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# Testosterone, Gendered Behavior, and Societal Norms

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## Abstract

*The role that biological differences between males and females may play in shaping gendered behavior is sharply contested in contemporary social science. This article examines two major works representing contrasting positions in the controversy: Sociologist Cordelia Fine's Testosterone Rex: Myths of Science, Sex, and Society and evolutionary biologist Carole Hooven's T: The Story of Testosterone, the Hormone that Dominates and Divides Us. The essay examines the relevant claims and evidence in each text and situates them within the wider ideological debate over gender inequality. It is concluded that the evidence Hooven marshals on the influence of testosterone on gendered behavior, sexuality, and identity is compelling, while Fine fails to adequately demonstrate what she views as the overwhelming role of socialization.*

## 1. Introduction

There is ongoing debate regarding whether biological sex differences influence gendered behavior. The question has been examined in a variety of disciplines, such as biology, evolutionary psychology, sociology, and philosophy, leading often to distinct and controversial findings. The crux of the debate – whether biology (nature) or social factors (nurture) are the main driver of gender differences – is controversial and emotionally charged given the potential implications of the findings for gender roles and inequality. Indeed, discussing the roots of gender differences strikes a

nerve in light of scholars' often ideological investment in the issue and their consequently strongly held views.

While biologists and evolutionary psychologists argue that sex differences do influence gendered behavior, other scholars maintain that sex differences do not have a great impact on gendered behavior. Many philosophers and social scientists contend that society and culture, rather than sex hormones, create gendered behavior. In this paper, I will examine the controversy through the lens of two opposing authors, Carole Hooven and Cordelia Fine, along with other popular sources. I will discuss both authors' core arguments and the evidence they marshal in support of their respective positions. Moreover, I will examine their claims and counterclaims in the context of the wider politicization of the debate in society. That is, I will address the thorny question of ideology, exploring whether the authors accuse the other side of ideological and confirmation biases. I will then close with my assessment of the empirical merits of each position.

## 2. Core Arguments

In *The Story of Testosterone, the Hormone that Dominates and Divides Us*, Carole Hooven argues that testosterone is a major influence on gender differences in behavior. Hooven discusses how testosterone affects an individual's brain, body, and behaviors in the service of reproduction. Naturally, men have higher amounts of testosterone in their bodies compared to females. For Hooven, this natural difference is critical to the develop-

ment of gender differences in both bodies and behavior.

In contrast to Hooven, Cordelia Fine claims in her book, *Testosterone Rex: Myths of Sex, Science, and Society*, that the theories highlighting testosterone's power in influencing male behavior are inaccurate and do not explain the full truth regarding sex differences. According to Fine, "Testosterone Rex" is the myth articulated by evolutionary psychologists that one's biological sex is so pervasive and unchanging that it constitutes a direct source of human behavior. Indeed, Fine stresses that biological sex is not the ultimate cause of behavioral differences between the sexes. Fine argues that once individuals believe in testosterone's ability to shape gender differences, there will be limits placed on both females and males that prevent full gender equality. Thus, she attempts to persuade her readers that testosterone is not the driving force in human sex differences as traditionally believed. In fact, for Fine, there are other more decisive forces at play, such as socialization, culture, and other social factors.

### 3. Supporting Evidence

In this section, I will examine five domains of evidence where Hooven and Fine contrast with each other. I will focus on their respective views of whether gendered brains exist; the impact of congenital adrenal hyperplasia on young girls' behavior; the difference in characteristic playing styles of girls and boys; sex differences in nurturing; and distinct mating practices by sex. In each case, readers will notice the sharp contrast in the authors' approaches. While Fine's consistently stresses the roles of socialization and social context to explain gendered behavior, Hooven focuses again and again on the decisive role of testosterone.

Beginning with the latter, we see that Hooven supports her argument by referencing animal studies completed by William C. Young and his team at the University of Kansas Medical School.

Young and colleagues (1959) experimented on female guinea pigs to see if testosterone injections would have an effect on their sexual behavior. Drawing from this study, Hooven (86) cites Young's conclusion:

Since behavior is underpinned by the nervous system (the brain and spinal cord), Young concluded that high testosterone in utero had altered the female guinea pigs' brains. If the brain is not masculinized prenatally, then the animal lacks the specialized neural anatomy that T can act on in adulthood to "activate" typical male behavior.

Essentially, Hooven maintains that since the brain influences behavior in all animals, then hormones such as testosterone must impact people's behavior in society. In other words, testosterone has the power to change the brain and create gendered brains and behavior. Testosterone makes individuals behave in a more masculine way, and the lack of testosterone makes individuals act more in a feminine way.

Fine challenges Hooven's view of gendered brains. While citing research from Margaret McCarthy and Arthur Arnold (2011), Fine (66) writes:

Sex isn't a biological dictator that sends gonadal hormones hurtling through the brain, uniformly masculinizing male brains, monotonously feminizing female brains. Sexual differentiation of the brain turns out to be an untidily interactive process, in which multiple factors—genetic, hormonal, environmental, and epigenetic (that is, stable changes in the "turning on and off" of genes)—all act and interact to affect how sex shapes the entire brain. And just to make things even more complicated, in different parts of the brain, these various factors interact and influence one another in different way.

Rather than testosterone having the sole power to shape a person's brain, Fine argues there are other factors at hand that influence one's brain development. Since there are many factors influencing a person's behavior, Fine believes it's not right or fair to assert that sex hormones are solely responsible. From a social standpoint, individuals must look at a person's environment, diet, social world, and more before attributing gendered behavior strictly to sex hormones in the brain. Humans are complex and many factors influence a person's brain development. Indeed, Fine cites work by Joel et al. (2015) showing that typical brains do not have universally male or female structures, but rather overlapping attributes. Indeed, there is a "a shifting 'mosaic' of features, 'some more common in females compared to males, some more common in males compared to females...'" (67). To be sure, Fine acknowledges that certain characteristic features of the brain are more common among men and women. But, for Fine, given the 'mosaic of features', this is a far cry from labeling brains as "male" or "female."

Another issue that illustrates the basic difference in interpretation between Fine and Hooven is a condition known as congenital adrenal hyperplasia (CAH). CAH occurs when fetuses in utero are exposed to unusually high amounts of testosterone. Although this condition affects both girls and boys, it affects girls more as the extra testosterone can lead to differences in their bodily features. Moreover, Hooven suggests that girls born with CAH are drawn to more boyish toys due to being exposed to higher amounts of testosterone compared to other girls. Hooven discusses a study on toy preferences among CAH children and those without the condition (Pasterski et al. 2005). She summarizes the results (95-97):

CAH girls played mostly with boys' toys. They spent only 21 percent of their time with girls' toys but 44 percent with the boys' toys. In contrast, the unaffected girls showed the reverse pattern: they spent 60 percent of their time

with girls' toys and only 13 percent with the boys' toys (unaffected boys spent 70 percent of their time with boys' toys and only 6 percent with girls' toys).

Hooven goes on to stress that these results are "typical" of an array of studies on CAH. As she notes (95):

First, CAH girls' play is masculinized. Second, CAH girls don't play *just like* boys, but they play *more like* boys than do unaffected girls. CAH girls' play is midway between that of typical girls and typical boys... The powerful evidence from studies on CAH girls seems to seal the deal: exposure to high levels of testosterone, even before we are born, masculinizes not only our bodies, but also our interests, preferences, and behaviors.

Plainly, exposure to prenatal testosterone in the womb does have an effect on gendered behavior. Although CAH girls are female, they behave in ways more similar to boys. Testosterone has the power to influence CAH girls' behavior, interests, and playstyles.

Notwithstanding the apparent strength of the evidence Hooven cites, Fine (139-140) maintains that these differences in playstyles and toy preferences may have other, ultimately more social, roots:

At least part of the reason that girls with CAH have more boyish interests is because they're less influenced by gender labels and gender modeling than are other children... By contrast, girls with CAH were impervious to information that particular toys (like a xylophone or balloon) were "for girls," despite remembering that information just as well... Along similar lines, Barnard College sociomedical scientist Rebecca

Jordan-Young points out that to understand these girls' more masculine preferences, we have to consider the psychosexual effects of the condition: girls are born with atypical or masculinized genitalia, they often undergo intensive medical and psychiatric observation or intervention, and have physical characteristics out of keeping with cultural ideals of feminine attractiveness.

In other words, Fine suggests that girls with CAH are less likely to feel pressured by societal norms governing how they should act. Girls with CAH understand how they are expected to behave in accordance with gender norms, but they choose not to. Because of their condition, girls with CAH may spend more time around doctors and professionals, figures that are more often predominantly masculine, thus exposing these girls to more masculine behavior than other girls their age. As girls with CAH typically do not follow societal standards of attractiveness, they tend to behave more stereotypically manly as they have more masculine attributes in their appearance. As can be seen, while Hooven and Fine both recognize that girls with CAH are more likely to have male-typical toy preferences, they contrast sharply in their interpretations of the roots of such preferences.

Hooven and Fine's contrasting interpretations are visible again with regard to children's playstyles and toy choices. While Hooven stresses that these differences are anchored in testosterone's effects on the brain, Fine stresses the central role of socialization. According to Hooven, testosterone does have an impact on gendered behavior. Testosterone helps aid the development of male and female bodies. Since society has deemed those bodies "masculine" and "feminine", and constructed social roles around such bodies, boys and girls end up acting the way they do. Hooven acknowledges that gender roles are, indeed, constructed by society and do reinforce boys' and girls' playstyles and toy choices. Yet for Hooven, boys and girls gravitate to particular playstyles

and toy choices in no small part due to hormonal influences on their developing brains.

Fine challenges the biological argument, however, seeing it as another illustration of the "Testosterone Rex" myth. "In toy stores," Fine writes (17), "Sex-segregated product aisles (real or virtual) *assume* a child's biological sex is a good guide to what kinds of toys will interest them. . . *supposedly* in keeping with sex-specific selection pressures of our evolutionary past" (emphases added). Yet for Fine, it is socialization and norms in the first place that decisively determine gendered choices. Children are taught at an early age by parents, friends, marketers and others the toys with which they are expected to play. Toy stores act as a form of gender policing in which they reinforce gender norms of girls playing with feminine toys and boys playing with masculine toys. Due to the social norms of their respected societies, children are conditioned to behave in ways that align with their society's values. In sum, again we see that although both authors recognize the plain differences in girls' and boys' playing styles and preferences, they offer different explanations.

Let us turn now to apparent differences in males' and females' tendencies toward nurturant behavior. Both Fine and Hooven discuss the observable difference in nurturing patterns between men and women. Females typically are expected to be more caring and maternal towards their children compared to men. Yet for Fine, these social expectations on nurturance are by no means anchored in any deterministic sense in our biology, as evidenced by the diversity of "roles" male and female animals play in nature. As Fine writes (31), the "incredible diversity of sex roles across the animal kingdom" shows that "gamete size" does not "determine arrangements for mating or parental care." Essentially, Fine suggests that biological sex does not determine how one will act towards their children. Since sex "roles" vary across all mammals and different cultures, it is reductionistic to suggest a person's capacity for nurturant behavior is constrained by their biological nature.

Fine (73) continues her point by emphasizing:

It's simply not possible to designate any one way of life as representative of "male sexuality" or "female sexuality." So, too, for parental care: although greater maternal care seems to be universal across time and place, both mothers and fathers can be negligent and abusive, or loving and attentive, while cultural norms span from wet nurses to breast-feeding on demand, from boarding schools and thrashings to permissive, helicopter parenting.

In brief, Fine claims that it is not right to assign fixed roles based on sex. Since females and males do overlap in their behavior, traits, and actions, it is empirically wrong and (as I will discuss below) politically shortsighted to restrict the scope of parenting behavior to the sex dichotomy. Humans act according to their cultural norms, and thus, sex roles vary depending on a person's environment.

Unsurprisingly, Hooven disagrees and believes that sex hormones do prompt a difference in nurturing instincts. While examining a song sparrow experiment (Wingfield et al. 1990), Hooven (159) writes:

Wingfield increased T in a group of males who were busy being dads, spending the day searching for tasty morsels like beetles, seeds, or worms and bringing them back to the nest. With elevated testosterone, other activities took on a greater appeal. Instead of devoting time and resources to their children, high-T dads went out singing at all hours along the perimeter of their territories, telling the neighbors to screw off and trying to score new females. The high-T dads neglected their families, and their chicks were more likely to die of starvation.

Hooven refers to this animal study to show how testosterone impacts nurturant behavior. Males

who have higher amount of testosterone in their system are less likely to be devoted fathers. Testosterone makes a male want to engage in more sexual promiscuity and compete with other males instead of caring for their children. Thus, through Wingfield's experiment, Hooven illustrates what she views as an important causal link between sex hormones and behavior – a link that Fine sees as negligible (for humans) before wider social and cultural forces.

Lastly, we examine Hooven's and Fine's interpretations of males' and female's mating strategies. Men are stereotypically perceived to be more promiscuous than women, who are seen as choosier than men in their mating patterns – a claim empirically bolstered by evolutionary psychological research. Hooven (197) writes that testosterone is a "culprit" for men's sexuality, again highlighting the relevance of animal studies:

Once it is granted that men's greater sex drive and preference for novelty are an adaptation, there is little doubt that testosterone is part of the mechanism. Whatever the mechanism is, it of course has to differ between males and females. And high testosterone, a product of male sperm producing testicles, clearly promotes physical and behavioral features designed to increase mating success. There's every reason to think that the mechanisms that explain the greater male libido and preference for sexual novelty likewise involve T. Animal studies aside we know that large increases in men's T levels going from extremely low to normal, will increase sex drive, sexual arousal, and sexual function.

Basically, Hooven believes that testosterone plays a significant role in differentiating men and women's sexual behavior. Males' higher testosterone spurs them to have a greater desire for sexual variety. Testosterone prompts men to

have different attitudes and beliefs towards sex compared to women. A leading scholar, David Buss, supports Hooven's claims regarding men and women's different sexual strategies. According to Buss (1995), men tend to desire more sexual variety than women. Also, males tend to be more open to casual sex than females, who are more inclined to prefer love and intimacy with a loyal partner. Essentially, evolutionary-orientated scholars argue that testosterone is a key reason behind men's and women's different instincts regarding intimacy and sexuality. Despite these claims, Fine again echoes her socialization approach, stressing that this difference in sexuality is due to social norms. To underscore this point, Fine refers to two classic studies (Clark and Hatfield, 1985; Hald and Høgh-Olesen, 2010) where male and female students are approached on a college campus by members of the opposite sex and invited on a date or for casual sex. Fine (43-44) writes:

Male proposers were perceived as more dangerous than the female ones, and women predicted that they would be perceived more negatively overall, and as more promiscuous, socially inappropriate, and sexually desperate if they were to accept the offer than if they were to refuse. For men, by contrast, accepting the offer was perceived to enhance, rather than damage, their reputation. . . Nor is the point that women's and men's sexuality is really just the same. But these studies perform a useful service in drawing attention to what appears to be easily overlooked: the many different social factors, still unequal for women and men, that feed into sexual decision making.

In other words, Fine believes that social norms and values prompt males and females to differ in their sexual behavior. Since society polices women to stay pure and innocent, women do not engage in

sexual promiscuity as much as men. However, society encourages men to act upon their urges and have sex with multiple partners, as it improves their reputation and status. Thus, one's social arrangements and culture determine their choices towards sexual behavior. Fine stresses that there are many factors that guide men and women's sexual choices.

We see, yet again, that Hooven and Fine acknowledge observable differences in men and women's sexual behavior, yet they disagree sharply on the roots of these differences.

#### **4. Interpreting the Controversy Through a Political Lens**

As we have seen above in appraising their respective claims and evidence, Hooven and Fine have contrasting viewpoints about the impact of testosterone on gendered behavior. But both authors go further in sketching what they see as the implications on society and politics for denying the claims and evidence in their respective books. Often, people will either affirm or deny biological differences between males and females in order to either justify or challenge sexism and gender inequality. Yet Hooven (25) stresses that it is wrong to use science to justify bad behaviors in males and females. She discusses throughout her book the numerous ways that "testosterone pushes the psychology and behavior of the sexes apart." Yet she notes that this is not "bad news", but rather "empowering information":

Nothing we know about T or sex differences implies that we have to accept current levels of sexual assault, harassment, discrimination, or coercion. On the contrary, social progress depends on scientific progress. Understanding the forces that drive our priorities and behavior, and how genes, hormones, and environment interact, helps us equip us to combat the expression of the darker parts of our nature. There is no need to down-

play the role of testosterone in our lives. Learning about how the world works and confronting the truth can sometimes be uncomfortable or disturbing. But I hope that it's mostly satisfying, empowering, and even fun, as it has been for me.

This quote perfectly summarizes Hooven's stance on the political issue. While sex hormones do influence gendered behavior, this by no means suggests that we must resign ourselves to such roles and certainly not to gender disparities. Hooven believes that our efforts to bring about social and political progress hinge on the best scientific evidence available. That is, we should continue to conduct sound scientific research about both the social and biological roots of gendered behavior so society can become more just and fair. Hooven frames her argument against those who do not believe in the power of testosterone on gendered behavior. While she believes it is important to take science into account for gendered behavior, she is against those who want to ignore these facts due to their suggested harmful implications on society.

Of course, it is precisely those biological "facts" that Fine contests. It is long past due, in Fine's view, to dethrone testosterone as the alleged "kingmaker" shaping human masculinity and behavior. As she writes (15-16):

Testosterone affects our brains, body, and behavior. But it is neither the king nor the kingmaker – the potent, hormonal essence of competitive, risk-taking masculinity – it's often assumed to be. . . . But seriously, Testosterone Rex is extinct. It misrepresents our past, present, and future; it misdirects scientific research; and it reinforces an unequal status quo. It's time to say goodbye, and move on.

By fundamentally misconstruing the roots of gendered behavior, Testosterone Rex hampers soci-

ety from achieving full gender equality. The scientific claim that sex hormones decisively shape the behaviors of men and women hinders society from progressing forward to a fairer and more just world. Fine is emotionally charged; she sees herself fighting for feminism and fighting against those who still believe in testosterone's ability to regulate gendered behavior. Socialization and culture are key reasons why gendered behavior exists and Fine emphasizes that people must take these other factors into account. Once other people consider how societal norms influence gendered behavior, then gender equality can be achieved. When this happens, people will see how women should have the same and equal rights as males. Fine argues that this enlightenment will help males realize women are equals to men, but society makes them behave differently. Believing in Testosterone Rex prevents society from moving forward towards female rights as it supports male behaviors are preferred, which is wrong. As depicted above, Hooven has a fundamentally different interpretation compared to Fine about the truth of testosterone on the body as well as a different interpretation on the implications on society.

Unlike Hooven, Fine engages in ideological critique. That is, she accuses believers in "Testosterone Rex" of promoting ideas that foster sexism and gender inequality in society. She claims (96):

Testosterone Rex implicitly blames women for their lower salary and status, distracting attention away from the 'unruly amalgam' of gendered influences—the norms, beliefs, rewards, inequalities, experiences, and, let's not forget, punishment by those who seek to protect their turf from lower-status outsiders—that unevenly tip the cost-benefit scales.

In writing this statement, Fine challenges Testosterone Rex for its harmful political implications. Testosterone Rex continues the idea that men are superior to women due to their inherent biological differences. When people believe in Testos-



terone Rex, it furthers gender inequality and unfairly justifies sexism. This belief does not take into account the norms and social policing that furthers gendered behavior and inequality. Men want to keep their power and they preserve their social dominance by assuming their pursuits are more significant than women's. Fine (144-145) urges people to change their mindsets as women will never experience true equality if they keep this old and extinct mindset intact:

Those who think in gender-essentialist ways are more likely to endorse the gender stereotypes that are the foundation of intended and unintended discrimination in the workplace. They are more likely to feel negatively toward power-seeking women, relative to men. They are more likely to allocate child care in a traditional way. They are more likely to prefer that the husband earns more in a heterosexual marriage, and to expect to make traditional work-care trade-offs. Women encouraged to take an essentialist view of gender become more vulnerable to 'stereotype threat' — the reduction in performance and interest in traditionally masculine domains triggered by negative stereotypes about women. Gender essentialist thinking makes men evaluate sex crimes more leniently, and makes people less supportive of progressive gender policies and feel more comfortable with the status quo.

Basically, Fine emphasizes the harmful political, economic, and cultural consequences associated with agreeing with Testosterone Rex. On the political side, women would not have the same rights as men nor treated with respect in the workforce. Women would not want to work in male dominated spheres such as STEM fields as it would have the expectation to be an occupation only for men. Societal norms enforce gender roles, and thus, women would act differently according to

Testosterone Rex beliefs. Women would be the "stay at home" mom, while men to be working the office all day to provide for his family. Thus, the man would be making all of the money in the relationship as the woman would have to rely on her husband for resources. Further, Fine emphasizes that men would not understand the real causes behind their misbehaviors towards women. As a result, people would stray from gender equality and women's rights. Fine sees a real problem in believing in Testosterone Rex as it would push back social progress society has made.

## 5. Two Paradigms in the Public Arena

This dichotomous debate also takes place on the internet. Bloggers, journalists, and more discuss whether sex hormones have a direct impact on gendered behavior. For example, authors Rebecca M. Jordan-Young and Katrina Karkazis (2019) do not believe in the power of testosterone. In their Washington Post article, "Five Myths About Testosterone", they argue that testosterone does not lead males to becoming more hostile, aggressive, or angry; nor does it increase men's libidos or necessarily enable them to perform better in sports. Similar to Fine, the authors state that there are other variables to consider when explaining gendered behavior, such as the social environment. Jordan-Young and Karkazis do not believe that testosterone drives the difference in gendered behavior. Moreover, echoing Fine's method, they challenge studies claiming the influence of testosterone on behavior and deem the studies flawed in logic and science.

While some authors underestimate the power of testosterone, others support how testosterone affects the body and a person's behavior. In "Trans Women Athletes Hold Competitive Edge, Even After Testosterone Suppression, Scientists Say", Jessica Chasmar reports how males who transition to females have an athletic advantage over biological females. Thus, sports officials may not allow transgender women to play in competitive sports

as officials debate it would not be a fair competition. Although transgender women are required to go through testosterone suppression in order to compete, some scientists caution that this therapy may not be sufficient. Chasmar (1) cites Hooven in the article:

[T]rans athletes who have undergone typical male puberty retain "much but not all of their athletic advantages" over people born female even after undergoing testosterone suppression. "Experts and activists debate the question of just how much strength and muscle volume drop after testosterone-suppressing medication. But evidence shows that male-typical levels of muscle mass and strength are not completely lost. In some trans women, no muscle at all is lost."

In brief, transgender women who have gone through testosterone suppression may still have a competitive advantage over their biologically female opponents. According to Hooven, testosterone suppression therapy does not impact a transwomen's body to a great extent. In other words, she stresses that transwomen have a competitive advantage since they are likely to retain their muscle strength. As a result, experts, scientists, and sports trainers are debating whether letting transwomen compete is fair. This article demonstrates how biological arguments concerning the power and influence of testosterone are relevant in the media.

## 6. Final Assessment of Argument and Evidence

While writing her book, I believe that Fine has blind spots in her discussion. Fine has assumptions that should be distinctly fleshed out in concise words. Since she majorly focuses on overturning the majority belief in "Testosterone Rex", she does not distinctly state what is the reason

for sex differences. Rather, she just hypothesizes that there are other factors in society that create the division between the sexes and gendered behavior. By focusing her attention on fighting "Testosterone Rex", she does not concentrate on her own thesis as to what could be the other possibilities. In her book, Fine does not highlight adequate evidence that social factors far outweigh biological factors. Fine ends her book by writing, that "revolving science is showing... [i]t's time to stop blaming Testosterone Rex, because that king is dead" (149). Essentially, she suggests that people should not blame testosterone for causing gendered behavior. However, what she does not adequately unpack how social factors explain the differences in behavior between men and women. Although she amply challenges errors in other researchers' studies, her argument would be stronger if she provided research that demonstrated the greater impact of social over biological determinants of gendered behavior.

It should be noted that Fine participates in confirmation bias in her book. Fine discusses work from scientist Angus John Bateman who tested a sexual selection theory in fruit flies. His study supported a biological claim that promiscuous males have greater reproductive success. Later in the book, Fine (24) mentions she does not agree with Bateman's conclusions and cites a study from evolutionary biologists that reexamine his conclusions:

While Bateman recognized this issue, Snyder and Gowaty quantified it. They noticed that in two-thirds of Bateman's series of experiments, his data indicated that males had produced more offspring than the females: a logical impossibility, since every offspring of course had both a father and a mother. In other words, the data had been biased toward counting the offspring of males. This bias is important because the very point of the study was to compare male and female variance in reproductive success, yet the

data were biased in ways likely to inflate estimates of the male variance.

Essentially, Fine finds other scientific studies that support her criticisms of Testosterone Rex. That is, she cites another study critical of Bateman for his alleged bias towards supporting testosterone's impact on male fertility. It appears that Fine only supports studies and information that agree with what she already thinks is true. It is difficult to discern whether Fine's confirmation bias amounts to conscious cherry picking (i.e., intentionally selecting data supportive of her perspective). Either way, it is plain that she is far more attentive throughout her book to existing literature supportive of her view and contrary to Hooven's emphasis on the key role of testosterone.

Due to the weaknesses of Fine's thesis, evidence, and writing, I find Hooven's argument and evidence more convincing. Fine focuses her book too much on attacking her opponent, Testosterone Rex and does not spend enough time writing about how the environment and socialization actually impact gendered behavior. Additionally, Fine's book is not organized well as she jumps around in her writing. Since Fine is so emotionally charged in her writing, her ideas appear scattered and don't flow well. On the other hand, Hooven effectively organizes her book. Her thesis is clearly stated at the outset, and each chapter is based on a piece of evidence that demonstrates how testosterone influences gendered behavior. Hooven carefully discusses her points, brings in studies that support her argument, and yet welcomes counterarguments as well. Hooven's writing is concise, straightforward, and does not leave the reader confused. In brief, Hooven's more organized and compelling writing, coupled with the strength of her argument and evidence, makes a more convincing case in the end regarding the biological bases of gendered behavior.

## Works Cited

- Bateman, A. J. "Intra-Sexual Selection in *Drosophila*." *Heredity*, vol. 2, no. 3, 1948, pp. 349–368., <https://doi.org/10.1038/hdy.1948.21>.
- Buss, D M. "Psychological Sex Differences. Origins Through Sexual Selection." *The American Psychologist*, vol. 50, no. 3 (1995): 164–8; Discussion 169–71. doi:10.1037/0003-066x.50.3.164
- Chasmar, Jessica. "Trans Women Athletes Hold Competitive Edge, Even After Testosterone Suppression, Scientists Say." *Fox News*, FOX News Network, 17 Jan. 2022, <https://www.foxnews.com/politics/trans-women-athletes-competitive-edge-testosterone-suppression-scientists>
- Clark, R. D., & Hatfield, E. (1989). "Gender differences in receptivity to sexual offers". *Journal of Psychology and Human Sexuality*, 2(1), 39–55.
- Conley, Terri D. "Perceived Proposer Personality Characteristics and Gender Differences in Acceptance of Casual Sex Offers." *Journal of Personality and Social Psychology*, vol. 100, no. 2, 2011, pp. 309–329., <https://doi.org/10.1037/a0022152>.
- Conley, Terri D., et al. "Backlash from the Bedroom: : Stigma Mediates Gender Differences in Acceptance of Casual Sex Offers." *Psychology of Women Quarterly*, vol. 37, no. 3, 2012, pp. 392–407., <https://doi.org/10.1177/0361684312467169>.
- Fine, Cordelia. *Testosterone Rex: Myths of Sex, Science, and Society*. W.W. Norton, 2018.
- Hald, G. M., & Høgh-Olesen, H. (2010). "Receptivity to sexual invitations from strangers of the opposite gender". *Evolution and Human Behavior*, 31(6), 453–458.

- Hooven, Carole. T. *The Story of Testosterone, The Hormone That Dominates and Divides Us*. Henry Holt and Company, 2021.
- Joel, Daphna, et al. “Sex Beyond the Genitalia: The Human Brain Mosaic.” *Proceedings of the National Academy of Sciences*, vol. 112, no. 50, 2015, pp. 15468–15473., <https://doi.org/10.1073/pnas.1509654112>.
- Jordan-Young, Rebecca M, and Katrina Karkazis. “Five Myths About Testosterone.” *The Washington Post*, WP Company, 14 Nov. 2019, [https://www.washingtonpost.com/outlook/five-myths/fivemythsabout-testosterone/2019/10/25/df0feceef671-11e9-829d-87b12c2f85dd\\_story.html](https://www.washingtonpost.com/outlook/five-myths/fivemythsabout-testosterone/2019/10/25/df0feceef671-11e9-829d-87b12c2f85dd_story.html).
- McCarthy, Margaret M, and Arthur P Arnold. “Reframing Sexual Differentiation of the Brain.” *Nature Neuroscience*, vol. 14, no. 6, 2011, pp. 677–683., <https://doi.org/10.1038/nn.2834>.
- Pasterski, Vickie L., et al. “Prenatal Hormones and Postnatal Socialization by Parents as Determinants of Male-Typical Toy Play in Girls with Congenital Adrenal Hyperplasia.” *Child Development*, vol. 76, no. 1, 2005, pp. 264–278., <https://doi.org/10.1111/j.1467-8624.2005.00843.x>.
- Phoenix, Charles H., et al. “Organizing Action of Prenatally Administered Testosterone Propionate on the Tissues Mediating Mating Behavior in the Female Guinea Pig.” *Endocrinology*, vol. 65, no. 3, 1959, pp. 369–382., <https://doi.org/10.1210/endo-65-3-369>.
- Snyder, Brian F., and Patricia Adair Gowaty. “A Reappraisal of Bateman’s Classic Study of Intrasexual Selection.” *Evolution*, vol. 61, no. 11, 2007, pp. 2457–2468., <https://doi.org/10.1111/j.1558-5646.2007.00212.x>.
- Tricker, R. et al. “The Effects of Supraphysiological Doses of Testosterone on Angry Behavior in Healthy Eugonadal Men—A Clinical Research Center Study.” *The Journal of Clinical Endocrinology and Metabolism*, vol. 81, no. 10 (1996): 3754–8. doi:10.1210/jcem.81.10.8855834
- Wingfield, John C., et al. “The ‘Challenge Hypothesis’: Theoretical Implications for Patterns of Testosterone Secretion, Mating Systems, and Breeding Strategies.” *The American Naturalist*, vol. 136, no. 6, 1990, pp. 829–846., <https://doi.org/10.1086/285134>.