

Transgender Athletes, Fair Competition, and Public Policy

Can policymakers support cisgender-transgender competition and still be champions of women?

BY DENNIS L. WEISMAN

The issue of transgender women competing against cisgender women in individual athletic competition is provocative and promises to become even more so in the coming years. Proponents of this type of competition believe that athletes should be able to compete against the gender with which they identify rather than the sex they were born into. Those opposed to this type of competition believe this “comingling” is a direct assault on landmark Title IX (prohibiting sex-based discrimination in any school or educational program receiving funding from the federal government) of the 1972 federal Education Amendments and marks the beginning of the end of women sports as we know it. Appealing to the principle of fair competition, more than 15 states are either considering or are in the process of passing legislation that prohibits transgender women from competing against cisgender women.

The public face of transgender athletes today is college swimmer Lia Thomas, a transgender woman who is in the process of transitioning from male to female. Thomas previously competed for the men’s swimming team at the University of Pennsylvania, posting the 32nd fastest 1,650-yard freestyle time in the nation for men in 2018–2019 and ranking 65th and 554th in the 500-yard and 200-yard freestyle, respectively. Thomas has dominated many, but not all, of the swimming races in which she has competed

against cisgender women. She recently set four school records in a single meet and won the 500-yard freestyle competition in March, becoming the first Division I transgender NCAA champion.

The argument against Thomas competing against cisgender women swimmers is that nature endowed her with certain post-pubescent physical attributes that provide a competitive advantage. These attributes include larger heart size, more hemoglobin, leaner body mass, and larger lung capacity. These physiological factors underpin the strength, speed, and recovery required to be competitive in most sports. Post-pubescent males have 15 times the amount of circulating testosterone as post-pubescent females. This translates into a 10%–12% performance advantage in running and swimming and a 20% advantage in jumping events, according to a 2018 *Endocrine Review* article by David Handelsman et al. Hormonal therapies that decrease testosterone and increase estrogen can significantly reduce this advantage. Nonetheless, natural male advantages, including bone structure, heart size, and lung capacity, are not eliminated by hormonal therapy, especially if the transition is post-pubescent.

This controversy has reached the high school level, where some cisgender women are discovering that they are at a physical disadvantage in contests they once dominated. This has resulted in their school records being eclipsed as well as the loss of scholarships and state championships. The rewards women believe they had earned on the merits from years of intense training and personal sacrifice are being lost because of a unilateral change in the terms of the competition. Coaches and club sponsors may now have strong incentives to actively recruit transgender women athletes. An outstanding question that has divided the

DENNIS L. WEISMAN is emeritus professor of economics at Kansas State University. He is grateful to the editor, Peter Van Doren, John Kleinman, Glen Robinson, and Melanie Weisman for helpful discussions. A special debt of gratitude is due Topper Hagerman for his comprehensive review of an early draft of this article. Dr. Hagerman was the trainer and exercise physiologist for the 1984 U.S. Olympic Men’s Alpine Ski Team.

sports world is whether policymakers can support this type of competition and still claim to be champions of women.

WHAT IS FAIR COMPETITION?

The question of what constitutes *fair competition* in individual sports is surprisingly complex. It is standard practice to partition individual sport competition into age and biological sex categories. Biological men typically do not compete against biological women (equestrian competition being an exception) nor do the young compete against the old. Wrestlers, boxers, rowers, and weightlifters are partitioned into different weight classes. The Paralympics recognize that the able-bodied should not compete against those that have suffered a disabling injury. The Special Olympics constitute yet another partition of athletic competition. Does this logic suggest there should be a separate category for transgender athletes?

The rationale for this type of stratification in athletic contests is to reduce the likelihood that nature alone, independent of individual effort levels, determines who prevails in winning the competition. Yet, even with athletic contests stratified by age and sex, there is intra-category variation in natural athletic ability. Nonetheless, this intra-category variation is expected to be less than the inter-category variation simply because the intense competition to qualify for top-tier athletic contests winnows out all but those with the highest natural athleticism. As Handelsman et al. wrote:

Finally, to put these competitive advantages into context, the winning margin (the difference in performance by which a competitor misses a gold medal, any medal, or making the final) in elite athletic or swimming events during the last three Olympics is < 1% equally for both male and female events.

ANALYZING PERFORMANCE FACTORS

To develop the underlying intuition for this analysis, it is useful to construct a highly stylized model of athletic competition. Suppose that an athlete's performance (P) is equal to the sum of the athlete's natural endowment (N), individual effort (E), and hormonal therapy (T), so that $P = N + E + T$. The athlete with the best performance, the highest value of P , wins the competition. Three observations about this model are instructive. First, N includes such factors as heart size, muscle mass, hemoglobin, and lung capacity. N is exogenous in that it is completely outside the control of the athlete. Second, E includes work ethic, training regimen, diet, and exertion level. E is endogenous in that it is entirely within the control of the athlete. Finally, T represents the hormonal therapy administered to the athlete and may be understood as the endogenous counterpart to N . T can take on

positive, negative, and zero values given there are drug regimens that increase and decrease androgen levels.

Rules against doping ($T > 0$) are common in athletic contests to ensure that no athlete secures an artificial competitive advantage. The most infamous case of such an unfair advantage is arguably that of cyclist Lance Armstrong. In 2012, the U.S. Anti-Doping Agency (USADA) concluded that he had used performance-enhancing drugs over the course of his career. Armstrong admitted as much in a 2013 interview with Oprah Winfrey. He was then stripped of his seven consecutive Tour de France victories and received a lifetime ban from professional cycling. This action was taken even though doping is widely believed to be pervasive in pro-

The rationale for stratification in athletics is to reduce the likelihood that nature alone, independent of individual effort, determines who prevails in competition.

fessional cycling. This raises the question of how fair competition should be defined in sports in which doping is a common practice.

To begin with the simplest case, suppose that each athlete, regardless of age and sex, has the same value of N . In addition, assume that $T = 0$ so there are no hormonal therapy regimens. The contest winner in this case—the competitor with the highest P —is the one who exhibits the highest E . This is shown in Table 1 wherein Competitor C, who has the same N value as Competitors A, B, and D, is the winner of the competition because she puts forth greater effort than her rivals. In a certain sense, this represents the ideal of fair competition because there is no variation among the competitors in terms of nature's physical endowments (N) and no artificial influences in the form of hormonal therapy (T).

In the real world, there are variations in nature's endowments (N) across both sex and age. But even within a particular sex/age stratification there is variation in nature's endowments. Nature does not create clones; not all 20-year-old male athletes are the

Table 1
N Values Identical for Each Competitor

Competitor	N	E	T	P
A	10	2	0	12
B	10	2	0	12
C	10	3	0	13
D	10	2	0	12

SPORTS

same. If our knowledge of exercise physiology were sufficiently advanced to measure these variations in N with precision, we could design the competition to control for these differences. This might entail varying the length of the race for each individual athlete based on his or her specific value of N . For example, runners are staggered in their respective lanes for a 400-meter race to ensure that each runner covers the same distance. But if one competitor has a 20% advantage in his N value, he might be required to run 20% farther. This is conceptually like a golf handicap (which is not used in elite competition) except that in golf the handicap is based on overall proficiency so that it is actually controlling for $N + E$ rather than just N . It may also be possible to vary T so that $N + T$ is the same for each competitor. This would eliminate any advantage conferred by nature but may require, at least in principle, reducing testosterone levels in transgender women below the average of cisgender women to offset any post-pubescent natural male advantage.

Table 2 illustrates the case where $N + T = 12$ for each competitor so that any differences in N across competitors are eliminated through variations in T . This practice would ensure that the winner of the competition, Competitor C in this example, is the competitor that puts forth the highest value of E .

It is standard practice to abstract from variations in N within any age/sex stratification. We recognize that these variations exist, but we are not able to measure them with the precision required to control for them. This necessarily implies that the winner of the competition may put forth less E than his rivals and still prevail in the competition. This is illustrated in Table 3 wherein Competitor B, who enjoys a 20% advantage over his competitors in terms of N , wins the competition despite putting forth only half the effort of his competitors. This is not considered unfair competition, but in a certain sense it is because the winner prevails only because nature conferred upon him a higher value of N .

Variations in T can be thought of in terms of altering N , either increasing or decreasing the competitors' innate values. Swimmer Thomas is reportedly undergoing testosterone-reducing therapy ($T < 0$) that is expected to put her on more equal footing with the cisgender women she competes against. This is illustrated in Table 4. All the competitors put forth the same level of Effort ($E = 2$), but Competitor D (who can be thought of as Thomas) prevails in winning the competition because she has a higher value of N and her testosterone-reducing therapy ($T = -2$) does not fully correct for this advantage. Note that she would realize no competitive advantage if $T = -4$, as this would perfectly offset the advantage ($\Delta N = +4$) conferred upon her by nature.

The troubling paradox that presents itself with this last example is that the other swimmers could dope ($T > 0$) to put them on equal footing with Thomas, but this would violate the rules that prohibit the use of performance-enhancing drugs. From the perspective of fair competition, there is no real difference between a transgender woman (with residual post-pubescent male athleticism) competing against cisgender women and a cisgender woman who dopes

Table 2
 $N + T = 12$ for Each Competitor

Competitor	N	E	T	P
A	10	2	2	14
B	11	2	1	14
C	12	3	0	15
D	13	2	-1	14

Table 3
 N Values Vary Across Competitors

Competitor	N	E	T	P
A	10	2	0	12
B	12	1	0	13
C	10	2	0	12
D	10	2	0	12

Table 4
 N Values Across Competitors Not Perfectly Offset by Differences in T

Competitor	N	E	T	P
A	10	2	0	12
B	10	2	0	12
C	10	2	0	12
D	14	2	-2	14

to obtain a comparable (and presumptively unfair) competitive advantage over her rivals. In this case, doping is not antithetical to fair competition but seemingly impossible without it.

If we knew precisely how to calibrate T , we could, in theory, control for any advantage that Thomas realizes from being born a biological male. For example, until quite recently, Olympic guidelines required that a transgender female have a total serum testosterone level below 10 nanomoles of cortisol per liter of blood (nmol/L) for at least 12 months prior to competition and maintain this standard for the duration of eligibility for competition as a female. This level of testosterone is at the lower limit of normal in men. The claim is that this constitutes an "intolerable unfairness" because "the normal healthy female testosterone range is 0–1.7nmol/L," according to a 2019 *Journal of Medical Ethics* article by Taryn Knox et al. But to make the competition truly fair, $N + T$ would have to be the same for all competitors. This would ensure that the winner of the contest, the one with the highest P , is the competitor who exhibits the highest E .

In November 2021, the International Olympic Committee

changed its guidelines and now leaves the determination of eligibility to each individual sport. Under the new guidelines, transgender women are no longer required to reduce their testosterone levels below specific bounds to compete.

This simple model reveals that the overarching issue in terms of fair competition is less about birth sex and more about controlling for N . It is noteworthy that medical science “highlights that there is still no clear line that is universally accepted as a fair standard for who is female for the purposes of equity in competition,” according to a 2019 *Current Sports Medicine Report* article by James Ingram and Connie Lynn Thomas. Competition between a man and a woman with the same N would arguably be fairer than competition between two women with different values of N (assuming $T = 0$ in both cases). This suggests that what makes the competition between Thomas and her cisgender female competitors unfair is not that Thomas was born a biological male, but that she is competing with a value of N that is significantly higher than those of her cisgender female competitors and the hormonal-reducing therapy ($T < 0$) she is receiving does not fully offset this advantage.

POLICY IMPLICATIONS

Athletic organizations such as the National Football League, Major League Baseball, the International Olympic Committee, and the National Collegiate Athletic Association have the discretion to design their athletic contests free from governmental interference. On the other hand, Title IX prohibits colleges that receive federal financial assistance from discriminating on the basis of sex. Regardless, fair competition per se need not be a bedrock principle for the design of such contests. This observation notwithstanding, it is uncertain how much interest from athletes, sponsors, and supporters there would be in contests that do not pay sufficient respect to fair competition. In the case of the NFL, salary caps and the order in which teams are permitted to draft college players, which varies inversely with the team’s record in the previous season, are designed to ensure sufficient rivalry in the league so that no team dominates year after year. In the end, the market can be expected to dictate the terms of the competitive engagement.

The more general question, and one that society will be forced to engage, is whether individuals should be allowed to strategically self-identify with respect to gender that allows them to secure an advantage they could not realize otherwise. This issue is compounded by the fact that actual cases of gender dysphoria are quite rare: approximately 1 in 12,000 men and 1 in 30,000 women according to a 2005 *Lancet* article by Arne Ljungqvist and Myron Genel.

What are the implications of allowing such self-identification in terms of the law and public policy? This brings us back to the original question that initiated this inquiry: is it possible to champion women (or at least not discriminate against them) if someone born biologically male can identify as a woman and be treated as such?

CONCLUSION

The debate over transgender women competing against cisgender women in athletic competition is both complex and polarizing. The overarching question concerns what constitutes *fair competition* in individual sports. This analysis reveals that the salient issue is less about transgender women competing against cisgender women than the competitive advantage that nature confers upon the former as a result of their birth sex that is not completely offset through hormonal therapies.

It is conceivable that the strong opposition to this type of competition would be tempered significantly if the advantage conferred by nature on transgender women were significantly reduced or eliminated. It may then be possible for transgender women to compete against cisgender women without violating society’s sense of what constitutes fair competition. If this is not possible because of a combination of biological, institutional, and scientific constraints, fairness may demand a further partitioning of athletic competition in which transgender women compete only against one another rather than against cisgender women. Regardless of how this issue is ultimately resolved in the courts and legislatures, it would be wise to buckle up and hold on tight because it promises to be a very bumpy ride. R

READINGS

- “Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance,” by David J. Handelsman, Angelica L. Hirschberg, and Stephane Bermon. *Endocrine Reviews* 39(5): 803–829 (2018).
- “Effect of Gender Affirming Hormones on Athletic Performance in Transwomen and Transmen: Implications for Sporting Organisations and Legislators,” by Timothy A. Roberts, Joshua Smalley, and Dale Ahrendt. *British Journal of Sports Medicine* 55(11): 577–583 (2021).
- “IOC Framework on Fairness, Inclusion and Non-Discrimination on the Basis of Gender Identity and Sex Variations,” International Olympic Committee, November 15, 2021.
- “IOC Releases Framework on Fairness, Inclusion and Non-discrimination on the Basis of Gender Identity and Sex Variations,” press release. International Olympic Committee, November 16, 2021.
- “The IOC Has a New Trans-Inclusion Framework, But Is the Damage Already Done?” by Frankie De La Cretaz. *Sports Illustrated*, March 23, 2022.
- “Transsexual Athletes: When Is Competition Fair?” by Arne Ljungqvist and Myron Genel. *Lancet* 366: S42–S43 (2005).
- “Transgender Athletes: How Can They Be Accommodated?” by Myron Genel. *Current Sports Medicine Reports* 16(1): 12–13 (2017).
- “Transgender Policy in Sport, A Review of Current Policy and Commentary of the Challenges of Policy Creation,” by James Ingram and Connie Lynn Thomas. *Current Sports Medicine Reports* 18(6): 239–247 (2019).
- “Transsexuals and Competitive Sports,” by Louis Gooren and Mathijs Bunck. *European Journal of Endocrinology* 151(4): 425–429 (2004).
- “Transwomen in Elite Sport: Scientific and Ethical Considerations,” by Taryn Knox, Lynley C. Anderson, and Alison Heather. *Journal of Medical Ethics* 45(6): 395–403 (2019).
- “We Need to be Able to Talk about Trans Athletes and Women’s Sports,” by Megan McCardle. *Washington Post*, January 13, 2022.
- “Why You Shouldn’t Judge Lance Armstrong (and Why You Should),” by Ashley Fetters. *The Atlantic*, November 8, 2013.