their simplicity. They appear to provide fundamental causes for a variety of phenomena and to ground those causes in the materialistic reality of the measurable science of biology. Specific genes are portrayed as causal agents for complex human characteristics, in such a way as to render those causes unassailable. In the following section I examine the role of genetic attributions in the evaluation of members of socially constructed groups, specifically, grouping according to sexual orientation, race, and criminality.
Genetic Attributions and Socially Constructed Categories

Sexual orientation

The notion that heredity determines sexual orientation is by no means new. During the nineteenth century, a number of scientists, among them K. M. Benkart and Paul Moreau, suggested that such a relationship existed (cf Conrad, 1997). The idea that homosexuality had genetic origins was championed throughout the early twentieth century, supported by multiple researchers (most notably Franz Kallman) and a variety of methodologies, including twin studies (Conrad & Markens, 2001).

In 1993, Hamer, Hu, Magnuson, Hu, and Pattatucci claimed to have found a genetic marker (Xq28) that may partly account for male homosexuality. The marker, which resides on the X chromosome, is passed down through the maternal lineage. Hamer et al.’s research (see also Hu et al., 1995) attracted substantial media attention and the marker (which includes hundreds of genes) soon became known as the “gay gene.”

The public reaction to the discovery of Xq28 illustrates the relationship between genetic attributions and essentialist thinking. Dozens of articles and news stories followed the research publication, igniting a discussion of the positive and negative ramifications of the discovery. Although the research paper was carefully construed as the initial finding of a genetic marker that may contain genes that are involved in homosexual orientation for men, many of the media articles (mostly in the U.S.) highlighted the lack of choice about adopting a homosexual lifestyle that this finding points to (for a review see Conrad & Markens, 2001). Other articles (mostly in the UK-- the birthplace of eugenics) focused on eugenic concerns such as selective abortions for “suspect” fetuses as well as diagnostic tests designed to identify such fetuses (for a review see Conrad & Markens). Both reactions indicate a perceived immutable causal relationship between
genes and homosexuality or in other words- Genetic Essentialism. No such fatalistic reactions had followed, for example, the psychoanalytic proposition that overbearing mothers and detached, cold fathers may be responsible for homosexual tendencies (e.g., Isay, 1989), although infants’ conscious control over parental behaviors is arguably no greater than their control over their genes.

Although researchers have sought genetic underpinnings for sexual orientation for decades (e.g., Bailey & Bell, 1993; Bailey, Dunne, & Martin, 2000; Hamer et al., 1993; Hu et al., 1995; Kallman, 1952; Rice, Anderson, Risch, & Eber, 1999), the accumulated evidence is riddled with lacunae, inconsistencies, and contradictions. For example, the magnitude of the heritability coefficient estimates for male homosexuality were found to differ remarkably from one study to the next (e.g., 100% estimated by Kallman, 1952; about 55% estimated by Bailey and Bell, 1993; but only about 25% estimated by Bailey et al. 2000.) To date, Xq28, the alleged genetic marker for homosexuality (Hamer et al., 1993; Hu et al., 1995) has not been found by any other laboratory, despite repeated attempts at replication (Rice et al., 1999). Furthermore, no region in the genome has ever been identified as the potential locus for genes that affect sexual orientation for female homosexuals. Taken together, the current scientific evidence to support substantial genetic underpinnings for sexual orientation is mixed and controversial to say the least.

Despite the dearth of scientific evidence, public polls suggest that the popular perception of genes and sexual orientation as connected is on the rise. Illustrating this shift, Sheldon, Pfeffer, Jayaratne, Feldbaum, and Petty (2007) compared two Gallup polls across 30 years, and found an increase in the public perception that homosexuality is something people are born with: 13% of respondents believed this to be true in 1977, compared with 40% in 2001 (Sheldon et al.). This
change coincides with increased media coverage of genetic research in general and of the relationship between genetics and sexual orientation in particular; the change appears unaffected by the continuing lack of strong scientific evidence for this relationship.

The essentialist view of genetics in relation to sexual orientation is a focal theme in the research of Toby Jayaratne and her colleagues (Jayaratne et al., 2006; Sheldon et al., 2007). In a recent study, Sheldon et al. (2007) conducted in-depth interviews to explore public perceptions of the origin(s) of sexual orientation. Perceptions regarding such origin(s) varied greatly among interviewees and ranged from assertions that genes are solely responsible for homosexuality (about 10% of respondents), through suggestions that genes contribute to homosexual orientation (about 35% of respondents), to the belief that genes play no role at all (these last respondents suggested alternative origins such as environment, a higher power, or personal choice.) To justify his view that homosexuality is genetically determined, one participant explained:

Certainly with the stigma that’s associated with being gay in this country, it’s not something people would choose. To the extent that there are gays represented in the population also indicates that it is something that is genetic and inherent and not a lifestyle choice.

One can also learn about Genetic Essentialism from respondents who contended that homosexuality is not “caused by” genes. One of them, a 58-year-old woman, stated: “I have eight sisters and one brother and she’s the only (one) that’s gay. So, I really don’t think genetics have anything to do with it.” Although this respondent did not think homosexuality is genetic,
her response reveals just as much Genetic Essentialism as the responses of those who believed that homosexuality is caused by genes.

Sheldon et al. (2007) also investigated the sources of information people draw on to explain homosexuality. While many of the respondents drew on contact with gay people (e.g., family members, friends, co-workers), many also referred to mass media as their source of information. Given the inaccuracies and simplistic nature of so much of the media coverage (Conrad, 1997; Conrad & Markens, 2001; Nelkin & Lindee, 1995; Wilcox, 2003), as well as the potentially detrimental effects of media portrayals of genetic causation (Brescoll & LaFrance, 2004; Dar-Nimrod & Heine, 2006; Eccles & Jacobs, 1986), one must ask what role the mass media plays in eliciting fatalistic genetic beliefs regarding sexual orientation. Thus far, it has been mostly sociological researchers (Conrad, 1997, 1999, 2002; Conrad & Gabe, 1999; Conrad and Markens; Nelkin & Lindee) who have elaborated on the nature of media reports. Psychological research in this area is limited and does not provide a clear picture (see for example Eccles and Jacobs’s analysis of the effects of media reports on genetic explanations for male superiority in math.) Additional psychological research is needed to provide more insight into these issues.

Since an increasing subset of the population (at least in the U.S.) seems to believe that a causal relationship exists between genes and sexual orientation, it is worth considering how this perceived relationship affects people’s attitudes towards homosexuals themselves. Jayaratne et al. (2006) explored this question among a representative sample of White Americans. Jayaratne et al. noted that a decrease in prejudice and discriminatory tendencies towards homosexuals could be predicted from an increase in the perception that genetics has a causal role in sexual orientation. This relationship held even after controlling for relevant constructs such as religiosity and
political orientation (see also Haslam & Levy, 2007). In the current political climate, in which some people still believe that homosexuals are “choosing” a “perverted” lifestyle, it may not be surprising that the perception that genes are responsible is associated with a reduction in prejudice against homosexuals. Affording genes deterministic power over sexual orientation enables the perception that people themselves have less control over their sexual preferences; of course, the decrease in prejudice does not signal an increase in the acceptability of such preferences. However, one should keep in mind that political contexts are dynamic. Given the right scientific advances (e.g. identifying the genes that may be involved in predisposing individuals towards homosexuality), and/or a change in political climate (Brookey, 2001; Hegarty, 2002), the association that currently acts as a positive moderator of prejudice towards homosexuals may one day be used as grounds for eugenic practices designed to eliminate such a negatively perceived phenomenon. One need look no further than Nazi Germany to find such practices suddenly implemented on a large, previously inconceivable scale.

Haslam and Levy (2007) investigated the structure of essentialist beliefs regarding homosexuality. They found that, unlike other social groupings such as gender and race (reviewed below), the structure of essentialist beliefs regarding homosexuality contained 3 facets. Building on previous studies (Haslam et al. 2002; Hegarty and Prato 2001), Haslam and Levy found that genetic attributions were independent of perceived discreteness, although these elements seem to go together for other groups such as gender and race (Haslam et al., 2000). These different facets made opposite predictions for attitudes towards homosexuals. The biological (i.e., genetic) factor was a predictor of positive attitudes towards gays, while the discreteness factor was a negative predictor even above and beyond conservative attitudes (Prato et al., 1994) and authoritarianism (Altemeyer, 1988).
While an association between a perceived genetic role in the determination of sexual orientation, culpability, and prejudice was empirically established, no research has yet shown strong causal relationships between these constructs. Current research is mainly correlational and therefore precludes causal inferences. More research is needed to investigate such relationships using experimental designs in which the manipulation of the perceived role of genes in determining sexual orientation elicits changes in people’s evaluations of homosexuals.

**Race and Ethnicity**

Race, and perhaps to a lesser extent ethnicity, are two of the most utilized social categories. As evidenced by national conflicts, wars, and racial divides past and present, individuals assign a tremendous amount of importance to people’s race and ethnicity (RaE). Researchers in psychology have examined the role of these constructs in depth in relation to a wide array of areas of study, from stereotypes and prejudice, through ingroup and outgroup perceptions and identity, to abilities and cognitive mechanisms. Across many areas of study RaE were and remain contentious topics.

Race and to lesser extent ethnicity have been subjected to intensive scientific scrutiny in an attempt to answer the question whether they are grounded in biological (genetic) foundations (e.g., Cavalli-Sforza, Menozzi, & Piazza, 1994; Motulsky & King, 2002; Rosenberg et al., 2002). However, People have been shown to perceive RaE as a useful source for making inferences (e.g., Dienstbier, 1972; Gil-White, 2001; Le Bon, 1898). The use of this kind of categorization resembles the use of species-based categorization (Rothbart & Taylor, 1992) in the sense that it binds people into discrete, natural, immutable, stable, and necessary categories (Haslam et al. 2000). This essentialist perception of RaE has been related to the perceived genetic similitude
among members of such groupings (Haslam et al., 2006). Some of the characteristics that
supposedly differ amongst RaE groups are also some of the most desirable, with intelligence as
the prime focus.

In the early twentieth century, the recently created IQ test served as a tool in eugenically
led assertions about inherited intellectual differences between ethnic groups. As part of this trend,
in 1923 Carl Brigham published a book on intelligence, in which he focused on Americans. One
of Brigham’s research conclusions was that Southern Europeans immigrants were “intellectually
inferior to the representatives of the Nordic race” (cited in Kevles, 1985, pp. 82-3). Brigham
“showed” that Blacks were significantly less intelligent than Whites, and ascribed a mental age
of 10 years to the average (American) Black (Kevles, 1985).

The modern debate regarding genetic underpinnings for racial differences in intelligence
can be traced back to Arthur Jensen’s essay (1969), “How Much Can We Boost I.Q. and
Scholastic Achievement?” In this essay Jensen asserted that Black-White disparities in IQ scores
were due (at least partly) to genetic differences. It did not take long for the debate to infiltrate the
public realm in the form of extensive media coverage, and while most journalists were skeptical,
some support was also evident (Nelkin & Lindey, 1995). Since then, scientific research
supporting Jensen’s claims, championed by a number of scientists, most prominent among them
Richard Herrnstein, J. Philippe Rushton, and Jensen himself (e.g., Herrnstein & Murray, 1994;
Jensen, 1994; Rushton & Jensen, 2005), has accumulated, and its proponents have argued that
there is evidence for the hypothesized relationship between IQ, genetic differences, and race.
Scientific critiques of this work, championed by scientists such as Steven Gould, Richard
Lewontin, and Richard Nisbett have also been abundant during this time (e.g., Gould, 1996;
Lewontin, Rose, & Kamin, 1984; Nisbett, 2005; Sternberg, 2005), and reflect the current position of most social and life scientists.

More recently the public debate on the issue of race and intelligence was again in the forefront when James Watson, a Nobel Prize laureate for the discovery of the double helix structure of the DNA as well as the first head of the Human Genome Project, discussed the issue in an interview for the Londonian *Sunday Times*. Watson provided a bleak view—"he was inherently gloomy about the prospect of Africa," since "all of our social policies are based on the fact that their intelligence is the same as ours—whereas all the testing says not really" (Nugent, 2007). With even stronger racist undertones he added that "people who have to deal with black employees find that [the belief that people of all races are equal] is not true." Watson subsequently apologized for his remarks and soon after resigned his duties as the head of Cold Spring Harbor Laboratories (which first reached notoriety as the main research center for eugenics.)

Although both the majority of the scientific community and international political bodies have converged in their assertion that there is no biological basis for the concept of race (e.g., Anderson & Nickerson, 2005; Lewontin et al., 1984; UNESCO, 1970) the Watson’s interview storm, just as the Jensen paper before it, suggests that interest in socially focused RaE genetic differences continues unabated. Furthermore, such interest may soon receive a boost from the rise in medical science research attempting to tailor race-appropriate cures for common illnesses (e.g., Alper & Beckwith, 1999, 2002; Resnick, 1999). Concerns about these developments have been raised by African-Americans who view such endeavors with mixed feelings: while they recognize the potential for positive health-related outcomes, they also fear the consequences of continued scientific exploration of the relationship between underlying racial differences and
With the contentious discourse very much alive, investigating the effect(s) of genetic attributions for perceived racial and ethnic differences seems as important now as it was during the heyday of the early eugenics movement. However, despite the continuing relevance of this question, only a limited amount of empirical research in this area exists. In 2005, Keller constructed the Belief in Genetic Determinism Scale (BGD). This scale includes general items such as “(t)he fate of each person lies in his or her genes” and specific items such as “I believe that many differences between humans of different skin color can be attributed to differences in genetic predispositions.” The BGD was shown to correlate with essentialist measures such as IPT, as well as general prejudice measures and specific negative racial stereotyping measures. Ethnocentric tendencies (i.e., nationalism and patriotism) also positively correlated with the BGD.

Jayaratne et al. (2006) investigated the race-related genetic attributions of White Americans. They assessed genetic attributions for racial differences by focusing on how much the participants endorsed the role of genes in constructing racial differences in intelligence, drive for success, mathematical ability, and violence. They found that these genetic attributions correlated with both traditional racism (e.g., a reaction to one’s offspring marrying a Black) and modern racism (e.g., a belief that Blacks have themselves to blame for not doing well). Such genetic attributions were still predictive of traditional and modern racism after controlling for demographic characteristics such as age, education, and southern residence as well as attitudinal measures such as political orientation and religiosity.
Sheldon et al. (in press) conducted in-depth interviews with a selected group of Blacks (not a representative sample). One of the questions revolved around the perceived prevalence of genetic attributions for racial differences among both Whites and Blacks. While the majority of Black participants believed that most Whites attribute such perceived racial differences to genes, they also believed that only a minority of Blacks make such attributions. Many of the participants who believed that the majority of Whites make genetic attributions for racial differences also believed that this makes Whites feel superior.

However, the study of lay racial theories and their relationships to other constructs is not limited to the contrast between Blacks and Whites. Hong, Liao, Lee, Wood, and Chao (under review) studied the effect of subscribing to different race theories on attitudes towards White Americans and American culture among Asian Americans. They found that Asian Americans who held biologically-based race beliefs perceived greater differences in the personality characteristics of typical White and Asian Americans (Study 1). In a different research project Chao, Chen, Roisman, and Hong (2007, Study 1) found that an essentialist belief about race among bicultural Asian Americans was associated with increased difficulty in switching rapidly between cultural frames. Asian Americans who subscribe to biological race theory also showed stronger stress reactions, as measured by stronger electrodermal responses while talking about their bicultural experience (Chao et al., Study 2).

While the above findings indicate an association between genetic attributions for RaE differences and ethnocentrism, racism, and perceived racism, they are not sufficient to establish a causal relationship because of the correlational or qualitative nature of the studies. Some researchers have suggested that racist tendencies lead to race-based genetic attributions, and caution scientists about undertaking endeavors that are designed to unearth group similarities and
differences in genetic makeup such as the Human Genome Diversity Project (HGDP) (Alper & Beckwith, 1999, 2002). I contend that although racists may be more likely to endorse genetic attributions for RaE, the opposite causality is also at work: a rise in perceived group genetic differences leads to an increase in prejudice.

To date, only a couple of researchers manipulated (primed) genetic attributions and explored their effect(s) on interethnic perceptions. Keller (2005) presented German students with either an essay about the geography of human genes (experimental condition) or an essay about oil production (control). He found that the genetic prime led the German participants to show stronger ingroup bias (increased liking of Western Europeans) as well as outgroup derogation (decreased liking of Eastern Europeans), compared with the control condition. This effect was moderated by the BGD, revealing a stronger effect for the prime among people with high scores on the scale. No et al. (under review) primed Asian American participants with essays arguing either for a biological (essentialist) race theory or for a social race theory. They found that Asian Americans who were primed with the biological theory were more likely to disidentify with American culture than Asian Americans who were primed with the social theory. Interestingly, Asian Americans who were exposed to the social race theory identified with their ethnicity just as strongly as they identified with the American culture. Conversely, Asian Americans given the biological condition primer identified more strongly with their ethnicity than they did with mainstream American culture (Study 4).

The evidence reviewed suggests that RaE differences that are attributed to genetics on the one hand, and ethnocentrism, racism, and prejudice on the other, feed off each other: each construct contributes to the other, potentially perpetuating an undesirable cycle. However, the evidence is limited and additional studies are needed to explore the causal relationship between
genetic attributions that are used to explain RaE perceived differences and prejudice. The belief that genetic differences exist between groups based on geographical location (and associated racial and ethnic memberships) does not necessarily entail racist attitudes, and can coexist with an anti-prejudice worldview, as manifested in the work of Cavalli-Sforza, the former head of the HGDP (Alper & Beckwith, 2002). In light of existing projects that may reveal RaE genetic differences, the moderating variables that contribute to the relationship between genetic attributions and bigotry (such as BGD) offer an important potential source for future scientific studies. Indeed, such research would be a welcome addition, as it might facilitate interventions designed to inoculate people against the increased bigotry that seems to follow RaE based genetic attributions.

**Criminality**

The problem of good and evil has been the subject of human curiosity for millennia. Generations of theologians, philosophers, and social scientists have investigated the notion of human evil from a plethora of perspectives. Following scholars such as Thomas Hobbs and Sigmund Freud, human nature was identified as the source of such evil. Other schools of thought, springing from the writings of intellectuals such as Jean-Jacques Rousseau, have claimed that civilization corrupts a fundamentally benign human nature. Religious scholars have asserted that powerful invisible agents such as demons and the Devil are responsible for evil deeds and moral corruption, and these beliefs have been echoed in popular folklore. More recently, other invisible and little understood entities - genes - have been offered as the source of immoral behavior.

The desire to understand criminality, antisocial behavior, and violations of civil moral codes was a major focus for both the scientific and popular strands of the eugenics movement.
From its inception through its heyday and even during its decline, eugenic ideology revolved around improving the human race via controlled heredity. Negative eugenics focused on eliminating undesirable elements in human behavior and society, and central among these were criminality and immorality. Galton and his successors attempted to demonstrate the heredity of antisocial behaviors by targeting families in which a high rate of such behaviors were found, and drawing extensive family trees for them (Kevles, 1985; Paul, 1995). Some of these portrayals appeared in books in which family ties were taken as sufficient evidence for the heredity factor of the undesirable behaviors. In the best known of these portrayals, Goddard (1913) investigated a family which he named the Kallikak family (from the Greek, *kalos*=good, and *kakos*=bad).

Field workers conducted interviews with family members and produced a detailed but methodologically questionable (Kevles, 1985) depiction of the family, in which pauperism and other elements of moral decay were emphasized and attributed to the family’s “feebleminded” matriarch.

Although early research, based on family trees and eugenic records, was methodologically flawed and represented poor science, the desire to explain and root out antisocial behaviors by isolating them within our DNA did not subside with the decline of eugenics as a scientific discipline. The genetic origin(s) of criminality once again hit the headlines, both popular and scientific, following the publication of a study suggesting that criminal behaviors might be related to a chromosomal abnormality (Jacobs, Bruton, Melville, Brittan, & McClement, 1965). Jacobs et al. identified a disproportionate number of males with an extra Y chromosome (XYY) among the population of a correctional facility in Scotland, and suggested that this anomaly “predisposes its carriers to unusually aggressive behavior” (p. 1351). Public interest soared and debates ensued over such questions as culpability and choice for such
“carriers” (Nelkin & Lindee, 1995). Latter researchers have largely dismissed the notion that the extra Y chromosome is responsible for increased aggression, emphasizing methodological flaws and biased inferences in Jacobs et al.’s study (e.g., Moor, 1972). Despite this dismissal of the original study’s conclusion, a public association between this specific chromosomal abnormality and criminality was still evident several decades later (Conrad, 1997; Nelkin & Lindee, 1995).

Research into the genetic underpinnings of criminal behaviors provides us with inconclusive evidence at best. While one finds some indication of an inherited tendency towards property crime (e.g., Mednick, Brennan, & Kambel, 1988; Mednick, Gabrieli, Hutchings, 1984; Raine, 1993), this indication cannot be extended to support the “Holy Grail” of criminal behavior research, that is, explaining violent crime (Mednick et al., 1988; but see Rowe & Osgood, 1984). However, genetic attributions for antisocial behavior, like the notion of demonic compulsion that preceded them, may point towards reduced culpability on the part of the criminal actor (Nelkin & Lindee, 1995). One of the basic notions of both judicial and popular perceptions of criminal culpability hinges on criminal intention, choice, and the ability to control one’s actions. Mens rea (Latin for “guilty mind”), the intentional element of a crime, is evaluated by jurors and judges and in its absence the accused may receive a reduced sentence or even be exonerated. A perceived fatalistic relationship between genes and criminal behavior eliminates the perceived agency of a criminal actor and renders the behavior non-controllable. Discussions of this nature appeared in the public media when rumors surfaced regarding the appeal of a convicted mass murderer on the grounds of chromosomal abnormality (Nelkin & Lindee).

Actual judicial decisions may also be influenced by the suggestion of an underlying genetic predisposition towards criminal behaviors. Cooper Dreyfuss and Nelkin (1992) compared two similar cases in which attorneys, who had been accused of misappropriating their
clients’ funds, faced disbarment procedures. Both cases appeared before the California Supreme Court in the early 1990s. In both cases, the allegations were not contested and the defendants identified currently controlled alcohol abuse as the proximal cause of their misconduct. The striking similarities between the two cases provided good grounds for an assessment of the role of genetic attributions. While one of the attorneys was disbarred, the other was only put on probation and allowed to continue practicing. The court that placed the attorney on probation found his mitigation arguments more appealing because he “had a genetic predisposition to alcoholism” (cited in Cooper Dreyfuss & Nelkin, p.328).

Other judges and juries have accepted genetic predispositions as mitigating elements that reduce culpability. For example, in 2005 a Canadian man accused of sexual assault was acquitted even though he did not contest the allegation. The judge exonerated this defendant on the basis that he suffered from non-insane automatism, caused by, among other reasons, a genetic predisposition to a sleep disorder. To prove this predisposition the defendant submitted evidence of a similar sleep disorder reported by family members (R. vs. Luedecke, 2005).

The evidence reviewed so far suggests that attributing criminal behavior to genetic predisposition alters the perception of both the intentional part of any criminal act and the related culpability of the actor, even though the evidence for such predispositions is anecdotal in nature. Although experimental research into perceived culpability and genetic attributions for undesirable behaviors is rare, the researchers in one study were able to establish a causal relationship between the two. Monterrosso, Rozyman, and Schwartz (2006) asked participants to evaluate a wide range of undesirable behaviors (e.g., murder, overeating) in a series of vignettes in which they manipulated the perceived cause of the behavior by highlighting experiential or biological underpinnings. The researchers found that the undesirable behaviors that were
explained with reference to experiential causes (e.g., the protagonist had a history of trauma or abuse), rather than biological causes, including explicitly identified genetic ones (e.g., the protagonist had an inherited condition), were seen as more voluntary and blameworthy, attracted less sympathy, and were assigned more severe punishment(s). In addition, participants felt that they were more likely to have behaved like the characters in the vignettes if they themselves had shared the relevant genetic endowment, but not if they had shared the same background experiences.

The current evidence suggests that genetic attributions for criminal behaviors mitigate evaluations of the actor’s culpability in and control over the act. Direct evidence for this connection is still sparse, but given the great strides currently being made in the science of genetics, that may change. The use of “my genes made me do it” may be limited as a legal defense, as it can be something of a double edged sword: lack of control over the behavior reduces culpability but at the same time it increases the probability that the actor will commit similar acts in the future. The perception that genetics influence criminal behavior seems largely based on an erroneous essentialist understanding, which nevertheless has the potential to sway policies and legal matters for individuals as well as society as a whole.
PART II: SCIENTIFIC THEORIES AND GENDER DIFFERENCES

Evaluations of Previous Research

There is, generally speaking, a scientific consensus that sex is genetically determined. Whereas the overwhelming majority of females have two X chromosomes, the overwhelming majority of males have at least one Y chromosome. Gender, however, is a social construct, which spawns both biological elements, such as sexual organs, and social elements, such as appropriate social roles.

Gender has been found to be one of the most essentialized social categories (e.g., Gelman & Taylor, 2000; Haslam et al., 2000; Prentice & Miller, 2006). Children as young as 4 and 5 years of age have been shown to use gender as an inference-rich category that enables them to draw conclusions regarding human behaviors, even when it contradicts other categorization cues such as appearance (Gelman, Collman, & Maccoby, 1986) and environment (Taylor, 1996). This tendency was shown to apply to both existing and novel characteristics.

Prentice and Miller (2006) demonstrated that essentializing gender is not confined to children’s categorizations. In two studies, they provided men and women with a novel perceptual task (i.e., estimating the number of dots on a screen) as well as feedback regarding their performance (i.e., the tendency to overestimate/underestimate the number.) Prentice and Miller (Study 1) found that both men and women believed their performance (e.g., overestimation) reflected the propensity of their own gender (to overestimate) when they performed the task alone. This tendency was significantly stronger when they performed the task with a person of the other gender who received the opposite feedback (e.g., underestimation); however, it was eliminated when they performed the task with a person of the other gender who received similar feedback. In a second study, Prentice and Miller showed that the tendency to correct for
inaccuracy (increase the estimate if one is told that one is an underestimator) was smaller when people judge that the task reflects gender differences. Prentice and Miller’s participants demonstrated a tendency to assume stable gender differences even for a novel task for which they had no prior expectations in terms of performance. Gender, therefore, seems to provide a meaningful framework for people to evaluate abilities, even if such abilities were not previously associated with it. But how meaningful is gender compared to other social categories?

Haslam et al. (2000) investigated the role of essentialism in categorization for 40 social categories (e.g., ethnies, age, interest groups.) After assessing various elements of essentialism, Haslam et al. found a 2-factor structure for essentialism. The first factor corresponded with people’s evaluations of natural kind, which included such elements as discreteness, immutability, stability, and naturalness. Out of the 40 categories examined, gender received the highest score on this dimension, suggesting that gender is perceived as reflecting the most natural, stable, and immutable category-based divide among people.

Haslam, Rothschild, and Ernst (2002) showed that a belief in immutability, such as the one which underlines gender categorization, is associated with the belief in a biological basis for the particular categorization. Keller (2005) refined these results with a new validated scale (BGD) and showed that belief in genetic determinism was associated with IPT. In addition, Keller (Study 2) demonstrated that BGD was associated with sexism. Reaching conceptually similar findings Coleman and Hong (2007, Study 1) found that women who endorse biological gender theory more strongly (compared with social gender theory) also endorsed feminine traits more strongly displaying self-stereotyping attitudes.

Although the research reviewed so far supports the idea that genetic attribution for gender differences is detrimental, its correlational nature precludes the establishment of a causal
relationship between the constructs. In order to establish a causal relationship one would need to show that perceived genetic differences alter people’s evaluations. In order to explore such a relationship, Brescoll and LaFrance (2004, Study 2) presented participants with fictitious newspaper articles that claimed that the ability to identify plants varies according to gender. These articles differed in the explanation they offered for these differences: some provided a biological explanation (e.g., evolutionary programming), others quoted a sociocultural source (e.g., socialization). The researchers found that reading about a biological explanation for gender differences in plant identification increased participants’ core belief that a person cannot change (personality immutability). In addition, the biological explanation inspired a stronger endorsement of gender stereotypes, compared with the sociocultural attributions. Brescoll and LaFrance (Study 3) then investigated which explanation leads to the observed changes, i.e., did biological attribution reduce the perception of personality mutability and increase stereotype endorsement? Alternatively, did sociocultural attributions increase the perception of such mutability and decrease stereotype endorsement? To examine these questions, Brescoll and LaFrance included a control group of participants who did not read any article. The results indicated a complex pattern. The biological attribution condition differed from the control and the sociocultural conditions by leading to an increase in stereotype endorsement. Conversely, the sociocultural attribution condition differed from the biological and control conditions by causing an increase in perceived personality mutability. This research shows how perceived genetic attribution can lead to increased stereotyping and may reflect an overrideable tendency to perceive personality as immutable.

Dar-Nimrod and Heine (2006) extended Brescoll and LaFrance’s research from beliefs to behaviors. We chose to investigate the effects of genetic attributions regarding male superiority
in math. There have already been some scientific investigations into potential genetic underpinnings for alleged gender disparity in math performance. Benbow and Stanley (1980), for example, argued that males may be genetically predisposed towards greater mathematical ability. Although Benbow and Stanley acknowledged that their data did not refute alternative sociocultural explanations, their assertions generated an extensive popular debate on the issue (Eccles & Jacobs, 1986; Nelkin & Lindee, 1995). More recently, Lawrence Summers, then the president of Harvard University, strongly suggested that there is higher percentage of men with high mathematical aptitude than there are women (Summers, 2005). Summers’s claims, which eventually led him to resign his position, triggered widespread but divided responses from prominent social scientists (Baron-Cohen, 2005; Pinker & Spelke, 2005; Spelke, 2005); the media covered the incident and the ensuing debate extensively. While admitting that the evidence at this stage provides no clear support for either the proponents or the opponents of the genetic hypothesis, we were interested in learning whether genetic attribution per se may affect behavior.

In two studies we examined whether providing genetic explanations for the stereotype “men are better at math than women” leads to a decrease in women’s math performance, compared with sociocultural explanations. Using the stereotype threat phenomenon (Steele, 1997; Steele & Aronson, 1995), in which members of stereotyped groups perform worse on stereotyped tasks when their group membership is made salient, as a framework, we exposed female participants to one of four manipulations: 1) a claim that there are no sex differences in math performance (ND); 2) a reminder of their sex (S); 3) a claim that sex differences in math have genetic causes (G); and 4) a claim that sex differences in math have experiential sociocultural causes (E). We found that, as with traditional stereotype threat manipulation (S),
women who learned of genetic attributions for gender-differences in math ability (G) performed significantly worse on a post-manipulation math test compared with women who learned that there are no gender differences in math (ND) or women who learned that such differences spring from experiential sources (E). Math performance in the E and ND conditions was virtually the same (Study 1) or showed a slight nominal advantage for the E condition (Study 2). These findings suggest that natural inclinations towards biological essentialism, evident from the similarity between the G and S conditions, can be overridden by explicit environmental explanations.

Colman and Hong (2007, Study 2) also exposed their female participants to either biological gender theory or social gender theory. They found that participants who read an article arguing for a biological gender theory endorsed traditional feminine attributes more strongly than participants who read an article arguing for a social gender theory. In addition, participants given the biological condition primer were quicker to endorse feminine traits than participants given the social condition primer.

The study of gender, arguably the most essentialized social category (Haslam et al., 2000), provides additional support for the notion that Genetic Essentialism has negative consequences. Belief in a biological basis for categorization has been associated with reduced belief in the mutability of attitudes and behaviors (Haslam et al., 2002; Haslam et al., 2006). In addition, although no clear evidence exists to support a biological basis for gender differences in either math performance or plant identification, the mere suggestion of such a relationship had undesirable effects on people’s beliefs (Brescoll & LaFrance, 2004) and behaviors (Dar-Nimrod & Heine, 2006). The suggestion of a sociocultural basis for such differences did not show detrimental effects. These studies, which investigated the effect of genetic versus sociocultural
perceived cause for gender differences, were an important start for this line of research; however they, by no mean, reflect the final account in the area.

**Evolutionary Psychology and Social Constructivism**

Many perceived gender differences have been explained with reference to sociocultural and/or genetic elements. Few discourses within the scientific community have generated as much discord as the continuing debate over what accounts for gender differences in sexual strategies and behaviors. Indeed, this has become something of a scientific and ideological battlefield between two established scholarly camps: evolutionary psychologists and social constructivists.

As discussed earlier, Darwin’s evolutionary theory was immediately seized upon by late 19th and early 20th century eugenicists as a theoretical framework for advancing pseudoscientific ideologies of human breeding. After the interest in eugenics subsided following World War II, there was a significant decrease in the amount of scientific research into finding genetic causes for mental and psychological characteristics. The mid-1970s saw a revival of sorts with the popularization of a new discipline: sociobiology, spearheaded by the publication of two books, Edward O. Wilson’s *Sociobiology: The New Synthesis* (1975) and Richard Dawkins’s *The Selfish Gene* (1976). Sociobiologists apply evolutionary theory to social behavior, and claim that numerous social behaviors are shaped by natural selection for reproductive success, thus laying the ground for the reproduction of evolutionary histories of specific behaviors or behavioral strategies. Controversial sociobiological assertions about human behavior arguably paved the way for evolutionary psychology to develop as a distinct discipline.

Evolutionary psychology is a recent theoretical paradigm in psychology that attempts to explain mental and psychological traits, such as memory, personality, or language, as adaptations,
i.e., as the functional products of natural selection. The crux of this paradigm is the introduction of a gene-based, adaptationist rationale about biological mechanisms into the field of psychology, resulting in an approach to psychological mechanisms based on an evolutionary theory perspective. In a nutshell, evolutionary psychology is focused on how evolution has influenced the human mind and behavior by shaping domain-general and domain-specific mental circuitry.

Sociobiology and evolutionary psychology have inspired strong reactions in both the scientific community and the public sphere. Its many critics include leading scientists and philosophers such as Stephen Jay Gould, Steven Rose, Marshal Salihns, and Alfie Kohn, some of whom founded "The Sociobiology Study Group" to critique various assertions embedded in sociobiological accounts of the roots of human behavior. Evolutionary psychology has been heavily criticized both as an overarching doctrine (e.g., Gould & Lewontin, 1979) and for making specific derived claims (e.g., Gould, 1996; Lewontin, Rose, & Kamin, 1984: Wood & Eagly, 2002). The main theoretical rival to the evolutionary psychology paradigm highlights sociocultural antecedents to explain human behaviors and behavioral strategies, and is generally referred to as social constructivism or social constructionism.

Social constructivists explore how sociocultural phenomena develop in particular social contexts. The social construct is a practice or concept which may appear to be natural and universal to those who live by it, but in reality is an invention of a particular society. Such constructs are theorized to be the by-products of numerous choices that create a practice in specific contexts. Social constructivism attempts to uncover the ways in which people select and form their perceived social reality.

In the social constructivist framework, human universals regarding behaviors and behavioral strategies are traditionally rejected (Bay-Cheng, 2006; White, Bondurant, & Travis,
Individuals are seen as a Tabula Rasa, a clean slate, ready to be implicitly yet potently shaped by their social environment into whatever mould fits their particular social role. Social constructivism, along with its theoretical kin deconstruction and postmodernism, attempts to identify the social forces as well as the motivation behind such forces and the behavioral patterns they create. The complexities of the social world and the diverse roles (e.g., woman, divorcée, mother, employee, manager, daughter, feminist etc.) each individual plays are harnessed to offer accounts for the wide variety of observed behaviors (Rose, 1998; Wilson, 2005).

It is not surprising that social constructivism opposes the basic tenets of evolutionary psychology. The suggestion that individuals arrive in the world as clean slates undermines the theory of evolution-based genetic preprogramming of mental circuitry put forth by evolutionary psychology. There is a fundamental, irreconcilable dispute between these frameworks. One of the most hotly debated issues, argued vehemently between scholars from these opposing frameworks, is the question of gender; and the most controversial dispute within this already heated debate revolves around gender differences in sexual strategies (e.g., Bay-Cheng, 2006; Buss, 2007; Nelkin, 2000; Rose, 2000; Schmitt et al., 2004; Vickers & Kitcher, 2003; White et al., 2000; Wood & Eagly, 2002).

No one disputes the idea that pronounced gender differences in mate selection strategies exist within the Western society in which this dissertation is written. Our shared experiences, as well as the mainstream narratives around us, strongly indicate that men are more likely to attempt to establish short-term mating relationships and to display sexual aggression; conversely, women tend to be more discriminating in their selection of short-term sexual partners and rarely exhibit sexual aggression. This point is not contested by either evolutionary psychology (e.g., Buss, 2007) or social constructivism (White et al., 2000), although epistemological concerns
regarding the presentation of reality (e.g., are women coy or discriminating?) abound (e.g., Wilson, 2005). However, these two systems focus on different elements to account for the largely agreed-upon view of the gender differences in behavior and behavioral strategies. Evolutionary psychologists focus on hypothesized successful strategies that our ancestors may have used to increase their chances of producing viable offspring, and argue that these strategies have shaped mental circuitry in a manner that perpetuates them. Social constructivists focus on social forces, power relationships and cultural practices to account for the same phenomena.

Despite being extremely generative and influential, evolution-based theoretical accounts of the development of sexuality-related gender differences have proved particularly controversial for both mainstream psychology researchers and scholars from other fields (most notably feminist scholars). The resulting critiques of the scientific value of evolutionary-psychology-derived theories are sometimes scientifically rigorous (e.g., Coyne, 2000, 2003; Vickers & Kitcher, 2003; Wood & Eagly, 2002), but sometimes tend towards less scientific and more moral discussions. For example, Dorothee Nelkin has suggested that “Evolutionary psychology is not only a new science, it is a vision of morality and social order, a guide to moral behavior and policy agendas” (2000, p. 24). Such critiques seem to have been prompted by a (sometimes implicit) sense that evolutionary psychology provides a “Kosher” stamp for a biased morality that translates into undesirable social inequalities because it proposes genetic foundations for certain contentious human behaviors. My research project is designed to investigate whether evolutionary psychology theories actually have the effects on moral evaluations that some of its critics suggest (e.g., Kimmel, 2003; Nelkin, 2000; Rose, 2000).
The Present Studies

The present studies were not designed to investigate the validity of the evolutionary psychology theories or social constructivist theories. The specific theories discussed in the following studies were presented to the participants in a simplified, even somewhat simplistic manner, similar to the manner in which people might learn about such theories from the popular media. My focus in these studies was the investigation of the effect that exposure to theories from evolutionary psychology and social constructivism may have on the people exposed to them. This research is not equipped to evaluate the actual theories and claims.

More specifically, in three studies I explored how participants exposed to different primes, judge men who display questionable sexual behaviors. These primes are evolutionary psychology accounts for gender differences, sociocultural accounts for gender differences, and control, unrelated primes. I also examined a potential psychological construct that underlie any prime-related differences in judgment (men’s perceived control).

I hypothesized that exposure to evolutionary psychology accounts regarding human sexual strategies or behaviors will result in more lenient evaluations of behaviors that can be attributed to male promiscuity, compared with exposure to social constructivist accounts. I also hypothesized that the reaction following exposure to an evolutionary psychology account will be more similar to an unprompted reaction, compared with the reaction following exposure to a social constructivist account. The second hypothesis was based on common suggestions regarding the prevalence of the biological construct among lay people (e.g., Conrad, 1999; Nelkin & Lindee, 1995, Paul, 1998). Some empirical evidence supports this notion as well. Brescoll and LaFrance (2004) found that participants who read that sex differences in the ability to identify flora were due to socialization showed an increase in their perception that people can
change compared with both participants who read that the different ability has genetic origins and control participants who did not read anything (but see their results regarding endorsement of gender stereotypes for a different pattern.) Dar-Nimrod and Heine (2006) also found that women who learned about a genetic explanation for men’s alleged superiority in math performed on par with women who were only primed with their gender (control condition) on a math test, whereas women who learned about an experiential explanation performed better than the ones in these two other conditions.

In Study 1 and Study 2, I exposed participants to theoretical accounts for gender differences in mate selection strategies and assessed the effect of the prime on evaluations of male promiscuous behavior. In Study 3, I exposed participants to different theoretical accounts for rape and assessed participants’ evaluations of the behavior of a sexual aggressor, potential mediator of the evaluations (perceived control) and potential consequences (punishment). I also assessed general beliefs following the primes (i.e., beliefs about genetic determinism and rape myths.)
Study 1- Mate Selection and Sexual Solicitation

It is Friday night and David is readying himself for a night out with his friends. The guys are set to meet at Charlie’s for a quick snack and then on to some dancing at the newly opened The Dance Bar. They are celebrating Samuel’s birthday and have agreed to bring only $5 each for the cover charge. They are quite familiar with all the tricks and moves- they know how to get the girls to buy them drinks all night with the right combination of seduction and reservation. They are veterans of the town’s bar scene and they are proud of it (although some other guys in their college class seem to pass judgment on the sleazy way they use their sexuality.)

Some readers may need to read the above description a second time, just to make sure they identified the gender of the protagonists correctly; some readers will consider the scenario a pitiful joke; still other readers may see it as a dream come true. Whatever one’s reaction, it is highly unlikely that the description corresponds with one’s everyday experience (Baumeister & Vohs, 2004; Hyde & Oliver, 2000). However, if the gender of the protagonist and his friends are switched, the story is unlikely to raise an eyebrow – the idea of women using their sexuality as a form of currency is all too common. The common observation that men are in general more eager than women to have sexual relationships, especially short term ones as is the hallmark of the ubiquitous “bar scene”, was also found empirically (See Baumeister, Catanese, & Vohs, 2001, for review). Multiple theoretical accounts for the phenomenon have been offered, and while some focus on our evolutionary history (e.g., Allgeier & Wiederman, 1994; Buss, 2007; Buss & Schmitt, 1993; Schmitt et al., 2003), others focus on sociocultural elements (e.g., Bay-Cheng, 2006; Travis, 1999; White et al., 2000). Yet others attempt to combine elements from the two perspectives (e.g., Levins & Lewontin, 1985; Wood & Eagly, 2002).
A full evolutionary psychology derived theoretical account for sex differences in mate selection strategies is beyond the scope of this dissertation (for detailed accounts see Buss & Schmitt, 1993; Kenrick, Trost, & Sundie, 2004). Instead I offer the main points of such an account in a simplified form. In an influential paper, Buss and Schmitt (1993) summed up 11 elements of evolutionary history which they argue lead to the development of sexual strategies among males and females (pp. 205-206):

1. In human evolutionary history, both men and women have pursued short-term and long-term matings under certain conditions where the reproductive benefits have outweighed the costs.

2. Different adaptive problems must be solved when pursuing a short-term sexual strategy as opposed to pursuing a long-term sexual strategy.

3. Because of a fundamental asymmetry between the sexes in minimum levels of parental investment, men devote a larger proportion of their total mating effort to short-term mating than do women.

4. Because the reproductive opportunities and reproductive constraints differ for men and women in these two contexts, the adaptive problems that women must solve when pursuing each strategy are different from those that men must solve, although some problems are common to both sexes.

5. Men historically have been constrained in their reproductive success primarily by the number of fertile women they can inseminate. This reproductive constraint on men can be separated into four relatively distinct problems that men historically had to solve to effectively pursue a short-term mating strategy: (a) the problem of partner number, (b) the problem of identifying which women are sexually
accessible, (c) the problem of identifying which women are fertile, and (d) the problem of minimizing commitment and investment.

6. Reproductive constraints on men can be separated into four relatively distinct problems that men historically had to solve to effectively pursue a long-term mating strategy: (a) the problem of identifying reproductively valuable women, (b) the problem of ensuring certainty in paternity, (c) the problem of identifying women with good parenting skills, and (d) the problem of identifying women who are willing and able to commit to a long-term mating relationship.

7. Women historically have been constrained in their reproductive success not by the number of men they can gain sexual access to but rather primarily by the quantity and quality of the external resources that they can secure for themselves and their children and perhaps secondarily by the quality of the man's genes.

8. These reproductive constraints can be separated into two distinct problems that women historically had to solve to effectively pursue a short-term mating strategy: (a) the problem of immediate resource extraction and (b) the problem of assessing prospective long-term mates.

9. These reproductive constraints can be separated into distinct adaptive problems women historically had to solve to effectively pursue a long-term mating strategy: (a) the problem of identifying men who have the ability to invest resources in her and her children on a long-term basis, (b) the problem of identifying men who show a willingness to invest resources in her and her children on a long-term basis, (c) the problem of identifying men with good parenting skills, (d) the problem of identifying men who are willing and able to commit to a long-term relationship, and
(e) the problem of identifying men who are able and willing to protect them from aggressive conspecifics.

10. Men and women have evolved distinct psychological mechanisms that function to solve the adaptive problems confronted to effectively pursue short-term and long-term matings.

11. These psychological mechanisms and their behavioral manifestations, combined with the temporal contexts in which each set is activated, constitute the evolved sexual strategies of men and women. Strategies are defined as evolved solutions to adaptive problems, with no consciousness or awareness on the part of the strategist implied.

Highlighting females’ higher minimal investment in offspring (Trivers, 1972) and offering a logical account, Buss and Schmitt (1993) derived and tested 9 hypotheses. They devoted particular attention to their first hypothesis— one of the most discussed and controversial evolutionary psychology derived hypotheses, which argues for a genetics-based explanation for the assertion that men invest more than women in short-term sexual strategies. Buss and Schmitt derive 6 predictions from the hypothesis and find empirical support for each prediction. They also derive 3 spin-off hypotheses related to the problems men face with short-term mating strategies, and test them empirically as well.

Whereas evolutionary psychology focuses on human nature as the source of its predictions, social constructivist theories focus on social and cultural elements and traditionally reject the assertion that psychological categories, such as gender, exist apart from the context in which they occur or are studied (e.g., Hare-Mustin & Marecek, 1990).
Different scholars have suggested different sociocultural elements as explanations for our perception of gender differences in mating strategies. However, for the empirical researcher, social constructivist theories may come across as somewhat feeble, perhaps “(b)ecause social constructionism's theories tend to be abstract and its views are sometimes difficult to convey to those trained in a more positivist tradition” (Unger, 2001, p. 264). A full account of all the contextual elements highlighted in social constructivist theories is well beyond the scope of this dissertation. Instead I explore one such theory in detail.

Travis, McGinnis, and Bardari (2007) suggested, for example, that beauty has become a key factor in the control of women’s sexuality in a manner that ultimately sustains gender-based oppression. They argue (pp. 293-294):

Despite traditional notions that sexuality is based in anatomy and biology, we contend that sexuality is a socially constructed phenomenon; sexuality is negotiated between people and groups and emerges as a result of normative standards about what is both typical and desirable. The social framework of sexuality provides rules about who can be sexual and under what circumstances sexual behavior is appropriate. The social framework of sexuality even defines what counts as sex. Ultimately, individual experiences of being sexual and sexually aroused are determined, at least in part, by these socially constructed realities. Although sexuality may be experienced as a personal and highly private aspect of the self, social and political frameworks fundamentally shape the ways in which we think about and experience sexuality. These frameworks encompass norms, expectations, labels habits, customs, judgments, values, and social scripts of sexuality and sexual
behavior. Socially constructed definitions assign meanings and determine whether behaviors are seen as flirtatious, titillating, provocative, salacious, or criminal. The experience of desire and the formulation of what even constitutes sexuality have developed within a social and political context.

Most important the social framework determines who has the power to exercise choice and authority. Social constructed definitions of sexuality do not occur randomly but derive from the interests of privileged groups. Those who are in power (political, economic, and social) have the most influence in establishing the social framework and are in positions to exert more influence over its design, usually for their own comfort. The sociopolitical context in most societies has consistently advantaged men at the expense of women…

A primary mechanism used to monitor and control women’s sexuality resides in the realm of beauty. For women, sexuality is inextricably linked to physical appearance. Sexuality is distorted as ornamental and observable rather than being viewed as a quality that emanates from the context of women’s lives and relationships. Thus, the shape of a woman’s body, the size of her breasts, and the color of her hair, are all features commonly used to assess her value as a sexual being.

Ideas about sexual appeal and beauty are not benign expressions of aesthetics preference, but are symbolically constructed systems of knowing and meaning. The social construction of women’s sexuality as embedded in attractiveness constitutes a conflation between beauty and sexuality. The merger moves sexuality into the public realm, making it concrete and external, and thereby amenable to inspection, definition, social monitoring, and control. Equating physical appearance with sexuality facilitates a
pervasive and ready monitoring of whether women are adhering to an appropriate sexual identity and, most important, an appropriate social role.

By linking women’s identity to observable marker and signs that are readily available for public monitoring, comment, and sanction, the social control of women is sustained. Under the framework, women whose identities are not centered on the display of sexuality through beauty and who instead may be focused on obtaining power through educational and economic pursuits are pejoratively labeled as unfeminine, asexual, or lesbian. Women who live in poverty or who are unable to effectively pursue normative standards of beauty are viewed as lazy and even mentally ill…The social construction of women’s identity demands selflessness; healthy, good women attempt to meet the needs of others, specifically, the needs of men. A consequence of the internalization of the beauty-sexuality-identity equation is that the normative standards and expectations that are destructive for women often are unseen and unchallenged.

Travis et al. (2007) then explore the consequences of internalizing these beliefs and standards and subsequent transformation into the enforcers of these standards. Travis et al. review the effects of this internalization on women’s body manipulations (dysfunctional eating, cosmetic procedures), health (eating disorders, smoking), and sense of identity fragmentation. They conclude that as long as women strive for such an “impossible fantasy” (p. 298) they will not be able to avoid deleterious effects.

Evolutionary psychology and social constructivism therefore offer different scientific accounts for gender differences in sexuality. But the differences are not only scientific. The debate long since developed into a full-fledged ideological war. Although evolutionary
psychologists attack social constructivist theories and portray them as non-scientific and ideological (e.g., Cosmides & Tooby, 1994; Thornhill & Palmer, 2000), it is mostly the social constructivists who are on the offensive. Here are a selected few examples of such critiques.

Biological determinism (today, sociobiology and evolutionary psychology) has, throughout history, been used to reinforce oppressive gender and racial roles by giving priority to biological explanations and by claiming the influence of biology to be inevitable, universal, and eternal (Gannon, 2004, p. 442).

Biologically based science has the nice quality of disguising politics (Moore & Travis, 2000, p. 36).

How do the (evolutionary psychology's) attendant presumptions about mating strategies establish a very narrow range of erotic and aesthetic desires as both natural and universal? As anthropologists we are equipped to do more than prove this science to be flawed. We should also point to the gender and sexual politics it can enable (Orgel, Urla, & Swedlund, 2005).

*Overview of the study*: Study 1 explored how different popular representations of psychological theories affect evaluations of a minor sex offender, i.e., does social constructivism’s criticism that evolutionary psychology arguments advance an ideological worldview, withstand an empirical investigation? In this study participants were initially exposed to different scientific accounts, similar to those found in popular media articles. One of the
accounts provided an evolutionary psychology perspective explaining the origin of sex differences in employing mate selection strategies. The other account explained the same theme from a social-constructionist perspective. A third article, which did not offer information on sex differences, served as a control prime. After reading one of the three articles participants were asked to judge a man caught soliciting sexual services.

I hypothesized that participants exposed to evolutionary psychology arguments, which locate the source of men’s promiscuity and women’s chastity in their genes, will be less punitive (i.e., set a lower bail bond) towards the man who attempted to solicit sexual services compared with participants exposed to the social constructionist perspective. I also hypothesized that participants in the control condition will show a similar pattern to participants exposed to the evolutionary psychology account.

Method

Participants

One hundred and sixty nine participants (111 women, 58 men) took part in the study. The participants were between the ages of 18 and 67 (mean age= 20.96 years old). Participants received either a psychology class course credit OR $10 for their participation.

Procedure and materials

Participants were invited to take part in a study titled “Personality and Judgments” in which, they were told, we were investigating the relationship between personality dimensions, verbal aptitude, and legal judgments. They arrived at the lab and completed an informed consent
form. Following the consent procedure they completed a couple of personality measures (self-esteem- Rosenberg, 1965, Need for cognition- Epstein, 1996), which we included to support the cover story. Following the personality measures participants completed a “verbal reasoning test” in which the manipulation was embedded in the form of a reading comprehension task (appendix 1). This form of manipulation was used successfully in a previous study (Dar-Nimrod & Heine, 2006, Study 1). The first two essays that served as the manipulations claimed, respectively, that 1) women and men differ in frequency of use of long-term versus short-term sexual strategies due to the evolutionary process (Appendix 1a), and 2) women and men differ in their sexual strategies due to society’s structure (Appendix 1b); the third essay made no reference to gender-related sexual strategies (Appendix 1c- control). To complete the task participants had to answer 4 basic questions about the particular text they had read.

Following the manipulation participants performed two judicial decision tasks (bail setting). First, participants read about a 25-year old male (the “unfortunate John”) who was caught by police trying to solicit sexual services from a prostitute (Appendix 2a). Participants then set the amount of the bail bond by completing a bond assessment form in which they were instructed to set bail between $50 and $1000 (adapted from Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). To reduce suspicion regarding the repeated sexual content, participants were also asked to set bail for a young female who was caught shoplifting at the mall (Appendix 2b). This second vignette was also designed to allow us to control for participants’ general punitive tendencies.

After determining the bail amount, participants completed the Belief in Genetic Determinism Scale (BGD: Keller, 2005) to assess whether the manipulations affected participants’ general belief in the fatalistic influence of genes. Finally, demographic information
(sex, age, cultural background) was collected. Following the experiment the participants were thoroughly debriefed and probed for suspicion.

**Results**

*Data cleaning:* To ensure that the data reflected genuine responses from attentive participants I wanted to confirm that the participants read the prime. To address this concern I removed the data collected from participants whose percentage of correct answers to the questions about the essay was at or below chance level (1 correct answer or less). Nine participants (5.3%) were removed from further analyses based on such a performance.

I then attained descriptive statistics for the amount of bail that participants set for the release of the unfortunate John. The participants were given the range of $50-$1000 as a guideline for appropriate bail. Two participants set an amount outside the range ($0 and $3,000) and were therefore removed from the analysis. One participant who did not complete the bail-setting task for the shoplifter was also excluded from the main analyses. The total number of participants left for the main analyses was 157 (56 men).

*Main analyses:* A 3 (evolutionary psychology prime, social constructionist prime or control) x 2 (male or female) analysis of covariance (ANCOVA) was performed examining the amount of bail set for the unfortunate John, controlling for the amount of bail set for the shoplifter. I found that women (estimated marginal mean bail [EMM] = $396.27) set higher bail than men (EMM = $337.86), but this difference was not significant: $F(1, 150) = 2.38, p = .13, \eta_p^2 = .016$. I did find a significant main effect for the manipulation, $F(2, 150) = 4.80, p = .01, \eta_p^2 = .06$. However, these effects were qualified by a significant manipulation x gender interaction
F(2, 150) = 3.20, p = .04, \eta_p^2 = .041. To explore the interaction effect I analyzed the manipulation effect separately for the men and women in the sample.

Among the men, an ANCOVA (controlling for the amount of bail set for the shoplifter) revealed a significant effect for the manipulation F(2, 52) = 3.89, p = .03, \eta_p^2 = .130. As Figure 1 illustrates, Tukey's post-hoc comparisons on the estimated marginal means revealed that the men who read the social constructionist account set significantly higher bail than the men who read the evolutionary psychology account (p < .05) or the control essay (p < .05). The latter two conditions did not differ significantly from each other (p > .25).

Among the women, an ANCOVA (controlling for the amount of bail set for the shoplifter) revealed a significant effect for the manipulation F(2, 97) = 3.63, p = .03, \eta_p^2 = .070. As Figure 1 illustrates, Tukey's post-hoc comparisons on the estimated marginal means revealed that the women, who read the evolutionary psychology account, set significantly lower bail than the women who read the social constructionist account (p < .05) or the control essay (p < .05). The latter two conditions did not differ significantly from each other (p < .25).

**BGD:** To evaluate whether exposure to the evolutionary psychology account for sex difference in mate selection strategies affected participants’ general belief in genetic determinism, a t-test was performed comparing participants in the evolutionary psychology condition to the participants in the two other conditions. Although the participants in the evolutionary psychology condition scored higher on the BGD (M = 72.08, SD = 13.35) than the participants in the other conditions (M = 71.59, SD = 12.87), this difference was not significant, \(|t| (155) < 1."
Figure 1: Estimated marginal means and standard errors of set bail (in dollars) for the release of the unfortunate John controlling for the shoplifter bail in each condition

**Discussion**

The main result of the study indicated that participants were less punitive towards criminal sexual behavior demonstrating male sexual desire when they read an evolutionary account for gender differences in mate selection strategies than when they read a social constructivist account for the same differences; it is worth noting that, legally speaking, the offence participants were evaluating was a minor one. This result provides support for the hypothesis that thinking about gender differences in mate selection strategies from a genetic perspective generates greater leniency towards signs of male promiscuity compared with thinking of the same gender differences from a sociocultural perspective.
However, the findings also indicated a complex pattern when one compares the punishment in each of the experimental conditions to the punishment assigned by participants in the control condition. Among the men in the sample, participants who read the evolutionary account assigned a similar level of punishment as the participants who read the control, unrelated essay. The participants in both of these conditions set higher bail for the release of the culprit compared with participants who read the social constructivist account. These results suggest that men may perceive males promiscuity as having a biological/genetic origin.

Among the women, however, a different pattern emerged. Participants in the evolutionary condition posted lower bail compared with the participants in the control condition and the evolutionary condition, who were similarly punitive. These results suggest that women may perceive male promiscuity as a sociocultural outcome. Thus, the evidence regarding the deviations of genetic accounts and social accounts from unprimed accounts presents a complex pattern: both the genetic account and the social account can be perceived as the deviation.

One potential explanation for the results is that prior beliefs and attitudes play an important role. Such attitudes may indicate an underlying leaning towards biological and social explanations. With much of the social constructivist theories originating from feminist perspectives, it is perhaps unsurprising that women naturally perceive male promiscuity as having sociocultural origins. However, it is worth noting that such beliefs can be modified, and, specifically, influenced by exposure to biological accounts. Furthermore, the men in our sample are likely to have had personal experience with sexual desires of a promiscuous nature and may implicitly associate such desires with their biology. Interestingly, this association may also be malleable as the increase in the level of punishment meted out to the culprit suggests.
In Study 1 I examined people’s desire to punish a minor sexual offender after reading about sociocultural or genetic explanations for gender differences in sexual strategies. However, not all expressions of sexual promiscuity are illegal, and some expressions may be part of behaviors with which a student population is likely to be familiar at first hand. In Study 2, I used similar priming content to explore the effect of exposure to different theories on evaluations of one such behavior.
**Study 2- Mate Selection and Porn Watching**

*Overview:* Study 2 explored how similar primes to the ones used in Study 1 affect evaluations of a socially dubious but non-criminal sex-related behavior. In this study, participants overheard, supposedly unintentionally, a short speech discussing either 1) an evolutionary psychology account of sex differences in mate selection, OR 2) a social constructionist account of the same phenomenon, OR 3) dialectical response biases in questionnaires (control). After hearing one of these accounts participants completed an evaluation task involving a man who watches pornographic movies.

I hypothesized that the manipulation will affect men and women differently. I predicted that men exposed to the evolutionary psychology arguments will provide more positive evaluations of the porn watcher, as he will be perceived as “genetically programmed” towards promiscuity, compared with men exposed to a social-constructionist account. I also hypothesized that men in the control condition will provide similar evaluations of the porn watcher as men in the evolutionary psychology condition.

The prediction for the women was somewhat harder. On one hand, if porn watching is an undesirable attribute, associating it with an innate tendency towards promiscuity may reduce the belief in the person’s abilities to overcome the desire to engage in such a sexually dubious behavior, which in turn might lead to less negative attitudes towards such a person (Monterosso et al., 2006). On the other hand, the genetic perspective may also enhance the perceived differences (e.g., our genes are really different- we are made from different elements) between the female participant and the male porn watcher, and thus reduce the likelihood of positive evaluations.
Method

Participants

One hundred and eleven participants (83 women, 28 men) took part in the study. The participants were between the ages of 18 and 26 (mean age= 19.87 years old). Participants received either a psychology class course credit OR $10 for their participation.

Procedure and Materials

Participants were invited to take part in a study titled “Personality and Evaluations.” They were told that we were exploring the relationship between personality characteristics and social evaluations. An experimenter greeted participants upon arrival, apologized, and said that a previous, unrelated study was running late and the research assistant responsible for that study had to rush to class. The experimenter added that she promised the other research assistant she would release their participant when he or she completed the study. She then asked the participant to complete the consent form and personality measures (as in Study 1) at the only available table in the room. A few minutes later, a confederate walked into the room pretending to be the participant in the other experiment.

The confederate sat in the only chair available, beside the “real” participant, to be debriefed. The experimenter apologized again to both individuals for the mishap and reassured the real participant that due to the different experiments involved, there were no detrimental effects from listening to the upcoming debriefing. The experimenter then turned to the confederate and read the “debriefing”/manipulation (Appendix 3) out loud, forcing the real participant into the role of an audience. One of three different bogus debriefings, corresponding to the 3 conditions (i.e., evolutionary psychology account for gender differences in mate
selection strategies - Appendix 3a, social constructivist account for gender differences in mate
selection strategies - Appendix 3b, and control, which revolved around dialecticism among
Europeans and Chinese people - Appendix 3c), similar to those ones used in Study 1, was read
out in front of each “real” participant. Once the bogus debriefing was concluded the
experimenter released the confederate. This form of manipulation was used successfully in a
previous study (Dar-Nimrod & Heine, 2006, Study 2).

Following the fake debriefing, the experimenter asked the participants to complete a self-
description task in which they provided information about their gender, age, favorite books,
weekend activities, last rented DVD movies, etc. (Appendix 4a). Upon completion of the self-
description task, the participants received a handwritten form similar to the one that they just
completed. The form contained the alleged answers of a different participant, which indicated
that this participant was a male who, among other things, had recently rented pornographic
movies (Appendix 4b). Participants then provided their impression of the person suggested by
the form. They rated the person’s intelligence, friendliness, and similarity to themselves as well
as their desire to have him as a friend, using 7-point Likert scales. To reduce suspicion and
potentially control for basic attitudes towards strangers, participants also read an additional self-
description allegedly written by a female who did not report watching porn (Appendix 4c). The
participants also provided their impression of this second person. (All personal details except
gender and rented movies were counterbalanced to control for the potential appeal of any of the
other details.)

Once they provided their impressions, participants completed the Belief in Genetic
Determinism Scale (Keller, 2005). Finally, demographic information (sex, age, cultural
background) was collected. Following the experiment the participants were thoroughly debriefed and probed for suspicion.

**Results**

*Data cleaning:* The first 10 participants in the study received only one form to evaluate in a gender-consistent manner (i.e., women rated women and men rated men), because of an administration misunderstanding. The data from this group of participants was removed, leaving 101 (75 women) participants for the main analysis.

*Creating the dependent variable:* In order to create a single measure of the positivity of participants’ impressions of the bogus individuals they rated, I combined the 4 rating questions of each of the individuals into two composites. The composites showed acceptable internal consistency-- Cronbach $\alpha = .68$ for the man’s (i.e., the porn watcher) composite, and $\alpha = .70$ for the non-porn watcher composite. In addition, the corrected item-total correlation of each item in the composites was above $r = .30$ indicating a desirable contribution of each of the items. I therefore averaged the two sets of 4 items to create two composite measures reflecting the positivity of the participants’ evaluations of each of the bogus individuals.

*Main analyses:* A 3 (evolutionary psychology prime, social constructionist prime or control) x 2 (men or women) ANCOVA was performed examining the evaluations of the porn watcher controlling for the evaluations of the non-porn watcher. Unexpectedly, I found a marginal significant effect for gender $F(1, 94) = 2.87, p = .09, \eta_p^2 = .030$. Women (EMM = 4.00) evaluated the porn watcher somewhat more positively than men (EMM = 3.70). I did not find a main effect for the manipulation, $F(2, 94) = 1.60, p = .21, \eta_p^2 = .033$. The analysis did reveal a
significant manipulation x gender interaction $F(2, 94) = 4.02, p = .02, \eta_p^2 = .079$. To interpret the interaction effect I analyzed the manipulation effect separately for men and women.

Among men, an ANCOVA (controlling for the evaluation of the non porn watcher) revealed a significant effect for the manipulation $F(2, 22) = 4.07, p = .03 \eta_p^2 = .270$. As Figure 2 illustrates, Tukey's post-hoc comparisons on the estimated marginal means revealed that the men who were exposed to the evolutionary psychology account evaluated the porn watcher more positively than the men who were exposed to the social constructionist account ($p < .05$) or the control essay ($p < .05$). The latter two conditions did not differ significantly from each other ($p > .25$). Among women a similar ANCOVA revealed no significant effect for the manipulation, $F(2, 71) < 1$ (see Figure 2).

Figure 2: Estimated marginal means and standard errors of the evaluations of the porn watcher controlling for the evaluations of the non porn watcher*

* Higher scores represent more positive evaluations
BGD: To evaluate whether exposure to the evolutionary psychology account for gender differences in mate selection affected participants’ general belief in genetic determinism, a t-test was performed comparing participants in the evolutionary psychology condition to the participants in the two other conditions. As in Study 1, although the participants in the evolutionary psychology condition scored higher on the BGD (M = 73.03, SD = 11.15) than the participants in the other conditions (M = 72.00, SD = 12.73), this difference was not significant, $|t|(91) < 1$.

Discussion

The results from Study 2 again indicate gender differences in the effect of exposure to theories accounting for gender differences in mate selection strategies. My first hypothesis was partially supported: among the men in the sample the results indicate that participants who were exposed to the evolutionary account provided more positive evaluations of an alleged peer who admitted watching pornographic movies than participants who were exposed to a sociocultural account. However, the second hypothesis was not supported. Men in the control condition showed similar valuations as the men in the social constructivist condition rather than men in the evolutionary psychology condition. No significant differences were found among the women in the sample.

These results are somewhat inconsistent with the results of Study 1. In Study 1 the results indicated that men exposed to an evolutionary account did not differ from men in the control condition (but did differ from men in the sociocultural condition) in the amount of punishment they assigned to a minor sex offender. Study 2 found that men who were exposed to the
evolutionary account differed from men in the control condition (and men in the sociocultural condition) in their evaluation of a porn watcher. As the primes in both studies had the same content (and previously elicited similar findings - see Dar-Nimrod & Heine, 2006) it is unlikely that the manipulation methodology is responsible for the different effect. Logical elimination suggests that the difference in the men’s reactions was due to the dependent variables in the two experiments. Such a discrepancy highlights the importance of contextual factors in evaluations of sexual behaviors (White & Post, 2003).

In Study 1 participants evaluated a minor sex offender, a criminal who displayed a behavior that the participants themselves had likely not experienced. In Study 2, however, participants evaluated a porn watcher, an alleged peer (a previous participant in the experiment) who admitted to doing something that is not a crime, something that at least of few of the participating men were likely to have experienced (even though mainstream society frowns upon such behavior to some extent.) Due to their hypothesized increased first-hand experience and familiarity with porn watching, our male participants may have internalized powerful mainstream social scripts. Their reaction to the porn watcher (just like the women’s reaction to the sexual offender in the first study) may reflect that. Exposure to the evolutionary psychology account may weaken the social script effect and lead to more positive evaluations of the porn watcher.

Surprisingly, the women in the sample provided a marginally more positive evaluation of the porn watcher compared with the men (main effect), and were not significantly affected by the manipulation. This finding may reflect that modern young women are unlikely to be fazed by a young man admitting to watching porn. Alternatively, women may perceive a man who admits watching pornographic movies as an honest person (“all men do it, the honest ones admit to it”)
and reward this honesty. It may also be that the porn titles did not jump out for the women as they did for the men, such that the prime’s effect may have been somewhat reduced.

While Study 1 and Study 2 primed participants with theoretical accounts for gender differences in mate selection strategies, the battlefield of human sexuality on which social constructivism and evolutionary psychology have been clashing is not restricted to choices and preferences. For decades, feminist scholars and social constructivists have argued that rape is a non-sexual act (at least primarily), with social and cultural underpinnings (e.g., Brownmiller, 1975; Buchwald, Fletcher, & Roth, 2005; Burt, 1980; Martin, 2003). More recently, Thornhill and Palmer (2000) (drawing on earlier researchers such as Barash, 1979) have refocused explanations of rape motivation on sex, and in particular on reproductive sex. These suggestions have drawn the ire of numerous scholars (and many journalists) and reignited a furious debate. Thornhill and Palmer further recommend educating the public about the evolutionary basis of rape. In the next study I will attempt to explore the consequences of such a policy.
Study 3- Rape Accounts and Sexual Violence Evaluations

Rape represents one of the most viscerally objectionable of all human behaviors, and is therefore an exceptionally highly charged issue. It is condemned in virtually every culture, creates harsh and profound reactions among victims and their family members (e.g., Thornhill, 1996), and was recently established as a war crime by international tribunals (Kesic, 2005). Rape is also the subject of numerous theories and investigations.

Much of the scholarly attention devoted to rape falls under the aegis of the larger “nature versus nurture” debate. The increased influence of postmodernism and social constructivism in the last few decades of the 20th century brought with it a focus on the sociocultural elements that underlie rape (e.g., Brownmiller, 1975; Burt, 1980; Martin, 2003). Closely following such accounts, with the emergence of evolutionary psychology, scholars began to introduce genetic explanations for the phenomenon (e.g., Barash, 1979). This trend culminated in the publication of Thornhill and Palmer’s (2000) A Natural History of Rape: Biological Bases of Sexual Coercion.

As in social constructivist explanations of gender differences in mate selection, many sociocultural elements have been identified and theorized as contributing factors in rape. Offering a comprehensive review of this literature is beyond the scope of this dissertation. Most of these works focus on social aspects, ranging from language (Benedict, 2005), power (Brownmiller, 1975), and pornography (Dines, 2005) to religion (Adams, 2005), social scripts (Levy, 2005), and even violence in sport (Messner, 2005). The common thread in all these accounts is the location of the antecedents of rape in our social life or “rape culture” (Brownmiller, 1975; Buchwald, Fletcher, & Roth, 2005; Burt, 1980). In one such account, White
and Post (2005) suggest a multilevel model with historical and societal elements interacting with dyad and person level elements. They place the ultimate causes at the societal level (p. 394):

The model assumes that patriarchy operating at the historical/sociocultural level affects the power dynamics of all relationships. Shared patterns of ideas and beliefs passed down from generation to generation define one’s social networks. Historical and sociocultural factors create an environment in which the growing child learns rules and expectation, first in the family network, and later in peer, intimate, and work relationships. Early experiences define the context of later experiences (Huesmann and Eron 1992; Olweus 1993; White and Bondurant, 1996). Embedded in these social networks are characteristics of the personal relationships in which individuals act violently. Power dynamics become enacted in social networks and result in the internalization of gendered values, expectations, and behaviors. Thus, cultural norms governing the use of aggression as a tool of the more powerful to subdue the weaker combine with gender inequalities to create climate conducive to violence. Violence is inextricably bound to the social context of male domination and control. Rape represents an extreme behavioral manifestation on the continuum of dominance and control. The patriarchal view of society gives men a higher value than women. Patriarchy takes it for granted that men should dominate in politics, economics, and the social world including family life and interpersonal relationships. This model can be applied specifically to an understanding of rape as a particular type of violence against women.
White and Post (2003) develop their model by providing further details about the sociocultural level. They then articulate the more proximate levels: the social network level, dyadic level, situational level, and individual level. They recognize the importance of interactions among these levels and warn against accepting simplistic, single-factor explanations.

One such largely unifactorial theory is advanced by Thornhill and Palmer (2000). Focusing their attention on the ultimate causes of rape, Thornhill and Palmer offer an account based on the evolutionary history of our ancestors in the Pleistocene era. Building on Triver’s (1972) parental investment theory and additional evolutionary theories and findings that suggest that women are the selective sex and men the promiscuous one, Thornhill and Palmer offer two hypotheses for an evolutionary underpinning for rape (pp. 59-60):

There are currently only two likely candidates for the ultimate causes of human rape:

- It may be an adaptation that was directly favored by selection because it increased male reproductive success by way of increasing mate number. That is, there may be physiological mechanism designed specifically to influence males to rape in ways that would have produced a net reproductive benefit in the past. “How could rape increase reproductive success?” ask Wrangham and Peterson (1996, p. 138). “There is,” they continue, “a blindly obvious and direct possibility; By raping, the rapist may fertilize the female.” Remember, however, that identifying an effect that may have increased reproductive success in past environments is not the same as identifying the function of an adaptation.

- It may be only a by-product of other psychological adaptations, especially those that function to produce the sexual desires of males for multiple partners without
commitment. In this case, there would not be any psychological mechanism designed specifically to influence males to rape in ways that would have produced a net reproductive benefit in the past.

In their discussion of their two hypotheses, Thornhill and Palmer (2000) signal some disagreement about which hypothesis is preferred. Nevertheless, the majority of their book (8 chapters out of 12) is dedicated to the exploration of the first hypothesis: rape as a male adaptation among the human species. Thornhill and Palmer suggest that rape may have developed as a reproductive strategy for males who were unsuccessful in the “male to male” competition (the deer strategy) or in the “impressing the female” competition (the peacock strategy). By passing on their genes through rape and thus siring viable offspring, such males ensured the selection of rape as an adaptive trait. Thornhill and Palmer then derive various predictions based on the “rape as adaptation” hypothesis (e.g., regarding the desired age of a female chosen for rape, cost benefit analysis, reactions of raped females etc.) and evaluate previously collected data to test these predictions.

Many have responded to Thornhill & Palmer’s (2000) thesis with profound disdain, and media frenzy followed the publication of their book (Pozner, 2000). Their scientific methodology, underlying assumptions, and formal logic were meticulously examined and criticized (see Travis, 2003, for an edited volume containing 17 critical papers written in response to Thornhill & Palmer). Even their writing style was ridiculed (Kimmel, 2003). Their thesis was heavily condemned, not only by the feminist and social scientists whom Thornhill and Palmer strongly criticized in their book. Even evolutionary biologists sympathetic to evolutionary psychology responded negatively to the book’s scientific theory. For example, Coyne (2003) evaluated the
book as follows: “to a scientist, the scientific errors in the book are far more inflammatory than are its ideological implications.” The negative criticism of Thornhill and Palmer (2000) was not confined to the scientific merit of their work. Critics were also quick to suggest that a troubling ideological and political worldview permeated their thesis (e.g., Kimmel, 2003; Vickers & Kitcher, 2003).

Thornhill and Palmer (2000) not only offered an evolution-based theory to account for rape in humans; they also suggested that unless social policy to counter rape takes its evolutionary underpinnings into account, any interventions designed to reduce the frequency of rape will be unsuccessful. One of their main suggestions is that men must be educated (and women as well, discussed separately) about the role of evolution in their sexual desires: “Such programs might start by getting the young men to acknowledge the power of their sexual impulses and then explaining why human males have evolved to be that way” (Thornhill & Palmer, p. 179).

Study 1’s findings, in which exposure to a sociocultural explanation for gender differences in mate selection strategies resulted in the meting out of a harsher punishment to a minor sexual offender, cast doubt on the efficacy of Thornhill and Palmer’s proposed program. It has also been suggested that telling young adults about evolutionary (genetic) underpinnings for rape may in fact achieve the opposite of what Thornhill and Palmer had in mind. Many of the critiques that claim that Thornhill and Palmer suggestion may engender undesirable effect seem to hold an implicit or explicit belief that associating rape and biology increases such behavior as it reduces the perceived control men have over their sexual advancements (Coyne, 2003; Sanday, 2003; Vickers & Kitcher, 2003)
Burt (1980) argued that “rape culture,” which generates gender-role stereotyping and sexual conservatism, is also closely linked to the acceptance of rape myths, that is, false beliefs, stereotypes, or prejudices about rape, rapists, and rape victims. Because of these associations, Burt claims that people are more likely to endorse rape myths after having been desensitized to them within the rape culture. Since many of the critiques of Thornhill and Palmer’s (2000) thesis suggest that perceiving rape as a male adaptation strengthens the foundation of our society as a rape culture, it is important to examine the effect of exposure to such scientific claims on the endorsement of rape myths.

**Overview of the study:** Study 3 explored how scientific theories about rape affect evaluations of sexual aggression. It was designed to evaluate one of Thornhill and Palmer’s (2000) controversial recommendations about teaching young adults about the (theorized) evolutionary explanation for rape. In Study 3 participants were first exposed to different theoretical arguments regarding the origin of rape, and then asked to evaluate a vignette depicting a sexual assault (date rape). The study was also designed to address the relationship between exposure to rape theories and endorsement of genetically deterministic beliefs and rape myths.

I hypothesized that participants exposed to evolutionary psychology arguments, which argue for genetic roots for male sexual aggression, will view the aggressor’s behavior less negatively compared with participants exposed to social-constructionist arguments. In addition, I predicted that the less negative judgment of the behavior that was expected in the evolutionary psychology condition will be mediated by a predicted reduction in the perceived aggressor’s control over his behavior. I also explored whether such primes affect the amount of control the victim is perceived to have.
I further hypothesized that participants exposed to an evolutionary psychology explanation for rape as an adaptation will show stronger belief in genetic determinism as well as stronger endorsement of rape myths, compared with participants exposed to a sociocultural explanation for rape.

Method

Participants

One hundred and forty participants (100 women, 40 men) took part in the study. The participants were between the ages of 17 and 35 (mean age= 20.25 years old). Participants received a psychology class course credit for their participation.

Procedure and Materials

Participants arrived at the lab to take part in a study about human sexuality titled “Evaluations of Sexual Content.” Upon arrival they were told that we were investigating evaluations of a variety of sex-related content such as news articles and sexual behaviors. Following the consent procedure, participants read a bogus media article that discussed one of two arguments: 1) men commit the act of rape in order to maximize their potential for offspring, a central goal in our evolutionary history (E condition: Appendix 5a), OR 2) men commit the act of rape as a result of living in a society that perpetuates gender inequality and male dominance (S condition: Appendix 5b); there was also a third article containing no reference to gender-related sexual strategies or sexual aggression (control: Appendix 5c). The participants were asked a few evaluative questions about the article to ensure that they had read the article carefully.
Next, participants read a vignette depicting a form of date rape in which an aggressor is persisting in his sexual advances despite an explicit indication on the part of the woman that she would rather stop (Appendix 6). They then completed a questionnaire regarding the vignette. The questionnaire (Appendix 7) explored the effect of the prime (i.e., the article) on evaluations of the aggressor’s behavior. Particular focus was placed on exploring the effect of the prime on evaluations of the negativity of the behavior itself by asking participants to evaluate the aggressor’s behavior explicitly as well as the prevalence of such behavior and their willingness to remain friends with the aggressor. The questions also address punishment associated with such behavior (assign a prison term), and evaluations of the amount of control the aggressor had over his behavior (i.e., how much control the aggressor had over his behavior, how much can men control their desire for sex once aroused, how carried away do men get when aroused, how attuned to women resistance are men when they are aroused). In addition, participants were asked about the amount of control the victim was perceived to have (to explore “blame the victim” phenomenon). Finally, participants completed a questionnaire assessing attitudes about rape (The Illinois Rape Myth Acceptance Scale (IRMAS): Payne, Lonsway & Fitzgerald, 1999), the BGD (Keller, 2005), and a demographic questionnaire. Following the experiment the participants were thoroughly debriefed and probed for suspicion.

Results

Creating the dependent variables: Four composites were created capturing evaluations of the aggressor’s behavior, the aggressor’s perceived control over that behavior, and the scales used. The composite assessing the aggressor’s behavior showed somewhat less than desirable internal consistency (Cronbach $\alpha = .50$ for the 4 items that composed the evaluation of the
aggressor’s behavior). The composite assessing the aggressor’s perceived control showed acceptable internal consistency $\alpha = .76$. The scales used showed good internal consistency; the IRMAS, $\alpha = .93$ and the BGD, $\alpha = .83$.

To allow for a mediation analysis I used multiple regression analyses to test hypotheses regarding the vignette. I first dummy coded the manipulation variable to two variables contrasting each of the experimental conditions with the control condition. Table 1 summarizes the codes used for these analyses. I then created two interaction terms which were the products of each of these variables and gender (coded 1: men, -1: women).

Table 1: Codes and contrasts used to compare the conditions in the regression analyses

<table>
<thead>
<tr>
<th>Variable</th>
<th>Contrast</th>
<th>Evolutionary</th>
<th>Social</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy 1</td>
<td>Evolutionary vs. control</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dummy 2</td>
<td>Social vs. control</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Date rape vignette

Behavior evaluations: To investigate the effect of our manipulation on the evaluations of the aggressor’s behavior I conducted a regression analysis predicting the behavior evaluation composite from the dummy-coded manipulation variables, gender and the interaction effects between the dummy-coded variables and gender. The analysis indicated that these variables predicted a significant amount of variance in the behavior evaluation, $F(5, 134) = 2.46, p = .04$, $R^2 = .084$. Table 2 shows the standardized regression coefficients for each of the variables. The results show that women evaluated the aggressor’s behavior more negatively than men. Exposure to the evolutionary psychology account for rape did not significantly change evaluations of the
aggressor’s behavior compared with evaluations by participants in the control condition. The exposure to the sociocultural account, however, increased the negativity of these evaluations compared with control condition evaluations. However, the latter findings were qualified by a manipulation x gender interaction. To investigate the nature of the interaction I conducted simple slope analyses predicting behavior evaluation from the essay participants read separately for men and women (Aiken & West, 1991).

Table 2: Regression coefficients and standard errors predicting the evaluation of the aggressor’s behavior

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized regression coefficient (B)</th>
<th>Standard error</th>
<th>Standardized regression coefficient (β)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.670</td>
<td>.123</td>
<td></td>
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<tr>
<td>Gender</td>
<td>.274</td>
<td>.123</td>
<td>.291*</td>
</tr>
<tr>
<td>Dummy 1</td>
<td>-.115</td>
<td>.179</td>
<td>-.064</td>
</tr>
<tr>
<td>Dummy 2</td>
<td>-.524</td>
<td>.211</td>
<td>-.284*</td>
</tr>
<tr>
<td>Dummy 1 x Gender</td>
<td>-.063</td>
<td>.179</td>
<td>-.042</td>
</tr>
<tr>
<td>Dummy 2 x Gender</td>
<td>-.457</td>
<td>.211</td>
<td>-.275*</td>
</tr>
</tbody>
</table>

* p < .05

As Figure 3 shows, among men exposure to the sociocultural account increased the negativity of the evaluations of the aggressor’s behavior, compared with control, B = -.981, SE = .308, β = -.53, t = 3.19, p < .01. Among female participants no significant effect for the manipulation emerged, B = -.067, SE = .308, |t| < 1.
Figure 3: The effect of reading a sociocultural explanation for rape on the evaluation of a sexual aggressor

Perceived control (aggressor): To investigate the effect of our manipulation on the perceived control participants felt the aggressor had over his behavior I conducted a regression analysis predicting the perceived control composite from the dummy-coded manipulation variables, gender and the interaction effects between the dummy-coded variables and gender. The analysis indicated that these variables predicted a significant amount of variance in the behavior evaluation, $F(5, 134) = 2.53, p = .03, R^2 = .086$. Table 3 shows the standardized regression coefficients for each of the variables. The results indicate that women tended to perceive more control in the aggressor’s behavior compared with men. Exposure to the evolutionary psychology account for rape did not significantly change evaluations of the aggressor’s control over his behavior compared with evaluations by participants in the control condition. The exposure to the sociocultural account, however, tended to increase the level of perceived control compared with control condition evaluations. However, the latter tendency was qualified by a marginal significant manipulation x gender interaction. To investigate the nature of the interaction I conducted simple slope analyses predicting behavior evaluation from the essay participants read separately for men and women (Aiken & West, 1991).
Table 3: Regression coefficients and standard errors predicting the aggressor’s perceived control

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized regression coefficient (B)</th>
<th>Standard error</th>
<th>Standardized regression coefficient (β)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td>.182</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.372</td>
<td>.182</td>
<td>.266*</td>
</tr>
<tr>
<td>Dummy 1</td>
<td>.024</td>
<td>.265</td>
<td>.009</td>
</tr>
<tr>
<td>Dummy 2</td>
<td>.599</td>
<td>.313</td>
<td>.219†</td>
</tr>
<tr>
<td>Dummy 1 x Gender</td>
<td>-.093</td>
<td>.265</td>
<td>-.042</td>
</tr>
<tr>
<td>Dummy 2 x Gender</td>
<td>.587</td>
<td>.313</td>
<td>.239†</td>
</tr>
</tbody>
</table>

* < .05, †- p = .06

As Figure 4 shows, among men exposure to the sociocultural account increased the perceived control of the aggressor compared with control, \( B = 1.186, SE = .462, \beta = .43, t = 2.57, p < .05 \). Among women, no significant effect for the manipulation emerged, \( B = .012, SE = .462, |t| < 1 \).

To assess whether the aggressor’s perceived control mediated the effect of the manipulation on the evaluations of the aggressor behavior I conducted a mediation analysis. Including aggressor’s perceived control as a predictor increased the variance explained in the evaluations of the behavior from \( R^2 = .084 \) to \( R^2 = .160, \Delta F(1, 133) = 18.61, p < .001 \). The more control the aggressor was perceived to have, the more negative the evaluation of his behavior became. Regression coefficients appear in Table 4. To evaluate whether the change in behavior
evaluations among men was mediated by their evaluations of the aggressor’s control over his behavior (Baron & Kenny, 1986). I conducted a Sobel test. The results provided support for the role of perceived control as a mediator $z = 2.20, p = .03$. However, the aggressor’s perceived control did not account for the entire explained variance in the behavior evaluation. Even after controlling for perceived control the manipulation had a significant effect $B = -.70, SE = .294, \beta = -.30, t = 2.38, p < .05$ suggesting partial mediation (see Figure 5).

Figure 4: The effect of reading a sociocultural explanation for rape on the evaluation of a sexual aggressor’s perceived control*

* Higher values reflect increased perceived control
Table 4: Regression coefficients and standard errors predicting the evaluation of the aggressor’s behavior II

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized regression coefficient (B)</th>
<th>Standard error</th>
<th>Standardized regression coefficient (β)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.883</td>
<td>.216</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.186</td>
<td>.117</td>
<td>.198</td>
</tr>
<tr>
<td>Dummy 1</td>
<td>-.109</td>
<td>.168</td>
<td>-.061</td>
</tr>
<tr>
<td>Dummy 2</td>
<td>-.382</td>
<td>.201</td>
<td>-.207†</td>
</tr>
<tr>
<td>Dummy 1 x Gender</td>
<td>-.085</td>
<td>.168</td>
<td>-.056</td>
</tr>
<tr>
<td>Dummy 2 x Gender</td>
<td>-.318</td>
<td>.201</td>
<td>-.192</td>
</tr>
<tr>
<td>Perceived control</td>
<td>.236</td>
<td>.055</td>
<td>-.351***</td>
</tr>
</tbody>
</table>

**- p < .01, †- p < .1

Figure 5: Perceived control partially mediates the relationship between reading a sociocultural explanation for rape and increased negative behavioral evaluation among men*

\[
\beta = .43^{**} \\
\beta = -.35^{**} \\
\beta = -.30^{*} \\
(\beta' = -.53^{**})
\]

* Sobel test: z = 2.20, p = .03
Punishment: To investigate the effect of our manipulation on the punishment of the aggressor I conducted a regression analysis predicting the prison term assigned by participants from the dummy-coded manipulation variables, gender and the interaction effects between the dummy-coded variables and gender. The analysis indicated that these variables predicted a significant amount of variance in the assigned punishment, $F(5, 134) = 4.99$, $p < .001$, $R^2 = .163$. Table 5 shows the standardized regression coefficients for each of the variables. The results demonstrate no significant effect for gender. Exposure to the evolutionary psychology account for rape did not significantly change the assigned punishment compared with evaluations by participants in the control condition. The exposure to the sociocultural account, however, increased the length of imprisonment compared with control condition assigned punishment. However, the latter effect was qualified by a manipulation x gender interaction.

Table 5: Regression coefficients and standard errors predicting the aggressor’s punishment

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized regression coefficient (B)</th>
<th>Standard error</th>
<th>Standardized regression coefficient (β)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.813</td>
<td>.395</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.600</td>
<td>.395</td>
<td>-.194</td>
</tr>
<tr>
<td>Dummy 1</td>
<td>-.058</td>
<td>.580</td>
<td>-.010</td>
</tr>
<tr>
<td>Dummy 2</td>
<td>2.740</td>
<td>.661</td>
<td>.466***</td>
</tr>
<tr>
<td>Dummy 1 x Gender</td>
<td>.192</td>
<td>.580</td>
<td>.039</td>
</tr>
<tr>
<td>Dummy 2 x Gender</td>
<td>2.689</td>
<td>.661</td>
<td>.513***</td>
</tr>
</tbody>
</table>

***- $p < .001$
To investigate the nature of the interaction I conducted simple slope analyses predicting assigned punishment from the essay participants read separately for men and women (Aiken & West, 1991).

As Figure 6 shows, among men exposure to the sociocultural account increased the aggressor’s assigned prison term compared with control, $B = 5.43$, $SE = 1.052$, $\beta = .92$, $t = 5.16$, $p < .001$. Among women, no significant effect for the manipulation emerged, $B = .05$, $SE = 1.052$, $|t| < 1$.

Figure 6: The effect of reading a sociocultural explanation for rape on punishment of a sexual aggressor*

* Punishment is assessed as number of years in prison.

Perceived control (victim): To investigate the effect of our manipulation on the perceived control participants felt the victim had over her behavior I conducted a regression analysis predicting the victim’s perceived control item from the dummy-coded manipulation variables,
gender and the interaction effects between the dummy-coded variables and gender. The analysis indicated that these variables did not predict a significant amount of variance in the behavior evaluation, $F(5, 130) < 1$, ns. In addition, none of the predictors had a significant regression coefficient, all $p$’s > .15.

**IRMAS:** A 3 (evolutionary psychology prime, social constructionist prime or control) x 2 (men or women) analysis of variance (ANOVA) was performed examining the endorsement of rape myths as demonstrated by the score on the Illinois Rape Myth Acceptance Scale. Replicating previous research I found significant effect for gender $F(1, 134) = 8.60$, $p < .01$, $\eta^2_p = .060$. Women ($M = 2.28$, $SD = .68$) endorsed rape myths less than men ($M = 2.80$, $SD = .80$). I also found a main effect for the manipulation, $F(2, 134) = 3.64$, $p = .03$, $\eta^2_p = .052$. Tukey HSD posthoc comparisons indicated that participants who read the sociocultural account for rape ($M = 2.14$, $SD = .63$) endorsed rape myths significantly less compared with those who read the evolutionary account ($M = 2.61$, $SD = .80$) and those who read the control essay ($M = 2.50$, $SD = .73$). There was no significant difference between the latter two conditions (see Figure 7). There was no significant manipulation x gender interaction $F(2, 134) < 1$.

**BGD:** To evaluate whether exposure to the evolutionary psychology account for gender differences in mate selection affected participants’ general belief in genetic determinism, a t-test was performed comparing participants in the evolutionary psychology condition to the participants in the two other conditions. The participants in the evolutionary psychology condition scored higher on the BGD ($M = 71.39$, $SD = 12.66$) than the participants in the other conditions ($M = 65.99$, $SD = 13.62$), $t(138) = 2.30$, $p = .02$. 
Figure 7: The effect of rape explanations on acceptance of rape myths (men and women combined)*

* Higher scores represent increased acceptance of rape myths

Discussion

The results of Study 3 again show gender differences in the effect of exposure to a social constructivist account versus exposure to an evolutionary psychology account for the same phenomenon. The two main hypotheses in the study were supported among the men in the sample. The results indicate that men exposed to a sociocultural explanation of rape provided harsher evaluations of and more punishment to a sexual aggressor compared with men in the control condition; this finding provides support for the first hypothesis. The results also indicated that men in the control condition did not differ significantly from men who were exposed to an evolutionary explanation of rape; this finding provides support for the second hypothesis. In addition, the increase in the negativity of the behavior evaluations, which was found among the
men exposed to the social constructivist account, was partly mediated by perceived control of the aggressor.

The study’s two main hypotheses were not supported among women. No significant differences were found among women evaluating the sexual aggressor’s behavior, perceived control, or punishment. In addition, there was no indication of an increased tendency to “blame the victim” among either women or men, as the victim was not perceived as having more control over the situation following any of the manipulations.

The results of Study 3 also indicate that exposure to scientific theories about rape affects related individual differences measures. Exposure to a social constructivist account for rape reduced endorsement of rape myths compared with exposure to an evolutionary psychology account for rape; this finding provides support for one hypothesis. Exposure to an evolutionary account for rape did not affect endorsement of rape myths significantly, compared with unprimed participants (control); this finding provides for a second hypothesis. In addition, participants who were given an evolutionary account for rape showed a stronger belief in genetic determinism compared with other participants in the study.

Study 3 extended the findings of the previous two studies. Whereas the first two studies focused on gender differences in mate selection strategies theories, the third study did not focus on theories that discuss gender differences but instead on theories that discuss men’s behavior. Despite the differences in the content of the theories, the results of Study 3 look quite similar to the previous studies, at least among men. However, these results may be of special importance for public policy and intervention purposes.

Thornhill and Palmer (2000) proposed that young men be educated with information about the evolutionary/genetic underpinnings for rape. These researchers reasoned that following
such an intervention, men encountering their own sexual aggressive urges would now attribute these urges to their biology instead of interpreting them as non-sexual. Recognizing the “true” origin of these urges, combined with knowing about the severe punishment for acting on such urges, would supposedly create a better disincentive to rape than those currently in existence.

The results of the current study challenge Thornhill and Palmer’s (2000) proposal, and indirectly raise the important problem of suggesting policy recommendations prior to testing such recommendations empirically. The men in the current study arguably already hold an implicit belief that rape is biologically and sexually motivated, as Thornhill and Palmer (2000) suggest. Such a belief (extrapolated from the similarity between men’s reactions in the evolutionary psychology condition and the control condition) seems to lead to a less negative evaluation of behavior that can be identified as rape, partially, at least, due to an increase in the perception that the aggressor had less control over his actions. It seems unlikely that this result was what Thornhill and Palmer had in mind when they suggested their format for anti-rape education.

The current study also showed that exposure to a social constructivist account for rape decreases belief in rape myths. Given the importance of rape myths in the endorsement and/or creation of “rape culture,” it is valuable to learn that exposure to social constructivist theories of rape may be able to counteract prevalent and destructive beliefs, and contribute to dismantling of the “rape culture.” It is also interesting to note that a default endorsement of rape myths is similar to the endorsement that follows exposure to an evolutionary account for rape, suggesting that the default belief is guided by an underlying assumption in biological origins for rape.

The results of the study indicating that men who learn of a sociocultural explanation for rape are more critical of a sexual aggressor, assign him harsher punishment, and endorse rape
myths less, compared with men who are not exposed to such theories, may actually provide insight that can be incorporated into an intervention program. Indeed, the inclusion of social constructivist perspectives in educational programs targeting young men may well constitute a more effective approach than that suggested by Thornhill and Palmer (2000), assuming that the goal of any intervention is to reduce the prevalence of sexually aggressive behaviors.


**Discussion of the empirical studies**

In three studies I examined the effect of exposure to theories about human sexuality originating from an evolutionary psychology perspective or a social constructivism perspective. Across all studies I found that men who were exposed to an evolutionary psychology account provided more lenient evaluations of a young man displaying various behaviors that might be deemed promiscuous, compared with men who were exposed to a social constructivist account for the same phenomenon.

The pattern of the results was less conclusive among women. In Study 1, women who read an evolutionary psychology account for gender differences in mate selection strategies were also more lenient in their evaluation of a minor sex offender, compared to women who read a social constructivist account for the same phenomenon. In Study 2 and Study 3, however, exposure to evolutionary versus sociocultural theories about male sexual strategies and behaviors did not affect women’s evaluations of two different exemplars of male promiscuity, by and large. Therefore it is premature to draw conclusions about the effect exposure to such theories may have on women.

Both women and men displayed a stronger endorsement of rape myths following exposure to an evolutionary account for rape compared with exposure to a sociocultural account. It seems that rape myths are guided by an underlying assumption that sexual aggression springs out of biological male urges, as the unprimed participants responded more similarly to the participants in the evolutionary condition. As the endorsement of rape myths is widely accepted as reflective of an undesirable set of beliefs, it is valuable to learn that exposure to a sociocultural account may reduce such endorsements.
In Study 1 and Study 3, men who read social constructivist accounts were more punitive towards a sexual offender compared with men who were not primed (control participants). However, men who read an evolutionary psychology account showed similar punitive tendencies as their peers in the control condition. These findings suggest that men’s default perception regarding sexual offences locate the origin of such offences in biological urges that are a fundamental part of being a man. Such findings provide empirical support for claims which have long been argued among social constructivist and feminist scholars (e.g., Brownmiller, 1975; Buchwald, Fletcher, & Roth, 2005; Burt, 1980). It also provides partial support (albeit only among men) for the notion that (poorly understood) genetic and biological aspects have come to dominate lay-people’s understanding of human behaviors (Alper & Beckwith, 2002; Conrad, 1999; Dar-Nimrod, 2007; Kerr & Shakespeare, 2002; Nelkin & Lindee, 1995; Paul, 1998).

In Study 2, men evaluated a porn watcher, a fellow male who admitted to indulging in socially condemned (although not illegal under most circumstances) behavior. As in the other studies, men primed with social constructivist theory evaluated the porn watcher more negatively than men primed with evolutionary psychology theory. However, unlike the other studies, in Study 2 men who were primed with an evolutionary account, rather than those primed with a sociocultural account, differed from the participants in the control condition. In a previous section (discussion of Study 2), I suggested a potential explanation for these findings. I suggested that personal familiarity with the behavior in question (based on one’s own experience or one’s immediate environment) may increase exposure to sociocultural elements related to the behavior, and, in turn, may establish a default reaction similar to the reaction following a social constructivist account rather than an evolutionary psychology account.
In the context of human sexuality, exposure to social constructivist theories seems to reduce acceptance of socially condemned (including illegal) sexual behaviors among men. Therefore, following the suggestions of numerous scholars (e.g. Brownmiller, 1975; Buchwald, Fletcher, & Roth, 2005 (edited volume); Burt, 1980, Marin, 2003), it may be beneficial to at least include a social constructivist account of human sexuality in interventions designed to decrease unacceptable, especially aggressive, sexual behaviors among men; it may even be worth considering *basing* such interventions on social constructivist theories.

**Limitations**

The studies in this dissertation are the first to explore the effects of exposure to different theories regarding human sexuality on people’s beliefs and evaluations of others. The results provide an initial indication for the phenomenon. There are various evolutionary psychology accounts of human sexuality and many of them acknowledge sociocultural elements. It may be too inclusive to generalize the findings of the present studies to represent the effects of exposure to all evolutionary psychology accounts of human sexuality. There are also numerous social constructivist accounts for human sexuality and gender differences in this area. Placing them all into one category under the banner of “social constructivism”, as I did for practical reasons in this dissertation, may obscure important elements that are crucial in explaining the effects that were found. It may also generalize only to the evaluations that were studied—evaluations of human sexuality.

One particular limitation is that these studies only included college students as participants (Henrich, Heine, & Norenzayan, 2008). Such a population is arguably more knowledgeable with regard to scientific theories in general and evolutionary approaches in
particular on average compared with a representative sample from a North America population. This convenient sampling limits generalization of the findings. On one hand, assumed increased familiarity with scientific theories and their complexities may have attenuated the effect of the simplistic presentation of the theories resulting in a weaker effect for the primes. As Jayaratne et al. (in press) showed, uneducated people are also susceptible to making genetic attributions and to genetic essentialism. On the other hand, the findings that men have been more likely to react similarly in the control conditions as they do in the evolutionary conditions may represent increased exposure to evolutionary and genetic theories among our college students sample. This limitation also indicates the potential relevance of prior beliefs which were not explored in the current research.

Several findings were also evident in only one study and should be acknowledged as such. The role of perceived control as a mediator of increased negativity in the evolution of male sexually promiscuous behavior was only tested and found once, and may well need to be tested again. The finding that the belief in genetic determinism was affected by exposure to evolutionary theories was also only weakly supported, with mean differences in the hypothesized direction in all studies but with significant differences in one study.

The findings also showed some inconsistencies, which I have done my best to explain; however, such explanations should be tested *a priori* in new research designs. Whereas the men in the studies showed a consistent effect by providing significantly different reactions after exposure to an evolutionary psychology account compared with exposure to a social constructivist account, the women showed no such consistency. The generalization of the results to women is therefore unwarranted at this stage.
The studies indicated a mostly consistent pattern of results when it comes to men. However, the findings regarding women were inconsistent. One limitation of the studies was the focus on male perpetrators in the dependent variables. Such focus may have reduced women’s identification with the perpetrators and/or interest in the vignettes resulting in the pattern of results I have found.

As these studies provide some initial direction and tentatively support the two main hypotheses that were tested, they also show a somewhat complex pattern. Future studies are needed to address questions that these studies raised and potentially resolve some of the inconsistencies that were found.

**Future directions**

The nature versus nurture debate continues unabated in the area of human sexuality. Well formed theories as well as more dubious ones continue to attract considerable attention from the popular media. The theories to which the participants were exposed in the present studies were obviously simplified, delivered in a newspaper article format rather than an academic paper or textbook format. It may be important to discover whether exposure to less simplified versions of the theoretical accounts, perhaps using academic writing, would influence participants in the same way as the presentations they encountered in the present studies.

Future studies should also explore in greater depth those elements that may mediate the relationship between exposure to evolutionary and sociocultural theories of human sexuality and behavior evaluations. One such mediator was found in Study 3 (perceived control), and replicating this effect seems highly desirable. However, perceived control was found to only partially mediate the relationship among men. Other mediators such as changes in perceived
discreteness among social categories, populations (demographic variables such as education, income, ethnicity), and the role of personal choice seem to be other worthy candidates for investigation as possible mediators.

Personally held prior beliefs may be particularly important to explore. As the samples studied in this dissertation were taken from a student population their prior knowledge and beliefs may have been influenced by prior exposure to scientific theories. Future studies may incorporate a longitudinal design in which prior beliefs (as well as confidence in them) will be assessed some time before the experimental manipulation. Such design allows for assessment of the importance of prior held beliefs. One may also want to include a third part that will take place some time after the experimental session (i.e., exposure to scientific theories) to assess the longer term effects of such exposure. The longitudinal design will allow the amalgamation of the correlation-based research with the experimental one.

The role of the social context and personal experiences relating to the dependent variable should also be explored. These elements were offered as potential explanations for the findings in Study 2, but they should be directly tested before their effect can be truly assessed.

As genetic theories in general and evolutionary based perspectives in particular are at the cutting edge of today’s science and are figured to stay there for the foreseen future, it is important to explore the ways in which one can avoid undesirable effects of exposure to such theories. It may be as simple as alerting people to the phenomenon or offering a disclaimer of sort or it may be as convoluted as offering a fine grained explanations that demonstrate the sensitivity to the situation of even strong genetically influenced characteristics (e.g., height is influenced by genes but also by nutrition as well as surgical interventions). Such research is of
the highest importance with the flux in the amount of the simplistic genetic information that the public is exposed to.

Conclusions

The three empirical studies in this dissertation indicate that men (and arguably women under certain conditions) are affected differently by exposure to genetic (evolutionary) versus sociocultural (social constructivist) theories about human sexuality. It also seems that men’s default attitudes are based on the assumption that behaviors that may be deemed indicators of promiscuous tendencies originate from their genes/biology. Such attitudes tend to produce undesirable effects, including greater leniency towards illegal sexual behaviors and sexual coercion, and stronger endorsement of rape myths. These findings may be helpful in the creation of educational programs designed to combat such destructive attitudes.
GENERAL DISCUSSION: THE LARGER PICTURE

People are motivated to make sense of the world they perceive. One of the most important challenges they face relates to the social world in which they observe a wide variety of human abilities, attitudes, beliefs, and behaviors. While the pendulum continues to swing between nativist and environmentalist explanations (and one might add free will as a third component) for perceived heterogeneity, recent indications suggest that nativist perceptions are gaining the advantage in contemporary Western societies, bringing with them a variety of social and individual concerns. Recently, psychological researchers have begun to address these issues.

Across diverse social categories, one finds evidence for causal relationships between genetic attributions explaining group differences on the one hand, and group perceptions, attitudes towards groups, and even behaviors on the other. The novel empirical studies in this dissertation also show that evaluations of specific individuals within the group are affected by such attributions. While some of these attributions are associated with a reduction in prejudice (e.g., towards sexual orientation) or increased leniency (towards males displaying dubious sexual behaviors) most of them are associated with increased prejudice and stereotyping (e.g., towards race, ethnicity, and gender). The common theme among these attributions is that they go beyond scientific evidence, endowing the gene with an almost mystical ability to shape individuals and group characteristics, and to decrease the perceived power of sociocultural and environmental elements as well as individual choice in shaping human behavior.

The potential implications of the use of genetic attributions to account for perceived differences between social categories are mostly negative and historically alarming. Eugenic ideology thrives when such attributions are present and has been implicated in widespread policies, ranging from restrictions on marriage and immigration to sterilization and extermination.
as recently as a few decades ago (Black, 2003; Kevles, 1985; Paul, 1998). Although the current political climate appears unfavorable to such widespread practices, policy makers are nevertheless attuned to scientific suggestions that emphasize genetic underpinnings for group differences. An indicator of such political attention can be observed in American congressional reviews of research that (at least partly) attributes perceived racial differences in intelligence to genetic factors (Alper & Beckwith, 2002). In addition, one must remember that political climates are dynamic, and the current emphasis on the individual may be short-lived.

Behavioral genetic research seems to be on the increase and promises to keep the nature versus nurture debate in the public eye. In addition, the evolutionary psychology framework, whose research served a main role in the empirical section, continues to gain traction within the scientific community with some of the most ingenious designs and carefully derived research hypotheses. It is also one of the more appealing research topics covered by journalists as it make an immediate connection from human nature to how we think and act. One cannot predict what findings the research that is conducted under these theoretical frameworks will uncover, and it is not unthinkable that some value-laden differences (stereotypical or novel) associated with social categories such as gender or race will be found to have genetic underpinnings. In this dissertation I have demonstrated that such attributions affect inter-group and interpersonal perceptions and behaviors. The question is, what are the elements which increase deterministic (and most often erroneous) genetic attributions?

Multiple factors contribute to genetic essentialism. Conrad and his colleagues (Conrad, 1997, 1999, 2002; Conrad & Gabe, 1999; Conrad & Markens, 2001) have emphasized the role of mass media in the amplification of such perspectives. Public and journalistic fascination with genetic attributions for social groupings is evident in the frequency with which such reports
appear in mainstream media outlets (Nelkin & Lindee, 1995). To illustrate this fascination let's take a look at books that received special attention from arguably the most influential books review source in America today, the *New York Times*, during a single year. Out of all the books published in 1994, the Annual Most Notable Books List included not only a book on the genetic underpinnings of sexual orientation (Hamer & Copland, 1994) but also one on racial differences in intelligence (Herrnstein & Murray, 1994) (Notable Books of the Year, 1994). Even more, that year there were only two popular science books highlighted by the editors in their annual review. Both these books, Steven Pinker’s *The Language Instinct* and Robert Wright’s *The Moral Animal*, were based in an evolutionary psychology paradigm (Editors’ choice 1994, 1994). In addition, a single memoir was also recommended by the editors, E. O. Wilson’s *Naturalist*, which depicts Sociobiology and one of its central figures, in a very favorable light (Editors choice 1994). It is an important sign regarding the wide acceptance of genetic explanations for human behaviors and beliefs not to mentioned social categorizations if the *New York Times*, often considered one of the liberalism strongholds, shows such favorable attitudes towards these perspectives. It may be of particular importance in light of Brescoll and LaFrance’s (2004) findings. In Study 1 they showed an association between the political orientation of media outlets and their endorsement of biological explanations for gender differences. Brescoll and LaFrance also showed that media portrayals that explain gender differences using genetic attributions increase gender stereotyping, whereas sociocultural attributions increase the perception that people can change (Study 3).

Conrad (1997) examined in greater detail how the mass media contributes to genetic determinism. For example, coverage of research findings (often initial and tentative) that portray genes as a cause (frequently the main or sole cause) of diseases, abilities, and behaviors is much
more substantial compared with coverage of (later) disconfirmations or retractions. Conrad (1997) reviewed the case of the gene for alcoholism, which was covered extensively by multiple media outlets following the publication of an article that suggested a specific gene was a potential contributor to alcoholism. Data collected from several major newspapers and popular magazines revealed that the subsequent disconfirmation of the original study received far less exposure, appearing in only a subset of the sources that had previously covered the topic extensively. When it did appear, the disconfirmation received minimal coverage and was featured in less prominent places. A similar pattern has been observed in the media coverage of other genetic research (Conrad 1997, 2002). The systematic discrepancy in exposure to genetic discoveries versus exposure to their disconfirmations potentially leads to an inflated view of genes as the primary causes of a variety of human phenomena.

Conrad (1997, 2002) has claimed that the media consistently provides an overly simplified picture of genetic research. Conrad called this the OGOD (one gene, one disease) concept, and suggested that this concept assumes a one-to-one deterministic relationship between a specific gene and a specific disease or trait. Although such relationships may exist, (e.g., in Huntington’s disease [but see Kitcher, 1996, for insightful arguments that undermine the deterministic view even in this case], Cystic Fibrosis, or Tay Sachs), these represent a tiny minority of genetic involvement in diseases. In terms of explaining psychological traits or other complex human phenomena, such relationships are as real as a pink unicorn. OGOD portrayals ground human conditions in poorly understood entities which, due to their materialistic nature, may allow people to assume there is an easy fix for such conditions: genetically determined problems might be resolved with a mere sweep of the nano-scalpel. Conrad (2002) identified
such underlying “genetic optimism” (p.73) in many media reports on genetic research, and even in reports on subsequent research disconfirmations.

The OGOD phenomenon is nowhere more evident than in the titles of media reports. By and large, the media is made up of for-profit organizations whose job is to sell information (and often perspectives) in a marketable package. To draw customers in, the first step is to make the report as appealing as possible, and one way of doing that is to use provocative titles. The use of catchy phrases and sound-bites is common practice in genetic reports (Conrad 1997, 2002; Nelkin & Lindee, 1995). Titles proclaiming that researchers have found a “gay gene” or an “evolution gene,” or, worse still, that they have found THE “gay gene” or THE “evolution gene,” provide, at best, a grossly simplified version of the original scientific reports, or, at worst, a complete misrepresentation of the evidence (no “gay gene” was ever identified.) Many people receive much, if not all, of their information from the titles of media reports, because only a small percentage of people read the entire newspaper. Such titles may contribute to a deterministic perception of genes, although more research is needed to address this proposition empirically.

The media’s problematic portrayals are not confined to the area of genetics – for example, Conrad (2002) has drawn parallels between some of the biases that characterize both genetic reports and crime reports. However, the evidence suggests that, particularly in the case of genetics, the related consequences of media distortions may be downright harmful (Brescoll & LaFrance, 2004; Dar-Nimrod & Heine, 2006; Eccles & Jacobs, 1986; Keller, 2005).

Yet the media may be only one of the agents reinforcing genetic essentialism. Indeed, one need not look beyond the academic realm to discover our own contributions to the problem. Such contributions come not only from those who specifically attribute value-laden group differences
to genes (e.g., Herrnstein & Murray, 1994; Jensen, 1969, 1994; Rushton & Jensen, 2005) but also from more mainstream scientists.

The language and metaphors used by many scientists, especially in popular writings, seem to evoke genetic essentialism in much the same way as the language and metaphors used by science journalists. Scores of examples may be found in the writings of prominent nineteenth- and early twentieth-century scientists such as Galton (1869), Burbank (1907), and David Starr Jordan (1915), among others. However, metaphors and language that evoke essentialism are also used by contemporary scientists who are not associated with eugenic ideology.

Certain linguistic usages seem to convey genetic essentialism, at least to the lay person. First, the OGOD phenomenon described above is not exclusive to media reporting. For example, in a book about his research into the genetic underpinnings of homosexuality (Hamer & Copland, 1994), Dean Hamer, the researcher who identified a potential genetic marker involved in male homosexuality, makes multiple mentions of the “gay gene,” despite the lack of any evidence for such a gene. Other researchers, competing for the attention of science reporters, have teamed up with their institutions’ PR staff to produce reports that share some of the simplification and consequent shortcomings found in media reports. Press releases based on initial, limited studies still make strong propositions despite a genetic research track record riddled with disconfirmations. This strategy of deliberately “over-claiming” is evident among prominent scientists and institutions. For example, the title of a recent press release originating from Harvard University asserted “Key Gene Discovered for Obesity and Diabetes” (Harvard School of Public Health, 2002; see Conrad 1997, 2002; Conrad & Gabe, 1999 for other examples).

The use of OGOD by scientists may reflect an unfortunate linguistic shorthand that has already become commonplace. Kitcher (1996) discussed the origin of the tradition of labeling a
gene according to the phenotype mutation associated with it. He traced this tradition back to Thomas Morgan, who used such shorthand to dub the mutant gene which he discovered to be responsible for white eyes in fruit flies. The tradition of naming genes based on their less frequent mutant alleles, which have been associated with phenotype, has endured and is still evident in the names assigned to many genes. For example, the first gene to be associated with hereditary breast cancer was termed BRCA1 (Breast cancer 1), and a family of genes that have been linked to food consumption are known as aho (abnormal hunger orientation) genes. This form of shorthand may not adversely affect professional biologists and/or geneticists, who are well aware of the interactive nature of genes and environment (Kitcher, 1996). However, when scientists use such shorthand to communicate their findings to the public at large, members of the public, who do not share the deeper understanding of nature-nurture interactions, may take the shorthand to mean that a gene causes a particular condition. The reality in the overwhelming number of such cases is that the gene may reflect a higher probability that the carrier will show the related condition (unless the research was disconfirmed). In the case of BRCA1, for example, it is estimated that the mutant allele is involved in about 5% of breast cancer cases (Conrad, 2002), but its name fails to reflect this limited involvement to an uninformed reader.

A second common essentialism-evoking theme, which often appears in scientific discussions of genetics, is the use of essence-based metaphors to describe the human genome. The Human Genome Project (HGP) has been described as the search for the “essence of life” (Coyne, 1995. p. 80), the “Holy Grail” that would enable the understanding of humanity (Morse, 1998, p. 219), the “book of life” (Pennisi, 2000, p. 2304), etc. All these depictions make explicit reference to the genome as a sort of recipe that defines humans and shapes their entire array of characteristics. The scientists who uttered these metaphors were some of the most prominent in
recent years, among them Nobel prize winners like James Watson, who stated that “our fate is, in large measure, in our genes” (cited in Jarof, 1989), and Francis Crick, with whose quotation this dissertation began.

A third common essentialism-provoking theme that I have identified in scientific discussions of genetics affords the genes a form of agency that may contribute to a mystical view of them as entities that strip the person of his or her will, and instead locate that will in sequences of deoxyribonucleic acid. Genes are described as “selfish” or puppet masters (Dawkins, 1976) or assigned conscious desires: the opening paragraph of Burt and Trivers’s (2006) book, *Genes in Conflict: The Biology of Selfish Genetic Elements*, contains more than 10 such explicit assertions (e.g., “genes want…”). Used as a kind of poetic shorthand, this is no different than saying “the mountain was angry that day” or “the bamboo wisely bent during the storm.” However, the use of such terminology when discussing genes evokes a misleading image of entities with needs and desires, and influences popular perceptions accordingly. More importantly, such discourse relocates the locus of perceived consciousness and control, taking it away from the individual and projecting it onto the gene. This phenomenon, evident among nativists and environmentalists alike (Ridley, 2003), contributes to essentialist expressions in public discourse about genetics.

Language plays a significant role in the way we think (e.g., Brown and Levinson, 1993; Lee, 1996; Roberson, Davies, & Davidoff, 2002). The enduring essentialist framing of information regarding gene-phenotype associations may play a key role in facilitating genetic determinism. To date, this role has not been empirically studied. Such research is needed, since the “gene of the week” phenomenon shows no signs of abating. This phenomenon is perhaps most disconcerting when it relates to behavioral genetics.
Genetic determinism and genetic attributions certainly seem to be connected, but holding deterministic views about genes does not necessarily lead to genetic attributions per se. One may believe that if genes for aggression are discovered, then the people who carry those genes will display more aggression even though they don’t believe genes for aggression actually exist (consider the woman mentioned above, who interpreted the lack of homosexuality among all her siblings except one as indicating the non-existence of a gene for homosexuality.) Conversely, one may believe there are genes that make people more prone to aggression but also deem that such tendencies can be overcome. This perspective is evident in Steven Pinker’s comic assertion that “(i)f my genes don’t like it they can jump in the lake” (cited in Ridley, 2003, p. 279). Thus, the study of genetic attributions can benefit from research that delves into areas beyond genetic essentialism.

Genetic attributions may also feed off identified cognitive heuristics. The correspondence bias (Gilbert & Jones, 1986) seems a likely candidate for the role of strengthening such attributions. Correspondence bias is the tendency to identify the source of an actor’s behavior in the actor’s disposition rather than the particular situation (e.g., Gilbert & Jones, 1986; Gilbert & Malone, 1995). Although no previous researchers, to my knowledge, have discussed genetic attributions in the context of the correspondence bias, the emphasis on the role of internal, dispositional attributions that is common to both constructs provides an initial justification for investigating the nature of the relationship between the two. To explore such a relationship one may borrow and adapt experimental manipulations from existing correspondence bias research. One may, for example, provide participants with situational information that is congruent, neural, or incongruent with suggested genetic predispositions, and evaluate the potency of the different types of information to influence behavioral predictions (Ross & Nisbett, 1991). One could then
compare the results with other conditions, in which alternative dispositional information (that can be portrayed as a result of socialization, for example), to explore the underlying representation of the dispositional characteristics that are captured by the correspondence bias.

As discussed, current perceptions of the roles of genes are contaminated by essentialist thinking. In addition, future discoveries may uncover genetic underpinnings for group difference(s). In future, researchers may want to focus on moderating variables, as well as developing educational interventions to counter undesirable associated outcomes.

Keller’s (2005) identification of the moderating role of the belief in genetic determinism is a step in this direction. Such beliefs do not appear in a vacuum (potential contributors were previously discussed). Intervention programs that set out to reduce genetic determinism may focus on the interactive relationships between genes and the environment. Examining prevalent myths such as the existence of genes for criminality may be particularly useful. For example, disseminating Caspi et al.’s (2002) findings that people who possess specific alleles for the MAOA gene are more likely to commit a violent crime, but only when they have been exposed to maltreatment during childhood, may highlight the nondeterministic nature of genes and reinforce a balancing emphasis on environmental influence. Many other potential candidates for such educational interventions are available (for a selective list, see Ridley, 2003).

Interventions of this kind are probably most appropriate during science classes in middle and/or high school, when students’ cognitive abilities are sufficiently developed to allow them to assimilate complex messages, the tendency of young children to show strong nativist attributions is already reduced (Gelman, 2003), and the adult form of genetic determinism has yet to set in. This is also the time at which the vast majority of future generations are most likely to be exposed to such information (outside of extra-curricular interventions).
Research into IPT and essentialism can also show us ways to reduce negative outcomes. For example, Haslam and Levy (2007) found that the structure of essentialist beliefs is different for homosexuality (see also Hegarty & Pratto, 2001), compared with race and gender. While the perceived discreteness, i.e., the notion that a category has clear boundaries that exclude any middle ground, was associated with genetic attributions for most social categories such as race, ethnicity, and gender, it showed no association with genetic attributions (Haslam & Levy, 2007, Study 3) or even negative association (Study 1) for evaluations of homosexuality. It should be noted that while genetic attributions were associated with positive attitudes for homosexuality, discreetness was associated with negative ones. Whereas future research may find genetic underpinnings that follow existing social categories, the role of discreetness as a potential moderator for negative outcomes may constitute one route for interventions. Focusing on the overwhelming genetic similarities between groups may also reduce perceptions of discreetness and negative attitudes.

Genetics research and within it evolutionary sciences (i.e., anthropology, biology, and psychology) promise intriguing new findings. On the one hand, such findings may contribute to an increased quality of life in a wide variety of ways, from improving food production (genetically modified foods) to improving health (although genetic research in this field has yet to live up to expectations with regard to cures for genetically transmitted diseases.) On the other hand, new genetic discoveries may also strengthen genetic deterministic cognitions, further reduce belief in the importance of the environment in shaping human behavior, and decrease perceived individual choice. This dissertation has explored some of the themes related to genetic attributions, added an empirical facet that investigated the effects of exposure to evolutionary psychology and social constructivist theories, and pointed out some areas where further research
is needed. Although the scientific importance of genetic research is beyond dispute, taking steps to ensure a reduction in the undesirable cognitions and behaviors that have so far dogged the study of genetics will go a long way towards fulfilling the great promise encompassed in such research.
References


Appendices
Appendix 1- Verbal ability test

Sample Questions

Verbal Section

Directions: Each of the following questions begins with a sentence that has either one or two blanks. The blanks indicate that a piece of the sentence is missing. Each sentence is followed by five answer choices that consist of words or phrases. Select the answer choice that completes the sentence best.

1. Considering everything she had been through, her reaction was quite normal and even __________; I was therefore surprised at the number of __________ comments and raised eyebrows that her response elicited.

   a. commendable...complimentary  
   b. odious...insulting  
   c. apologetic...conciliatory  
   d. commonplace...typical  
   e. laudable...derogatory

Directions: Each of the following questions consists of a pair of words or phrases that are separated by a colon and followed by five answer choices. Choose the pair of words or phrases in the answer choices that are most similar to the original pair.

1. PARAPHASE : VERBATIM ::
   a. approximation : precise
   b. description : vivid
   c. quotation : apt
   d. interpretation : valid
   e. significance : uncertain
Verbal Reasoning
Time—15 minutes  16 questions

Each of Questions has five answer choices. For each of these questions, select the best answer choice given.

Directions: Each of the following questions begins with a sentence that has either one or two blanks. The blanks indicate that a piece of the sentence is missing. Each sentence is followed by five answer choices that consist of words or phrases. Select the answer choice that completes the sentence best.

1. The fundamental ___________ between dogs and cats is for the most part a myth; members of these species often coexist ___________.
   a. antipathy…amiably
   b. disharmony…uneasily
   c. compatibility…together
   d. relationship…peacefully
   e. difference…placidly

2. His desire to state his case completely was certainly reasonable; however, his lengthy technical explanations were monotonous and tended to ________ rather than ________ the jury.
   a. enlighten…inform
   b. interest…persuade
   c. provoke…influence
   d. allay…pacify
   e. bore…convince

3. In some countries, government restrictions are so ________ that businesses operate with nearly complete impunity.
   a. traditional
   b. judicious
   c. ambiguous
   d. exacting
   e. lax

4. The recent Oxford edition of the works of Shakespeare is _________ because it not only departs frequently from the readings of most other modern editions, but also challenges many of the basic ________ of textual criticism.
   a. controversial…conventions
   b. typical…innovations
c. inadequate…norms

d. curious…projects

e. pretentious…explanations

5. The early form of writing known as Linear B was _________ in 1952, but no one has yet succeeded in the _________ of the still more ancient Linear A.

a. superseded…explanation

b. encoded…transcription

c. obliterated…analysis

d. deciphered…interpretation

e. discovered…obfuscation

Directions: After reading this passage, you will find a series of questions. Select the best choice for each question. Answers are based on the contents of the passage or what the author implies in the passage.

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Manipulation inserted here

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Directions: Each of the following questions consists of a pair of words or phrases that are separated by a colon and followed by five answer choices. Choose the pair of words or phrases in the answer choices that are most similar to the original pair.

1. NOVEL : BOOK ::
   a. epic : poem
   b. house : library
   c. tale : fable
   d. number : page
   e. play : theatre

2. HUNGRY : RAVENOUS ::
   a. thirsty : desirous
   b. large : titanic
   c. famous : eminent
   d. dizzy : disoriented
   e. obese : gluttonous
3. BOUQUET : FLOWER ::
   a. humidor : tobacco
   b. mosaic : tile
   c. tapestry : colour
   d. pile : block
   e. sacristy : vestment

Directions: After reading this passage, you will find a series of questions. Select the best choice for each question. Answers are based on the contents of the passage or what the author implies in the passage.

The Boston Chronicle. com

Not Science Fiction: An Elevator to Space

By KENNETH CHANG

SANTA FE, N.M. — With advances toward ultrastrong fibers, the concept of building an elevator 60,000 miles high to carry cargo into space is moving from the realm of science fiction to the fringes of reality.

This month, the Los Alamos National Laboratory was a sponsor of a conference to ponder the concept. Yet, the keynote address was by a titan of science fiction, Arthur C. Clarke, speaking via satellite from his home in Sri Lanka. "I'm happy that people are taking it more and more seriously," said Mr. Clarke, whose novel "The Fountains of Paradise" (1978) revolved around such a space elevator.

The discovery in 1991 of nanotubes, cylindrical molecules of carbon with many times the strength of steel, turned the idea from a fantastical impossibility to an intriguing possibility that could be realized in as little as a decade or two.

Proponents say the economic and technological advantages of a space elevator over rockets make it inevitable. They predict it will lower the cost of putting a satellite into space from $10,000 a pound to $100.

"As soon as we can build it, we should build it," said Dr. Bryan E. Laubscher, a scientist at Los Alamos who organized the conference. Just as the transcontinental railroad opened the West in the late 1800's, "I feel the space elevator is going to be such a paradigm shift in space access," Dr. Laubscher said.

"The first thought is, Is this really going to work?" said Dr. Steven E. Patamia, a researcher at Los Alamos, who was enlisted into performing space elevator calculations a week before the conference. "When you get into it, it begins to make sense. There are a good number of technical issues. They are probably all `overcomeable.' "
The original idea of a space elevator is more than a century old. In 1895, Konstantin E.
Tsiolkovsky, a Russian visionary who devised workable ideas for rocket propulsion and space
travel decades before others, proposed a tower thousands of miles high attached to a "celestial
castle" in orbit around Earth, with the centrifugal force of the orbiting castle holding up the tower.
(Imagine swinging a rope with a rock tied to the end of it.)

But the idea was fundamentally impossible to build. Steel, then the strongest material known,
was too heavy and not strong enough to support that weight.

Other scientists periodically revisited and reinvented Tsiolkovsky's idea, inspiring science fiction
writers like Mr. Clarke.

Nanotubes spurred NASA to take a more serious look in 1999. A team of scientists envisioned
huge cables of nanotubes and magnetically levitated cars traveling up and down. The structure
would be so large that it would require grabbing an asteroid and dragging it into Earth orbit to act
as the counterweight for holding up the elevator.

To avoid weather, especially lightning, the NASA scientists envisioned the base station as a
tower at least 10 miles high.

"We came out of that workshop saying the space elevator is 50 years away," said David V.
Smitherman of the Marshall Space Flight Center, who led the study.

Dr. Edwards simplified the NASA idea to what he calls "the Wright brothers' version," a single
ribbon about three feet wide and thinner than a piece of paper, stretching 60,000 miles from
Earth's surface.

1. What is the main argument of this article?

A) Space travel is cool
B) Ideas from science fiction novels are ingenious
C) Any structure is possible as long as the strongest materials are used
D) Space elevators are possible future forms of transportation
E) Technology will take humans to a new level

2. According to the article, what is an advantage of space elevators?

A) More satellites would be used
B) Anyone can travel in space
C) Astronauts don't need to train as hard
D) Space exploration would be cheap
E) Scientists will have more to explore

3. Why was Tsiolkovsky’s space elevator not built in 1895?
A) It would take too long to build
B) Interest in space travel was low
C) The idea was too farfetched
D) There was no funding for the project
E) Building materials were not suitable for the project

4. Why did NASA become more interested in the space elevator project?
A) NASA is interested in anything to do with space travel
B) A way of counter balancing the elevator is discovered
C) Americans want to dominate space travel
D) Materials needed to build such a structure has been discovered
E) NASA’s own scientists came up with the idea of space elevators

Appendix 1a: Evolutionary Psychology Manipulation

TheBostonChronicle. com

Sex differences in partner selection- Researchers find the reasons in our genes.

By DR. ERIC A. GOODEY

Bond, James Bond. The silhouette of the mega-spy approaches the shapely, young blonde woman encountering little resistance. An hour later the satisfied Bond leaves the lady in bed while embracing himself for yet another adventure. On a nearby set a mutant-looking hulk, armed with a chainsaw, is approaching an ill-hidden terrified group of teenagers. Knowing they have been discovered, the three youngsters are making a run for it. Inevitably one of them is being caught and blood springs all over the lens in a close-up festivity of screams and gore. But which one was it? Was it Greg, the popular, handsome jock? Or maybe Iris, the long legged yet shy, honour student? Or perhaps it was Jen, the promiscuous girl who had flirted with all the attractive guys in her class? The answer is well entrenched in decades of formula-based horror flicks. Sorry Jen, your time is up.

This formula does not seem to be exclusively owned by Hollywood by no means. While men’s ability to instigate sexual relationships on will often commence respect and admiration, women’s parallel talent (which seems to be less of an accomplishment) is bound to be condemned. Recently, a group of researchers, building upon 40 years of accumulated survey and experimental data, offered one of the most appealing underlying governing theories that explain the Hollywood formula, our society governing sexually-related morals and probably even your high school experience. They have traced the evolution of
such sex-roles back to our ancestors who lived and procreated many thousands of years ago. Due to space consideration we are not able to provide a full account of all the complexities and nuances of the theory, allowing the reader to further explore the depth of the research in the book “Evolutionary psychology of mate selection” by Dennis Rubb.

The current theory explains the differences between men and women choosiness based on our evolutionary history. Biologically men are able to inseminate numerous women during their life time. Women on the other hand are much more limited in their procreative ability because they have to carry the unborn fetus during 9 month of pregnancy followed by a period of breast-feeding, which may take up to several years (in many tribal societies women breast-feed for almost 4 years). The difference between men and women in the minimum investment in a child is called differential parental investment.

Following Darwin’s evolutionary theory passing ones genes to the next generation is the ultimate (yet non-conscious) goal of an organism. The best procreation strategy therefore is not surprisingly very different between men and women. Biologically speaking men would be most successful in passing more of their genes to the next generation by mating with as many women as they can, minimizing their investment in any individual woman. The law of large numbers favours their chances and their share in the next generation gene pool. Women, on the other hand, are heavily invested in each child. Historically they need the provision and protection of a man during the vulnerable time of child rearing in which the child is completely dependent. Women therefore, should be more selective in their choice of partners, searching for those who would stick around and contribute (resources, protection) to the development of the child.

The outcome of this evolutionary pressure is well documented in numerous surveys, according to researchers. These findings consistently show that men have a much stronger preference for multiple sex partners compared with women. It is also strengthened by similarly common findings that women are attracted more to men’s status and resources (increasing child’s survival chances), while men are attracted more to women’s physical appearance and age (historical signs for fertility). According to one researcher “it would be highly improbable for such reproduction pressures to consist for practically the entire human species history without strongly shaping our gene pool to reflect the advantageous strategies. It is very natural then that men are actively seeking more sex with more partners while women are naturally choosier in their sexual choices”.

So next time you find yourself observing a man serially “checking out” all the attractive women in a club in a non-discriminating manner, while the women return a disinterested frown you may well be watching our genes in action.

1. What is the main argument of this article?

A) Males have a greater desire for multiple sexual partners due to their genetic make-up
B) Females have a greater desire for multiple sexual partners due to their genetic make-up
C) The society constructs sexual strategies that reflect basic inequalities
D) Females only purpose in sex is to achieve status
E) Males and females are similar in their sexual choices
2. What is the proposed mechanism which facilitates the sexual strategies?

A) Society’s power structure that is allowing different standards for men and women
B) Men have stronger sexual drive
C) Different reproductive advantages for males and females shaped the gene pool through evolution
D) The history of human kind that shaped our thoughts
E) Women’s desire to be taken care of

3. According to the article, a major source of people’s level of promiscuity comes from

A) their morality
B) society’s indoctrination
C) laws and norms
D) the brain
E) their genes

4. According to this article, the findings that men are trying harder to initiate sexual relations

A) demonstrates their insensitivity
B) is reciprocated by women
C) demonstrates a logical evolutionary strategy
D) can not be changed
E) reflects society’s inequalities

Appendix 1b: Social Constructivist Manipulation

The BostonChronicle.com

Sex differences in partner selection- Researchers found the reasons in our culture.

By DR. ERIC A. GOODEY

Bond, James Bond. The silhouette of the mega-spy approaches the shapely, young blonde woman encountering little resistance. An hour later the satisfied Bond leaves the lady in bed while embracing
himself for yet another adventure. On a nearby set a mutant-looking hulk, armed with a chainsaw, is approaching an ill-hidden terrified group of teenagers. Knowing they have been discovered, the three youngsters are making a run for it. Inevitably one of them is being caught and blood springs all over the lens in a close-up festivity of screams and gore. But which one was it? Was it Greg, the popular, handsome jock? Or maybe Iris, the long legged yet shy, honor student? Or perhaps it was Jen, the promiscuous girl who had flirted with all the attractive guys in her class? The answer is well entrenched in decades of formula-based horror flicks. Sorry Jen, your time is up.

This formula does not seem to be exclusively owned by Hollywood by no means. While men’s ability to instigate sexual relationships on will often commence respect and admiration, women’s parallel talent (which seems to be less of an accomplishment) is bound to be condemned. Recently, a group of researchers, building upon 40 years of accumulated survey and experimental data, offered one of the most appealing underlying governing theories that explain the Hollywood formula, our society governing sexually-related morals and probably even your high school experience. They have shown the strong ties between the society sexual equality and individuals’ endorsement of the sexual double standards. Due to space consideration we are not able to provide a full account of all the complexities and nuances of the theory, allowing the reader to further explore the depth of the research in the book “Gender equality and evaluations of women’s promiscuity” by Dennis Rubb.

The current theory explains the differences between men and women choosiness based on our unequal society structure. In contemporary American society, as in most world societies, women have less power and status than men. Although most women in the United States are employed in the paid workforce, they have lower wages than men and are hardly represented at the highest levels of organizations.

The differing distributions of men and women into social roles form the basis for the social structural theory of sex differences. According to the theory the greater power and status tends to be associated with male-dominated roles: Men are used to roles with greater power and status which produce more dominant behavior, and women are used to roles with lesser power and status which produce more subordinate behavior. Dominant behavior is controlling, assertive, directive and autocratic, and involves sexual control. Subordinate behavior is more compliant to social influence, less aggressive, more cooperative, and involves a lack of sexual independence. The theory have been able to demonstrate just how strong the ties between social norms and sexual double standards. In societies where women are more strongly suppressed, promiscuous women are shunned by the mainstream and in extreme cases they are may be ostracized. In societies where women had made strides towards social equality, on the other hand, women sexual promiscuity (although on average is still frowned upon more than men’s due to the yet to be achieved goal of complete equality) is much more accepted and promiscuous women can be idolized and admired (e.g., Madonna, Paris Hilton, Gwen Stephanie). However, most societies are still unforgiving with regards to sexual promiscuity, especially for women.

The outcome of these cultural pressures is well documented in numerous surveys, according to researchers. These findings consistently show that men report a much stronger preference for multiple sex partners compared with women, yet the difference is closing with reduction in societies’ sexual inequality where men’s dominance in dictating appropriate sexual behavior is assumed to be reduced. It is also strengthened by similarly common findings that women are attracted more to men’s status and resources in societies where women’s ability to provide for themselves is reduced. According to one researcher “although biological accounts had been suggested to explain sex differences in mating preferences and promiscuity, it is highly unlikely that one would find such fast changes in acceptable
level of women’s promiscuity, as has been recorded in the last 40 years in many Western society, if such different mating strategies had been programmed in our genes”.

So next time you find yourself observing a man serially “checking out” all the attractive women in a club in an indiscriminant manner, while the women return a disinterested frown you may well be watching our society programming in motion.

1. What is the main argument of this article?
   A) Males have a greater desire for multiple sexual partners due to their genetic make-up
   B) Females have a greater desire for multiple sexual partners due to their genetic make-up
   C) The society constructs sexual strategies that reflect basic inequalities
   D) Females only purpose in sex is to achieve status
   E) Males and females are similar in their sexual choices

2. What is the proposed mechanism which facilitates the sexual strategies?
   A) Society’s power structure that is allowing different standards for men and women
   B) Men have stronger sexual drive
   C) Different reproductive advantages for males and females shaped the gene pool through evolution
   D) The history of human kind that shaped our thoughts
   E) Women’s desire to be taken care of

3. According to the article, a major source of people’s level of promiscuity comes from
   A) their morality
   B) society’s indoctrination
   C) laws and norms
   D) the brain
   E) their genes

4. According to this article, the findings that men are trying harder to initiate sexual relations
   A) demonstrates their insensitivity
   B) is reciprocated by women
   C) demonstrates a logical evolutionary strategy
   D) can not be changed
   E) reflects society’s inequalities
Survival of the fattest: How pets got so big?

By JAMES GORMAN

Marley is a friendly orange tabby on a weight loss plan. About a year ago he was up to 22 pounds 2 ounces, his personal best, or largest, at any rate. Now, after nine months on a low-carbohydrate, high-protein diet that could have been invented by Dr. Atkins, he's down to 21 pounds 3 ounces.

At least he is going in the right direction. Jelly Roll and Scout should be so lucky. Last winter, in upstate New York, the two Shetland sheepdogs each gained 14 pounds. For Jelly Roll, this meant a jump to 44 pounds from 30. For Scout, the relative weight gain was even greater. He doubled his weight, to 28 pounds from 14.

They are not alone. Veterinarians, pet owners, academic researchers and pet food companies all agree that as people are getting fatter, so are their pets. And for some of the same reasons. The bodies of people, cats and dogs all are designed to store energy as fat. The body is designed to eat a lot when food is plentiful, so that it can survive when food is scarce. The body says, "I'm fatter than you. I'll live longer," said Dr. Philip W. Toll, associate director of nutrition technology for Hills Pet Nutrition.

That biochemical strategy works well in nature. But in America most pet owners share an unnatural caloric wealth with their pets, and, said Dr. Toll, "lean times never come."

Fifty years ago dogs and cats depended largely on table scraps and spent a lot of time outdoors, ranging freely.

Now they have moved inside, and in the effort to reduce the millions of stray or abandoned animals put to death each year, veterinarians and animal protection organizations all urge that cats and dogs be spayed or neutered. Those procedures are a definite contributor to weight gain. And the fatter they are the more they suffer from diabetes and arthritis and other ailments.

The result is that dogs and cats do not burn up energy running, scrambling, scavenging and reproducing like crazy before their short lives are over. Of course, given the nature of the modern world, they would also be biting people, killing birds, getting run over and leaving unwanted presents on chemically enhanced lawns.

Last week the National Research Council of the National Academy of Sciences came out with new guidelines for dog and cat nutrition. The 447-page report, a survey of recent research, was not about obesity. In fact the problem was mentioned only briefly in a few sentences on Page 75, referring to a chapter in a textbook published in 2000 that claimed roughly 25 percent of dogs and cats are obese.

Dr. Claudia Kirk is a veterinarian with a doctorate in nutrition who was one of the researchers who conducted the study when she was working at Hills. She is now about to join the veterinary school of the University of Tennessee as an associate professor.

Dr. Christine Storts, a veterinarian with her offices in Cape Canaveral, Fla., said, "Rarely do we see an animal that is at the right weight." Dr. Storts estimated that only one in five pets had a healthy weight. "I
think obesity in dogs and cats is an extension of obesity in people," she said. But then, she noted that she does have a lot of older clients who were sedentary, and said that thin owners did not necessarily have thin pets. "My husband is extremely fit," she said, "and he overfeeds our dogs."

1. What is Gorman’s main argument?

A) Pets are getting fatter
B) The change in lifestyle has caused pets to be bigger now
C) Pets need to diet
D) Low carbohydrate, high protein diet are effective
E) Obesity in our pets is an extension of obesity in people

2. According to the article, what is NOT the cause of obesity in pets?

A) Pets are staying indoors more
B) Pets eat too much table scraps
C) Pets are urged to be spayed or neutered
D) The need to reduce the number of stray or abandoned animals
E) People overfeed their pets

3. How can pets improve their level of fitness?

A) Reduce food portions
B) Keep them indoors
C) Regular exercise
D) Give them more love and attention
E) Occasional visits to the Veterinarian

4. What is Dr. Christine Storts’ opinion on pet obesity?

A) Overweight owners overfeed their pets
B) Cannot judge an owner’s weight based upon their pet’s size
C) Only husbands overfeed their pets
D) Pets are to blame for their laziness
E) It is vital for pets to be healthy
Appendix 2: Set bail for a John

Provided below are details of a pretrial case-briefs. One case features a young man that was caught attempting to solicit sexual services from a prostitute. The other case features a woman that was caught shoplifting from a department store. This kind of information is used by judges to make decisions about how much bond money accused offenders are required to deposit with the court as insurance that they will appear on their trial date. Often, trial dates are set for several months after the pretrial. If the defendant appears on the set trial date, the bond money is returned to the defendant. If the defendant fails to appear in court on the trial date, the bond is kept by the court as a fine. Bond money is the court's way of insuring that accused suspects appear in court for their trials. Please review each case and set the amount of bail (usually ranges from $50 to $1000 for such offences) you find appropriate.

Pretrial Information
Arresting Officer: Officer Emma H.
Arresting Offense: Solicitation for sexual services
Location Of Crime: East Hastings St.
Date Of Crime: 11:30 PM, July 3, 1998
Defendant's Name: Robert C.
Defendant's Occupation: Bartender
Employment Record: Intermittent
Defendant's Address: 5-77 Crosby St., Victoria, BC
Length Of Residency: Five months
Prior Conviction Record: None
Previous Failures to Appear In Court: None
Comments: Robert C. (male, 25 years old) was arrested late Saturday night on Hastings Street while attempting to solicit sexual services from an undercover officer, Marilyn R. At 11:30 the suspect pulled over his car next to officer R. on the corner of Hastings and Main. The officer who was dressed in a short mini skirt an a revealing tank top was assigned that night to masquerade as a prostitute in an attempt to investigate cases of missing sexual workers that have been last seen at that area. The suspect rolled down his window and asked the officer if she is looking for a “date”. The officer entered the suspect’s car and said yes. At this stage the suspect pulled out his wallet and asked the officer how much it costs for her to engage in sexual intercourse with him. The officer asked for $75, which the suspect hastily handed over to her. Once the money exchanged hands officers John B. and Emma H., who were monitoring the verbal exchange through a radio transmitter that was hidden in officer R’s handbag, pulled next to the suspects car and put him under arrest for solicitation of sexual services. The suspect was interrogated and is not suspected to be associated in the investigation of the missing sexual workers.

Please assign a bond amount for this defendant. $ __________
Appendix 3: Fake debriefings

Appendix 3a: Evolutionary Psychology Manipulation

In the experiment you have just participated in we are investigating the strategies that men and women employ in their partner selections. Numerous studies have shown that men and women differ remarkably in what they look for in partners.

Men report a much stronger desire to engage in sexual relationships with multiple women, while women report looking for committed relationship first and foremost. Men also emphasize the importance of looks and age in their search for partner while women emphasize the importance of status and resources in the search for their partners.

The best theory that explains such differences in the search for partners is the evolutionary psychology theory. The theory expands Darwin’s evolutionary theory and stresses that the people who have the best sexual strategy are the ones that are more likely to reproduce and pass their genes to the next generation. After many thousands of years the gene pool contains more and more individuals that have advantageous strategies in all areas, including the best sexual strategy that allows them to have better chance to pass on their genes.

Because men and women historically (and to a large extent today as well) have a very different amount of investment in child rearing the best sexual strategies are very different for them. In the prehistoric era the minimum investment that man has to give to a child is his sperm. The minimum investment that a woman has to give to a child is 9 months of pregnancy followed up by a few years of breath feeding. The best sexual strategy for a man that want to have as many children as he can (which is the underlying reason that create the progress of evolution- passing one’s genes to the next generation) is to have sex with as many women as he can increasing the chances of impregnating them. The best strategy for a woman on the other hand is to be more selective and establish committed relationship with a man that can protect her and provide for her and the child during the time that the child is completely dependent on her.

Evolutionary psychologists therefore suggest that the findings that men want more sexual partners than women (as well as the estimations that show that man cheat more on their partners on average) just reflect the way that evolution rewarded our ancestors that had the suitable strategy for their sex. Not surprisingly our genes reflect such differences rewarding the choosier women and the more promiscuous men with a greater percentage of children compared to others. The sexual strategies that you might see in a night club are very likely reflecting the effects of the genes in which men are trying to initiate sexual relationship while women are much choosier.

The questionnaires that you have completed that asked about your sexual experiences and your past relationships were all design to further investigate this area.

Do you have any questions?
Appendix 3b: Social Constructivist Manipulation

In the experiment you have just participated in we are investigating the strategies that men and women employ in their partner selections. Numerous studies have shown that men and women differ remarkably in what they look for in partners.

Men report a much stronger desire to engage in sexual relationships with multiple women, while women report looking for committed relationship first and foremost. Men also emphasize the importance of looks and age in their search for partner while women emphasize the importance of status and resources in the search for their partners.

The best theory that explains such differences in the search for partners is the social construction theory. The theory demonstrates how the power relationship and the inequality of sexes in our society facilitated the creation of double standard for men and women. What is allowed and sometimes even encouraged for men is frowned upon and even scrutinized when it is done by women.

Because men and women historically (and to a large extent today as well) have been occupying different roles in our society men are exposed to masculine role models that present dominance and control. Although most women are employed in Western societies they still get paid less for the same amount of work. In addition, women are much less represented in leading positions in nearly every field. Further more due to their much larger role in child rearing the average woman ability to dedicate the same amount of resources to her career is largely diminished. Men’s exposure to dominant roles and strive towards achievements infiltrates other domains in life among them the sexual domain. Pushed towards dominance at whatever they do men also show tendency for sexual control that guide them towards the goal of sexual conquests. Women that are generally being encouraged to be more compliant, less aggressive and ultimately to show reduced sexual independence and imitative.

Social constructionists therefore suggest that the findings that men want more sexual partners than women (as well as the estimations that show that man cheat more on their partners on average) just reflect the way that our society endorses different acceptable behaviors from men and women. Not surprisingly our norms reflect such differences rewarding the choosier women and the more promiscuous men with a greater prestige and status. The sexual strategies that you might see in a night club are very likely reflecting the effects of these norms in which men are trying to initiate sexual relationship while women are much choosier.

The questionnaires that you have completed that asked about your sexual experiences and your past relationships were all design to further investigate this area.

Do you have any questions?
Appendix 3c: Control

In this study, we are interested in looking at potential role of personality/individual differences on response style in questionnaires. This form will explain how your participation will help us better understand this important research question.

In many studies that make use of questionnaires, a question of great significance is how accurately do the responses reflect people’s “true” beliefs, feelings, and opinions. Much research has been conducted on this topic, but the findings are that the data from questionnaires are often hindered by various ‘biases’. For example, some people show a tendency to please an experimenter by answering ‘yes’ whenever possible, known as an ‘acquiescence bias,’ while some people answer the questions by giving what they consider to be the socially acceptable answer, known as a ‘social desirability bias.’

Also, there is an interesting research in cultural psychology demonstrating the influence of “naïve dialecticism,” which is defined as a cognitive tendency toward acceptance of contradiction, shown to exist more so among people from East Asian cultures (Peng & Nisbett, 1999). For example, in one study it was found that Chinese participants were more likely to see truth in each of two contradictory propositions, whereas European-Americans tended to assume that one proposition had to be incorrect (Peng & Nisbett, 1999).

We are interested in exploring the extent to which dialecticism influences how people respond to a questionnaire, specifically, responses to questions of opposing meanings. For example, one pair of questions in the questionnaire was “How outgoing are you?” and “How shy are you?” To the extent that these items are opposite of each other, if one is answering the questions in a (logically) consistent manner, their two answers should converge in meaning (e.g., “I’m not very outgoing” and “I’m very shy”). On the other hand, for people accustomed to dialectical ways of thinking (e.g., Canadians of Asian descent), the above two statements might seem to be asking two different things (e.g., “I am very outgoing” with my close friends but “very shy” with casual acquaintances). Items in the questionnaire also varied in the length and complexity, this was to explore if these variables have any impact on the evaluation process as well.

Do you have any questions?
Appendix 4: Evaluations of a porn watcher

In the following task we will ask you to provide us with a few details about yourself. Please don’t write any identifying information in your answers as we will use your answer to further explore how to future participants form impressions and evaluations of others. If you will be providing answers that include identifying information we will whiteout these details to ensure your anonymity.

Sex: M F Age: 20

List 3 activities that you have done last weekend
1. Reading
2. Playing racquet ball
3. Watching TV

List the last 3 books you have read
1. Harry Potter and the prisoner of Azkaban
2. Catch 22
3. Coming to life

List your 2 favourite subjects from high school
1. English
2. Social science

List the last 3 movies (DVD/VHS) you rented at a store
1. Terminal
2. Boobsmania 3
3. Pemela Buttocks does New York

List 2 of your main goals for the coming year
1. Get a girlfriend
2. Get good grades
Appendix 5: Media reports

Appendix 5a: Evolutionary Psychology Manipulation

Survival of the fittest is a phrase most people are familiar with. ‘Survival’ can mean the survival of the present, physical self but it can also mean the survival of one’s genetic material, of passing on genes to offspring and thus ensuring the persistence of one’s genetic make-up. This cross-species desire to survive and reproduce can prove difficult for individuals who carry undesirable physical or behavioral traits. Adaptive strategy dictates that the individuals with the most adaptive behaviors, behaviors that maximize an individual’s contribution to the genetic pool (such as altruism), are deemed attractive and are thus able to reproduce. But what of those individuals whose physical and personality traits are not considered attractive?

Ken Simpson and his colleagues use the idea of rape to attempt to explain how less desirable males pass on their genetic material. They suggest that rape and other aggressive sexual behaviors are adaptive strategies used by members of several species, including humans, to increase the likelihood of genetic survival. As female members of the species are more likely to be sexually active with more attractive males, unattractive males use rape as an adaptive strategy to achieve their primary evolutionary goal, passing on their genes.

At the theoretical level, one’s survival is due to an attractive genetic make-up; those with attractive genes are called ‘fit.’ Children inherit a combination of the genes that made both of their parents desirable as a mate, resulting in an even stronger genetic code. The search for desirable mates and the production of increasingly strong offspring ‘weeds out’ unfavorable traits and reinforces favourable ones, allowing each subsequent generation to be more ‘fit’ than the previous. Rape may have evolutionary benefits for an individual by facilitating survival,
though not necessarily for a species due to the increased presence of less desirable attributes in the gene pool of the next generation. In this way, rape may be self-sustaining; the continuous representation of unfavorable traits in a species may lead to continued use of rape as an adaptive strategy used by individuals with those traits.

Research has indicated that sexual aggression and the probability of an individual committing rape increases as sex drive increases. Sex differences in exposure to androgens throughout the lifespan leads to a higher sex drive in men. This has been illustrated particularly well through studies of teenage boys. These studies have produced a positive correlation between the level of testosterone present in an individual and his level of sexual motivation and aggression. Conversely, studies of other species have linked removal of the testes with a decrease in sexual aggression and activity. These hormonal observations lend support to the prevalence of rape as a male adaptive strategy and its comparative absence as a female strategy. The hormonal level is largely regulated by genes, suggesting a way in which sexual aggression is passed on.

Rape is used as an adaptive strategy by several other species, for example the scorpion fly, mallard duck and orangutan. Simpson has observed rape behaviors in orangutans, whose social patterns and interactions in many ways mirror those of humans. This research suggests that the act of rape is a behavior that may have been adapted by many species to ensure the passing on of their genetic traits.

Appendix 5b: Social Constructivist Manipulation

Some cultures consider male use of violence appropriate in circumstances where a man’s ‘honour’ is at stake. In these ‘honour cultures,’ masculinity is defined by physical power, ability to protect and maintain property, and general toughness. For example, in an honour culture, if a
man’s female partner is unfaithful it may be acceptable for him to use physical aggression against her to re-establish his reputation.

Some cultures use a more implicit method of indicating acceptance of aggressive behavior towards women through reinforcement of the notion that women are less capable than men. Researcher Mandy Ross’s work suggests that the North American culture endorses sexual aggression towards women through the media. For example, she found a direct correlation between the number of pornographic magazines in circulation and the levels of reported rape, suggesting that pornography may convey a message of acceptance of aggression towards women.

Glen Douglas and his colleagues suggest that some behaviors society publicly denounces but privately condones may serve to legitimize rape. They cite patterns of physical violence – such as corporeal punishment in schools, mass media violence, and police or governmental use of violence – as these patterns are particularly easy to translate to other relationships.

The patriarchal nature of North American culture may also contribute to the existence of sexual aggression. North Americans are socialized from an early age to assume sex-typed roles: young boys are typically encouraged to play with toys related to construction or mechanics and to learn instrumental tasks while girls are more likely to be given dolls and toys that relate to domestic roles and to learn emotional tasks. Interests in the pastimes of the opposite gender may be implicitly discouraged. Though gender lines are blurring in the work place, there are still many careers in which one gender is grossly under-represented.

John Morrick’s cross-cultural studies of the relationship between women’s sociopolitical power and rates of assault reveal negative correlations. As access to legal, health and educational resources decrease, the rates of aggression and sexual assault of women increase. This pattern is especially apparent in areas with higher general acceptance of wife assault. Conversely, in areas
where women have more access to resources and are less subject to narrow gender definitions, the rate of rape and violence is significantly lower.

The manner in which a culture regards the relationship between men and women has a significant impact on rates of physical and sexual aggression towards women. Insidious, culture-based gender roles are taught from an early age. Despite the potential negative consequences of these roles and other cultural expectations, North American culture is an important factor in individual behavior and attitudes.

Appendix 5c: Control

Societies and their morals change at an astonishing pace. In Victorian times it would have been inconceivable to speak as openly about sex as most individuals do in twenty-first century Western society. The media portrays acts of sexual intimacy on such a frequent basis that it would appear that sex and sex-talk have become a banal part of one’s daily life. What is talked about, however, is severely limited; usually focusing on young, beautiful individuals that are either truly in love or in the throws of passion. This youth-oriented society omits vast groups of the population from popular sexual discourse, such as adults past their fifties. The general assumption held by many is that older adults cease to have sex, whether due to physical complications or a lack of interest. Yet, recent studies suggest otherwise.

According to Dan Berkson, cross-cultural research indicates that adult sexual behavior is more often correlated to cultural mores and expectations than other factors. Western culture largely associates sexual behavior with reproduction, and therefore the notion of engaging in sexual behavior after one’s reproductive prime seems futile if not unnatural. This negative stereotype especially affects women, as they cease to be able to reproduce at a much earlier age.
than men. By the time women reach seventy-five, only seven percent of women still engage in sexual intercourse at least once a week, in comparison to 19 percent of men who continue to have sexual intercourse after the age of seventy-five.

While cultural beliefs are the most reliable predictors of adult sexual behavior, there are other factors that contribute to a satisfying sex life in one’s later years. Carolyn Peterson asserts that two essential factors to healthy sexual behavior in old age are good physical and mental health, as well as regular sexual expression. This is why she is a supporter of changing nursing home practices that do not take into account the need for privacy and sexual intimacy.

As the baby boomer generation continues to age, we can expect to see a changing mentality about the sexual behavior of older adults. While the media frequently continues to portray sexuality among older persons as grotesque, humorous, and possibly immoral, future studies and an aging population may produce a shift in cultural attitudes sooner than expected.
Appendix 6: Date Rape Vignette

Julie and Thomas met in high school at a friend’s party. Each was attracted to the other, and they spent the remainder of the evening together. Even though they had mutual friends, they did not run into each other again until two years later at a university friend’s birthday dinner. Before the end of the dinner, they had exchanged numbers and by the end of the week Thomas had called Julie to ask her out on a date. They had a great time and set up a second date. On the following weekend, Julie and Thomas went dancing with friends and at the end of the night Julie decided to stay over at Thomas’ place as she had had too much to drink for her to drive home safely and the last bus for the night had left. At Thomas’ apartment, they decided to lounge on the couch and watch a late night movie. Julie leaned in and kissed Thomas passionately, and within no time they were making out on the couch. Thomas hadn’t had sex in over two years, and so he was especially exited about this new development. In a drunken haze he began to take off Julie’s clothes, yet Julie stopped him when he began to undo her pants because she was still a virgin and did not feel ready to go all the way. Yet by that point in time Thomas was so caught up in the moment that he couldn’t stop himself and he proceeded despite her protests, mumbling that she had really turned him on and they couldn’t just stop now. Julie was unsure what to do because she really enjoyed his company until that moment, but she also really did not want to sleep with him, so after a final attempt to push him away she gave up and just lay there in silence without moving, letting Thomas continue on his own. After Thomas was finished, they watched the rest of the movie in silence and Julie left once it ended.
Appendix 7: Questionnaire Following the Date Rape Vignette

The following questions are meant to assess your thoughts about the previous scenario. Your responses will be kept completely anonymous. Please respond as honestly as possible. Please circle your responses.

For questions 1 to 9, please indicate your answers on a scale from 1 (not at all) to 7 (extremely).

1. How acceptable do you consider Thomas’ behavior to be? 1 2 3 4 5 6 7
2. How common is this interaction? 1 2 3 4 5 6 7
3. How likely is it for a female to experience such a situation? 1 2 3 4 5 6 7
4. How likely is it for a man to behave as Thomas did in this situation?

How much do you agree with the following statements? 1 2 3 4 5 6 7

5. Once a man is sexually aroused and ready to have sex, he can’t stop himself. 1 2 3 4 5 6 7
6. Rape is an expression of an uncontrolled desire for sex. 1 2 3 4 5 6 7
7. When a man is very sexually aroused, he may not even realize that the woman is resisting. 1 2 3 4 5 6 7
8. Men don’t usually intend to force sex on a woman, but sometimes they get too sexually carried away. 1 2 3 4 5 6 7
9. What would be an appropriate sentence (0-20 years, with Sexual Assault carrying a sentence of 1 mo. – 3 yrs., and Rape carrying a sentence of 1mo. – 20 yrs.)?

_____________

For questions 10 and 11, please indicate your answers on a scale from 1 (no control) to 7 (complete control).

10. How much conscious control did Thomas have over his actions?

1  2  3  4  5  6  7

11. How much control did Julie have over the entire situation?

1  2  3  4  5  6  7
Appendix 8: Behavioural Research Ethics Board Approval for Study 1 and Study 2

CERTIFICATE OF APPROVAL - FULL BOARD AMENDMENT & RENEWAL

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<td>Ilan Dar Nimrod</td>
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<td>Mark Schaller</td>
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| REB MEETING DATE: |
| October 11, 2007 |

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The application for continuing ethical review and the amendment(s) for the above-named project have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

*Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:*

Dr. M. Judith Lynam, Chair  
Dr. Jim Rupert, Associate Chair  
Dr. Laurie Ford, Associate Chair
## Appendix 9: Behavioural Research Ethics Board Approval for Study 3

### The University of British Columbia
\[\text{Office of Research Services}\]
\[\text{Behavioural Research Ethics Board}\]
\[\text{Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3}\]

### CERTIFICATE OF APPROVAL - FULL BOARD

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### CO-INVESTIGATOR(S):

- Ilan Dar Nimrod
- Mark Schaller

### SPONSORING AGENCIES:

- N/A

### PROJECT TITLE:

Evaluations of Sexual Content

### REB MEETING DATE:

- September 13, 2007

### CERTIFICATE EXPIRY DATE:

- September 13, 2008

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The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

*Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:*

- Dr. M. Judith Lynam, Chair
- Dr. Jim Rupert, Associate Chair
- Dr. Laurie Ford, Associate Chair