

Are You Game–Theoretically?

A critical discussion of a game theory based argument in favour of banning doping in sport

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Are you game – theoretically? A critical discussion of a game-theory-based argument in favour of banning doping

1. Introduction

The aim of this article is to present and critically discuss an argument, based on a game-theoretical premise, in favour of the view that sports organizations ought to ban the use of doping (Breivik 1984, Schneider and Butcher 2000, Chwang 2012 and Breitsameter 2016).

In Section 2, we shall present the argument. In Section 3, it will be argued why this argument cannot be used to justify the current ban on doping mandated by the World Anti-Doping Agency (WADA) and why the argument in itself is flawed because it entails some dubious assumptions. Section 4 sums up the findings. The reason for presenting and criticizing this type of argument for banning the use of doping in sport is it has not yet been criticized in a systematic manner where all the premises and central assumptions are presented, clarified and criticized in detail.¹ In the following, the word ‘doping’ refers to an athlete’s use of substances or methods that are on WADA’s prohibited list (WADA 2021). The list includes, for example, a number of performance-enhancing drugs such as anabolic-androgenic steroids (AAS), growth hormones, beta-blockers and erythropoietin (EPO).

2. A game-theory-based argument in favour of banning doping

In what follows, I will first present a reconstruction of the argument and then unfold the premises in detail.

P1. Everything else being equal, if sports organizations, by doing X, can reduce harm to athletes, they ought to do it (the harm-reducing principle).

P2. Game-theoretical reasoning supports the view that by banning doping, sports organizations can reduce harm to athletes.

C. Sports organizations ought to ban doping.

As the argument is valid, we shall concentrate on the plausibility of the two premises. Let us begin by accepting that P1, which is a moral premise, is, at least initially, an attractive moral principle.

¹ There are several scholars who have criticized an argument in favour of banning doping in which one of the premises is based on game-theoretical reasoning. See e.g. Tamburrini (2000), Brown (2001) and Chwang (2012), all three of whom make a few brief critical comments on a game-theory-based argument in favour of banning doping. However, as should become clear in Section 3, I will mention their comments as well as adding some new critical comments on their discussion.

When sports organizations require all their athletes to wear safety equipment, such as helmets in cycling or motor sports, or lower-leg protectors in football, such policies are obviously morally attractive and fit well with P1. However, to understand P2 – and therefore why game-theoretical reasoning can be used as a premise in the justification of banning doping in sport – requires some elaboration. First, we will need to describe some of the important empirical assumptions which proponents of the argument usually accept as entailed in P2:

1. The harm assumption: doping harms the athlete's health (Chwang 2012, 35).
2. The cost assumption: doping use is time-consuming and increases the economic costs for athletes (see e.g. Breivik 1987, 83, Chwang 2012, 34, and Daumann 2018).
3. The effectiveness assumption: if used properly, doping is effective in enhancing sports performance (Breivik 1987, 84).
4. The non-competitive assumption: if all athletes dope, then no competitive advantages are gained by any athletes (see e.g. Breivik 1987, 86 and Chwang 2012, 35).
5. The rationality assumption: athletes are rational individuals trying to maximize their own utility – e.g. they want to win in sports competitions.
6. The enforceability assumption: a ban on doping is enforceable (see e.g. Chwang 2012, 33 and Breitsameter 2017, 289).

If we accept these assumptions, it is obvious that it would harm athletes if every athlete were to use doping compared to a situation where they did not dope. This is true because all athletes would then be in the same relative position concerning winning (and no competitive advantage of doping is then achieved), and all would damage their health and have to spend extra money and time on doping. However, there is also the scenario in which some athletes A use doping, whereas their competitors B do not, and vice versa. So let us present these four scenarios in the well-known matrix for game theory (see e.g. Breivik 1987):

		B	
		no-dope	dope
A	no-dope	(3,3)	(1,4)
	dope	(4,1)	(2,2)

The number in the matrix represents the ordering according to what a rational athlete would prefer: 4 = best, 3 = next best, 2 = third best, 1 = worst. So for A, the best scenario is (4,1) and for B, the best scenario is (1,4). The second best scenario for both A and B is (3,3) and the third best scenario for both is (2,2). Confronted with these four scenarios, it would be rational for both A and B to dope.² If A did not know whether B doped or not, it would be rational for A to dope, as A would have 4 if B did not dope, and 2 if B did dope. And if A did not dope and B did, A would have 1 if B doped, and 3 if B did not dope. The same way of reasoning applies to B. Therefore, if both A and B are rational decision-makers trying to achieve what they prefer, they will both choose to dope. A and B will therefore end up with the (2,2) scenario. Alternatively, if we want to reduce the harm to athletes, it would be better if none of them doped and the (3, 3) scenario were realized. And, so the reasoning goes, one possible way to realize this scenario would be to ban doping and let it be enforced by a worldwide organization such as WADA.

However, I intend to show that this argument in favour of a ban cannot be used to support the current ban on doping unless the harm assumption is modified. But more importantly, I will show that we must reject this argument because some of the other assumptions entailed in P2 are false or cannot be modified in a plausible way.

3. A critical discussion of the game-theoretical premise

Let us start a critical discussion of the game-theoretical premise by accepting that some of the central assumptions are true – namely, the effectiveness assumption,³ the cost assumption⁴ and the rationality assumption (Daumann 2018, 73–75). In what follows, I will first critically discuss the harm assumption and some of its implications. This is followed by a critical discussion of the non-competitive assumption and the enforceability assumption.

First, it is obvious that doping can be harmful, and therefore this provides good reason for its prohibition in sport. Besides possible deaths following abuse of doping, doping may also have other adverse effects. For instance, abuse and misuse of anabolic steroids may cause cardiovascular diseases; severe liver damage, reduced fertility and lack of impulse control (see e.g. WADA 2020).

² At least if A and B adopt the dominance principle of choice according to which you should choose – among the actions available to you – the act that, whatever other people do, will maximize your well-being. See Nozick (1969, 118–119) for a presentation and elaboration of this principle.

³ For evidence of the effectiveness of e.g. anabolic steroids, see e.g. van Amsterdam et al. (2010).

⁴ For evidence of the cost of and market for doping, see e.g. Paoli and Donati (2013).

However, the harm assumption formulated above, that doping harms the health of athletes, is false.

Doping, at least in certain circumstances, may actually increase the health of athletes. Let me give two examples. After a tough stage in the Tour, riders' bodies are drained of, for example, red blood cells and testosterone. In these situations, it can promote health if the riders are given red blood cells artificially (e.g. via EPO) and testosterone to compensate for the loss of these, instead of letting riders continue with a depleted body (see e.g. Savulescu 2015).

Another example is the use of an intravenous drip that may help speed up the absorption of water, salts, vitamins and sugar. This allows the athlete to recover faster and less painfully after a tough competition than if they take salt and sugar orally. The faster the body recovers, the sooner our immune system is reset and the less vulnerable we will be to infections. Accordingly, the use of certain substances and methods on WADA's prohibited list may in some cases improve athletes' health.⁵ Furthermore, even though doping may not increase the health of athletes, it may be safe to use. Several studies show that even though doping may not benefit athletes, some types of doping (e.g. EPO) can be safe to use:

The metabolic, hormonal, and renal effects of EPO do not seem to range beyond acceptable limits and are reversible. Taken together, EPO seems safe to use for experimental purposes in healthy volunteers. (Lundby and Olsen 2011, 1265)

Sometimes doping may only be dangerous to health if heavily overused (van Amsterdam et al. 2010). However, when doping might even promote health or can be safe to use or is only harmful after severe overuse, why then be so afraid of doping and punish people who use doping? The doping debate shows an obvious mismatch between the clear moral rejection of letting athletes use doping because it is believed to be harmful and the lack of reference to data that clearly shows that doping, at least in *limited and physician-controlled amounts*, is harmful. From these observations, it does not of course follow, as mentioned in the beginning of this section, that doping use may never be morally problematic or should never be banned. For example, overuse of anabolic steroids or consuming alcohol during a Nascar or Formula 1 motor race can be extremely dangerous for the athletes and others, and there are therefore strong arguments in favour of banning such use. The point I am trying to make here is merely that it does not seem right to accept the harm assumption as it stands, unless the use of all the substances (approximately 300)

⁵ For examples of how EPO can promote health in ways other than those mentioned above, see e.g. Bailey et al. (2006) and Ninot, Connes, and Caillaud (2006).

and methods on, for example, WADA's prohibited list are dangerous for athletes' health in whatever dose they are used. Therefore, the above-mentioned quotations, which challenge the harm assumption entailed in P2, suggest that the harm assumption should be modified to imply that only certain kinds and/or amounts of doping harm an athlete's health. However, and most importantly, if P2 is modified in this way, because of the above-mentioned observations – which clearly show that doping use is not always harmful – the argument under discussion cannot be used to argue in favour of WADA's current ban on doping. And it cannot be used, as WADA also forbid non-harmful use of the kinds of drugs and methods they have on their prohibition list. However, by narrowing the harm assumption of doping to only cover harmful doping, the argument can still conclude that there should be a ban on harmful doping, although, as already mentioned, it cannot be used to justify the current ban.⁶ In what follows we shall see that more trouble lies ahead even for a game-theory based argument entailing a modified version of the harm assumption (see e.g. Russell and Browne [2018] for such a modified version).

Secondly, one thing is when and how harmful doping is, which are questions for the medical sciences to answer. Another issue is how much harm (or risk of harm) it would be acceptable for adult athletes to be exposed to, which is a moral question. Moreover, it is a moral question that cannot be answered by applying the moral principle in P1, as its only focus is on harm reduction. Remember the wording of P1: 'Everything else being equal, if sports organizations, by doing X, can reduce harm to athletes, they ought to do it (the harm-reducing principle).' Nevertheless, however attractive this moral premise is, it does not imply anything explicit about how much harm or risk to harm we should consider morally acceptable in the realm of sport.

However, it does seem obvious that we should accept some kind of harm or risk of harm, whether it be in the realm of sport or elsewhere (Brown 2001). For it is no secret that some sports, such as boxing, motor sport, horse riding, rugby, American football, etc. claim several lives every year. In addition, when it comes to injuries, sport is often extremely harmful. For instance, the injury percentage per season for elite football players is between 70% and 90% (Waldén, Hägglund, and Ekstrand 2005)⁷ and among elite cyclists, 25% should expect to be hospitalized once per season due to crashes and accidents on the road (Coyle 2005). Furthermore, let's compare doping to other kinds of conduct that also pose a risk to health. If using doping is harmful or constitutes a risk to athletes' health, and therefore ought to be banned, the same kind of reasoning would not only apply to most

⁶ This is exactly Chwang's point – 'to forbid athletes ... from using a substance which only helps them and does not harm them in any way ... strikes me as perverse' (Chwang 2012).

⁷ See also Chomiak et al. (2016) for figures close to Waldén, Hägglund, and Ekstrand.

sports, but also to the consumption of alcohol and tobacco. Yet few believe that we should ban sport, smoking tobacco or drinking alcohol even though these activities can be extremely harmful or risk extreme harm to athletes or consumers.

However, some attempts can and have been made to escape this double-standard view where you morally accept that sports can be harmful to the health of athletes, but still believe that doping is morally wrong because it is harmful. One suggestion is to claim that banning sport or the consumption of alcohol and tobacco will, all things considered, have severe negative consequences for the wider society compared to the benefits of such bans. Nevertheless, it is an open empirical question whether this is true. In addition, the same may be true with the current ban on doping. But we do not know, and just to assume that banning doping, all things considered, will be beneficial to society, is begging the question. Another suggestion is to claim that even though sport can be harmful there are values in sport that we need to protect – values such as the pursuit of excellence or honour of tradition – which will not exist if doping is legal. However, this suggestion is far from convincing as doping is used to promote excellence. Furthermore, from a historical point of view doping it is fair to say that doping is part of the tradition within sport (Johnson 2016).

A final suggestion to escape this double standard is based on the saying ‘two wrongs don’t make a right.’ In other words, one attempt to argue for accepting harmful sports but not harmful doping is that the latter should be considered as an additional risk added to an already harmful sport. Therefore, by forbidding doping, you reduce the sum of health fatalities and injuries the athletes are exposed to. However, this line of thought suffers from two faults. First, the argument assumes that a doping ban will reduce the number of fatalities and injuries athletes are exposed to. But as I have described earlier in this section, this is far from certain, since there are a number of advantages (in terms of health) to legalizing doping in a physician-controlled environment. Second, the world of sports regularly accepts new measures that increase the number of fatalities and injuries. Accepting new sports like snowboarding or base-jumping, accepting new elements in ice skating or in skate and kite boarding and accepting that more people join traditional and harmful sports all increase the number of harmful acts in sports. But if you accept this increase in harmful acts, then why not also accept measures like doping even if it increases the number of harmful acts in the world of sports?⁸

However, if you believe that it is a moral problem that doping is harmful, but are still willing to accept that sport is or at least can be harmful, then it would be consistent to legalize doping. In this scenario, athletes would naturally have to spend time and money on doping compared to a ‘no

⁸ For a critical discussion of different ways of trying to argue in favour of morally relevant differences between harm due to sport and harm due to doping, see e.g. (Petersen 2021, 21-23).

dope' scenario. However, allowing doping would, as we have seen, also have some health benefits that may very well trump the time and money spent on doping – benefits the athletes would not gain in the 'no dope' scenario. Nevertheless, there seems to be good reason to regulate the use of performance-enhancing drugs instead of embracing a laissez-faire doping policy.

Firstly, we should accept that anyone in their right mind or, in other words, who is a rational decision-maker and over the age of 18 can have performance-enhancing drugs such as anabolic steroids, EPO and growth hormone prescribed by a physician. Whether you want to use doping must be something you decide for yourself but only once you are an adult who is well informed about the benefits and risks of doping, while also being a rational decision-maker (see e.g. Brown [1984] and Simon [1984] for elaborations and defences of this critique of the harm assumption).

Secondly, as neither I nor anyone else want athletes to die, we must ensure as far as possible that it is not particularly harmful to use doping – in any case, not more harmful than sport already is. Therefore, in connection with the legalization of certain doping drugs, I believe that we must put a cap on how much doping a physician can prescribe to their patients. We must define some clear safety values in respect of how much of a performance-enhancing drug or method you are allowed to use. This might be safety values that clearly indicate when a certain amount of anabolic steroids in the body is harmful. We could, for example, introduce some threshold values for the haematocrit level of athletes, which the athletes can increase by means of EPO. We should therefore have some guidelines that define limits for how much of a drug or substance the athletes can use. The athletes should therefore undergo regular testing and they should not be allowed to participate in competitions if they have been tested positive for exceeding the safety values. The International Cycling Union (UCI) did show the way for this strategy when they tested whether riders have a haematocrit level over 50% before major races. If a rider's level is above 50%, their blood is too thick and they have a much higher risk of developing blood clots. Riders who are tested positive will not be allowed to participate in the competition. The reason is that riders are regarded as being ill and are therefore suspended from cycling for two weeks (Møller 2010, 9). The safety value of 50% applies regardless of whether the reason for a high haematocrit level is use of EPO, oxygen tents or altitude training. WADA do sometimes apply the same kind of strategy when, for example, they allow athletes to use the asthma medicine salbutamol when it is inhaled at a rate of less than 1600 micrograms over 24 hours. Thirdly, the athletes must receive information from medical experts about various effects and side-effects of using a drug or a method. Finally, access to and administration of doping must take

place via a sports physician, who must also regularly monitor the health of athletes who use doping.

Furthermore, besides the harm assumption, which is in serious need of modification, we can also challenge the non-competitive assumption. Remember the wording of the latter assumption: ‘If all athletes dope, then no competitive advantages are gained by any athletes.’ There are at least two problems with this assumption. First, in order to accept this assumption, you would have to perceive doping as primarily a *positional good*.⁹ This means a good that is only good to have if others do not also have it. For instance, it is a positional good to be two metres tall if you are at a no-seating music festival. Here, it is a positional good being two metres tall, because you will be able to see the musicians on stage much better than people of average height. However, being two metres tall would stop being an advantage (i.e. a positional good) at a music festival if everyone at the festival were the same height.

However, I believe that there is good reason to favour the view that doping is not just a positional good, but can also be of important non-positional value. Doping can be a good that is capable of enriching and improving an athlete’s quality of life irrespective of whether others use doping. As just illustrated, doping can be healthy and help improve the athlete’s immune system after intense sport activity. This is essential to the athlete’s quality of life and health in both the short and the long term. Further, an athlete can choose to use doping because it satisfies some wishes that do not hinge on the comparison with other athletes. For instance, use of doping can help you do more of the things you like to do. It might be that you love to train and become able to train for longer or more efficiently by doping than if you do not use doping. Alternatively, it might be that you can set a personal record or get the kind of muscle definition you desire, which in turn contributes to your quality of life. However, if athletes’ use of doping is not just a positional good, it suggests that the scenario where everyone uses (or can use) doping is, at least on one dimension, better than the scenario where no one can do so.

Second, the non-competitive assumption is just plain false. Unequal responsiveness is a known fact, within the use of doping, as some will gain more than others when they use doping (see e.g. Tamburrini 2002, Lavazza 2019).¹⁰ So, it is false to claim that competitive advantages are not gained by any athlete if we have the all-dope scenario. But if this assumption is false, the game-theory- based argument in favour of banning doping falls apart. In addition, it does so because those who stand to gain the most from doping could rationally prefer the all-dope scenario to a total ban.

⁹ For an explicit proposition of the view that doping is a positional good, see Bostrom and Roache (2007).

¹⁰ For a critical discussion of Lavazza (2019), see Petersen and Lippert-Rasmussen (2021).

At least one of the proponents of the game-theory- based argument in favour of banning doping (Chwang 2012) acknowledges these differences in responsiveness, and argues that as nobody will know if they are high or low responders to doping, we (and the athletes) should accept a total ban. However, this is not a very convincing way to save the non-competitive assumption and the argument in question. Athletes, together with the coaches and doctors who have often worked with the athletes for years, are often very good at knowing or keen to know what works for the individual athlete –be it knowledge concerning diet, physical training, mental training, restitution time/methods, or the use of medical knowledge including doping.

Besides the harm assumption and the non-competitive assumption, we should question the enforceability assumption. Even if people could *agree* that doping is immoral and should be banned, such agreement is untenable for at least two reasons. In fact, such agreement is threatened by the fact that we do not always act in accordance with our moral outlook. It is unlikely that all athletes would act in accordance with their moral outlook, since a prohibition against doping would make it rational to use doping provided that the risk of getting caught is small and the benefit of using doping is high. Therefore, again, there are good reasons for not attaching too much importance to athletes' outlook on doping (for an elaboration of this point see Tamburrini [2002, 214]). Secondly, the past 40 years' doping policy shows clearly that the no-dope scenario above is utopian and that it is an open question whether the no-dope scenario will benefit the health of athletes. The current doping policy is utopian because doping is here to stay, and athletes (or coaches) will always use doping since so few get caught and the benefit is huge in terms of, for example, prize money, endorsement contracts and fame (Daumann 2018, 74). There will always be types of doping that are too elusive to test for. Moreover, the funds for doping tests are limited, leading to inadequate resources for enforcing the prohibition.

Finally, we can question whether a rational athlete would prefer the no-dope scenario (3,3) to the all-dope scenario (2,2), when there is unequal responsiveness to doping. However, it is of course very difficult to answer whether rational athletes want a no-dope scenario compared to an all-dope scenario. However, we could start by acknowledging the fact that doping actually takes place and that many athletes worldwide use or have used doping. Some recent research also shows that between 40% and 75% of athletes at major events such as the World Athletics Championships have used doping at least once within the past 12 months (Ulrich et al. 2018). Other research concerning the prevalence of doping among elite athletes shows us that it is consistently used at least once a year by more than 20% of athletes (Pitsch and Emrich 2012). The fact that athletes use

doping shows that, to some extent, they accept the use of doping. This may be because they believe that it increases their chance of winning or that it is not harmful or because they are convinced that it can actually be healthy to use certain types of doping. Alternatively, it may be because they believe that it is rational to use doping, since doping control is inefficient. Doping control will always have limited resources at its disposal, meaning that many athletes go untested. Numbers from major international competitions show that a mere 10–28% of athletes have been tested; the number is considerably lower in minor competitions. Furthermore, the number of athletes being tested outside competition is even lower and practically non-existent in some sports and some countries, such as Russia, do little to enforce the anti-doping rules or even neglect enforcing the rules (Moore 2017). Moreover, it is possible to dope using substances and methods that are extremely difficult to detect – such as blood doping with your own blood. The athletes are one up on the inspectors, as no reliable tests exist to reveal the use of certain doping drugs and methods (see e.g. Dimeo and Møller 2018, 63–66). This applies to certain types of growth hormone and insulin with a very short half-life and which are therefore only traceable in the body for a few hours after being absorbed by the body (Savulescu 2015). Alternatively, it may be because the athletes believe that it is morally acceptable that an adult, well-informed person expose themselves to a risk of harm. This might be a risk associated with a specific substance or participating in a dangerous sport such as boxing or motor sports (Brown 2001). So the number of athletes wanting to keep the current doping policy may prove to be close to zero.

To counterbalance the observations that suggest that it is rational to use doping, it could be pointed out that many athletes have publicly spoken against doping. However, such statements should, as a minimum, be taken with a grain of salt. Firstly, many athletes have been outspoken opponents of doping and have explicitly said that they have not used doping, only to test positive or later admit to using doping. Danish racing cyclists such as Bjarne Riis and Rolf Sørensen as well as British athlete and winner of Olympic gold in the 100 metres in 1992, Linford Christie, have all been outspoken and high-profiled opponents of doping. However, that was before they all tested positive for doping or admitted to having used it.

Secondly, it comes at a great cost to criticize the current doping policy and probably at an even greater cost to speak in favour of doping. If an athlete speaks in favour of doping, he or she will probably get the cold shoulder from coaches, sports organizations and sponsors. So any criticism of the current doping rules is quelled early on – not because of good arguments but because the price is too high. Furthermore, it is worth noting that the basic notion that it is the

active athletes who want doping to be illegal is highly inconsistent with *who* has actually argued for, introduced and made the doping rules. It was the International Olympic Committee (IOC) and the European Commission that made doping policy decisions at the beginning of the 1960s – not the athletes (Møller 2010, 42).

Thirdly, there is every reason to be sceptical of statements made by athletes when they claim that doping should be banned. Athletes who use doping benefit from arguing that the substances they use should remain illegal (Tamburrini 2000). This is because, if doping were legal, they would not benefit as much from it, since all other athletes would be able to use doping without the risk of getting caught. So game theory provides good reasons for believing that there is no correlation between what the athletes actually do, what they say and what they think of doping.¹¹

4. Conclusion

In the above analysis, I have tried to show that the game-theory-based argument in favour of banning doping in sport is not convincing. First, the argument cannot be used to argue in favour of WADA's current ban on doping, at least if it rests on the assumption that doping is always harmful. However, that in itself may not be a problem for adherents of the argument, and they can and should modify the harm assumption to cover only harmful use of doping.¹² But even with this modification, it was argued that the harm assumption is flawed, for example, because it is not obvious why we should accept certain harms in sport but not harm to athletes caused by doping. Second, the non-competitive assumption of P2 was challenged in view of the observations that doping can have some non-competitive advantages and is not only a positional good, so to speak, and because doping, due to unequal responsiveness, can give some highly responsive athletes a competitive advantage over other, less responsive athletes. Furthermore, as the enforcement of anti-doping rules has been and still is currently weak and very difficult to enforce thoroughly, it is far from obvious that a ban on doping can achieve the optimal no-dope scenario.

That being said, this critique of one argument against banning doping does not do any justice to all the other different arguments against the use of doping on the market. For example, some arguments claim that the use of doping is against the spirit of sport (MacNamee 2015;

¹¹ See also Tamburrini (2000) on this point.

¹² According to Chwang (2012), it is perverse to prohibit doping that is not harmful.

Petersen 2021), or that the legalization of doping will coerce athletes who do not want to dope into a doping regime (Brown 2001, Veber 2014). However, I hope to have improved our reasoning on an argument in favour of a ban on doping that is based on a game-theory-based premise.

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