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Fighting doping through sport redesign

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Abstract

This commentary discusses how the rules of the game may affect doping positively and negatively. The link between rules and doping prevalence is established. Some examples are given, indicating what to do and not. The main scientific outcome of the paper is perhaps that the fight against doping can be performed cheaper than through classical means such as improved test quality/higher test frequency, or less progressive (more egalitarian) prize functions, or tougher sanctions. As such, the recommended strategy may be seen as a "Columbi Egg". But, as always, nothing comes for free, and some serious creativity in sport redesign is needed to realize this method's potential.

Keywords: Economics of doping, sport redesign, sport complexity, uncertainty of outcome, anti doping.

1. Introduction

Performance-enhancing drugs (PEDs) or doping is potentially dangerous for professional sport. Whether one argues philosophically [Gilberg et al., 2006, Loland and Hoppeler, 2012, Loland, 2017], economically [Haugen, 2011] or medically [Backhouse and McKenna, 2011], there are obvious reasons to try to reduce the phenomenon. Some doping, which most experts and non- experts seems to agree is unavoidable (see e.g. [Haugen and Popela, 2015]), and acceptable. However, a full legalization is quite a different story.

Some authors [Tangen, 2017a,b, Savulescu et al., 2004] came to the conclusion that such a fight cannot be won. However, certain potentially important alternative strategies with possible significant PED-use potential, have not been discussed seriously.

In this note, the link between sport design and doping affinity is established and discussed. The fact that dope tests vary between sports, and should vary between sports [Haugen, 2004], indicates clearly that doping prevalence varies between sports. That is, certain sports should expect less doping problems than other sports. The reason is obvious: A very complex sport, which rewards a multitude of human characteristics is clearly hard to "fix" by adding drugs compared to simpler sports. If it is all about

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running, the objective is clear and almost one-dimensional; run as fast as possible. If one adds a ball, a pitch and two goals, the objective is almost likewise clear – win the match. However, how to win the match is surely a more complex task. In a 100-meter final, the man or woman who runs fastest wins, while in a soccer match the team running fastest or longest (aggregated) have very little effect on the match outcome. Soccer is an extremely more complex sport than track-and-field running, and hence it is a much more challenging task to dope a soccer team with reasonable chance of having a positive effect on aggregated results. Hence, how a sport is designed – the rules – may be important when it comes to doping prevalence. A reasonable hypothesis could be, the more complex the sport is, the less value doping strategies should have.

A very interesting aspect of sports business is the rules. As opposed to other business areas like car production or medical services, sports define their own rules. To some extent, both car producers or medical doctors also define rules, but there are certain rules that are well outside the decisive space of these agents. They are constrained by the legal system in the country (or countries) where they execute their business. Although most soccer fans would not approve such a strategy, there is nothing stopping FIFA[1] from making the simple rule change of substituting "football is played with a ball" to "football is played with two balls". However, a medical doctor cannot within the health care system decide that he or she should start treating only every second patient. Hence, we can safely assume that sport has more economical regulatory power than most other business areas.

In forthcoming paragraphs, this sport peculiarity, and its inherent potential consequences for doping, is discussed. In section 2 some of the most relevant results and their consequences for reduction of the doping problem are discussed. The main discussion on how rule changes may turn out beneficial (or not) is done in section 3, while section 4 concludes.

[1] Obviously under the assumption that FIFA's board agree to such a decision.

2. Relevant results from the "economics of doping" literature

Economics of doping – as a research area – has grown considerably after Breivik's pioneering work [Breivik, 1987]. A good source for understanding this branch of literature is his excellent review [Breivik, 2015]. Following the notation in [Haugen, 2004], the following 3 dimensions and their connection are assumed crucial for fighting doping: a, the positive utility involved in winning a competition, r, the probability of being exposed as a doper and c, the "cost" or dis utility of exposure. Then, based on a very simple imperfect complete information game model, the following inequalities are crucial:

$$\frac{1}{2}a < rc \text{ and } \frac{1}{2}a > rc \qquad (1)$$

If $\frac{1}{2}a > rc$, everybody take drugs, if $\frac{1}{2}a < rc$ everybody are clean. Then, the argument takes an empirical turn, judging realistic values of a, r and c – typically concluding by very large a's (top athletes earn a lot of money), small c and r, not very hard punishment (suspensions) and few doping tests. Hence, doping is hard to fight.

From a regulative point of view (how to improve the fight against doping in sports), the simple inequalities (1) are also convenient. Obviously, one could introduce more doping tests and/or more precise doping tests to increase r. Alternatively, one could make penalties harsher both longer suspensions and/or introduce fines to increase

c. Both strategies will of course make the product $r \cdot c$ bigger and eventually induce the inequality sign to shift. Certainly, one unpleasant characteristic of such regulative means is costs. As mentioned by the World Anti Doping Agency (WADA) several times, increasing the number of doping tests, as well as their quality cost money. Punishing athletes harder (increasing c) is a less costly strategy, which has become more frequently discussed, but at the same time harder to agree on. The reason for this ought to be evident: recruiting athletes to sport if one could loose the fortune and glory that drove most young athletes into sport may have dangerous consequences on the supply side Recruiting young talents may be far harder.

An alternative, and immediately seemingly more appealing one, can also be associated to inequalities (1). Instead of making the right hand side bigger, one could achieve the same effect by decreasing the left hand side – decreasing a. Or, in a more advanced context (with more than two athletes – see e.g. [Haugen et al., 2013]) change the shape on the prize functions typically with more egalitarian prize distributions. For instance, in this context, the difference between linear or non-linear prize functions turns out to be decisive.

However, also this approach has many obstacles. Apart from the fact that reducing prizes for athletes may have adverse effects on athlete recruitment, the problem of effort may hit more egalitarian prizes. Why would athletes train hard and do their best in a competition if second or third place produces almost as much "utility" as winning. Obviously, spectators prefer serious athletes trying their best to win. See for instance [Tullock, 1980] for a more in-depth discussion of this dimension.

A simple temporary conclusion could hence be that traditional means of fighting doping all have adverse side effects, either cost or adverse long-term effects on demand or supply. As a consequence, alternative regulative means should be of interest.

3. Redesigning sport with the aim of doping reduction

As discussed above, empirical [Pitsch et al., 2007] as well as model [Haugen, 2004] evidence indicate that doping prevalence vary between sports. Or stated alternatively; the positive performance effect of PEDs is higher in certain sports than in others. Logically, one should expect that the more complex[2] the sport is, the lower the doping prevalence is, given all other dimensions equal.

As a consequence, if certain sports have less doping problems (say football (soccer)) why not redesign the problematic sports in a more complex manner in order to reduce doping prevalence?

Such a strategy has obvious benefits. The adverse consequences of traditional anti doping strategies, as discussed in section 2, are largely eliminated. Changing rules in a sport should not cost very much, and potential adverse effects can be kept at a minimum by wise redesign decisions.

This strategy has not been extensively discussed in research literature. However, an interesting exception exists [Haugen et al., 2013]. Here, an example, although on the opposite mechanism, is discussed. The example is from cross-country skiing and discusses potential adverse doping effects of substituting interval start competitions with mass start competitions. In traditional cross-country skiing, the interval start was the norm. In such a competition, athletes start in intervals, and total competition is measured for each athlete. After all athletes have finished, total times are ranked, and the

[2] By complexity, it seems reasonable to address the number of physical and mental dimensions involved in mastering the sport. A more formalized discussion on this topic can be found in [Haugen, 2012]

winner is the one with the smallest time. In a mass start event, the first athlete passing the finishing line is the winner. As discussed in [Haugen et al., 2013][3], one possibly unexpected consequence of such a change is that a mass start opens for more possible winners. It is always easier to ski behind other athletes beacuse air resistance is minimized. Hence, not so good skiers get improved chances to win. Unfortunately, in a doping context, giving more skiers winning opportunities also (obviously) enhances their incentives to use drugs. They are now potential winners, and for a potential winner doping is suddenly an interesting strategy.

4 Conclusions

In previous sections, an alternative to traditional anti doping work has been presented. Although the presented strategy may seem obvious, it may not be simple to implement. Suppose we focus on 100-meter sprint. Most doping experts would probably agree that this event is especially exposed for doping abuse. It is simple – running as fast as possible – and as reality have demonstrated; anabolic steroids is almost always helpful in performance improvement. If the "medicine" prescribed above is to be applied, one should aim to make it more dimensionally complex. That is not necessary difficult, but some obvious constraints exist. For instance, it should at least to some extent keep its popularity. Introducing hurdles is a simple but not very constructive suggestion – as 110 m hurdles already exist. Running blindfolded could be an alternative, but the notion of the worlds fastest blindfolded man or woman may perhaps not be as popular as the normal version of the event.

The option of making it infinitely complex (forbid it) is of course always a possibility, but may not taste good. In short, the strategy suggested her is far from obvious. Redesigning sports in order to minimize doping, and at the same time keep popularity is actually a very complex target to achieve. Still, as a different way of looking at the doping problem, it has potential. As I see it, this potential is both interesting and feasible to achieve, but by no means simple to implement.

Finally, one important dimension we have avoided discussing so far, needs some investigation – uncertainty of outcome. This concept, introduced in [Rottenberg, 1956] is considered important among sports economists. Put simply, it states that if the spectators know who will win a sport competition, their interest, demand or willingness to pay to watch it decreases. Returning to the example on mass start in section 3. The statement "giving more skiers winning opportunities" indicates a change in uncertainty of outcome, in this case probably in a positive (increasing) direction. That is, demand may be severely negatively affected by reversing back from mass start to interval start.

This points out the complexity of the matter. One would prefer to keep doping prevalence at some minimum level (not necessarily zero), but keep athlete effort maximized. At the same time, one wants to achieve maximal recruitment as well as spectator interest. As pointed out above, all this dimensions are interrelated, and there are trade off-s involving different costs. Increasing uncertainty of outcome may lead to increased demand but also more doping. Luckily, if one sticks to making the sport more complex, in most situations, uncertainty of outcome should increase. So, the mass/interval-start example may be considered a special case.

[3] Although quite more formal than here.

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