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Doping control in sport: An investigation of how elite athletes perceive and trust the functioning of the doping testing system in their sport

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ABSTRACT

Doping testing is a key component enforced by anti-doping authorities to detect and deter doping in sport. Policy is developed to protect athletes' right to participate in doping-free sport; and testing is a key tool to secure this right. Accordingly, athletes' responses to anti-doping efforts are important. This article explores how the International Standards for Testing, which face different interpretations and challenges when policy is implemented, are perceived by elite athletes. Particularly, this article aims to investigate how elite athletes perceive the functioning of the testing system (i.e., the efforts of stakeholders involved in testing) in their own sport both nationally and worldwide. Moreover, it seeks to identify whether specific factors such as previous experience of testing and perceived proximity of doping have an impact on athletes' perceptions of the testing system. The study comprises a web-based questionnaire ($N=645$; response rate 43%) and uses qualitative findings to elaborate on and explain quantitative results. Results showed that two-thirds of the athletes reported the national testing programme in their sport to be appropriate. A majority of the athletes who had an opinion on the subject regarded testing programmes in some countries as not extensive enough or believed that in certain countries doping control was downgraded to win medals. Past experience of testing seemed to have a positive influence on trust in the concrete measures; however, if athletes experienced flaws during the control procedures, this could increase distrust and cause worry. The proximity of doping in an athlete's sport influenced the athlete's perception of the testing system. Particularly, athletes who need the testing system to be effective and to function well across the world show greater distrust of or dissatisfaction with the current testing system. The athletes' diverging views indicate that contemporary anti-doping policy is simultaneously met with support, (dis)trust and frustration. By integrating the views and experiences of Danish elite athletes, this study confirms that the current testing system is confronted with obstacles, and it contributes knowledge about some of the challenges WADA faces when policy is implemented. Implications of results and recommendations for anti-doping authorities are outlined in the paper.

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1. Introduction

The establishment of the World Anti-Doping Agency (WADA) in 1999, and particularly the implementation of the first World Anti-Doping Code in 2004 (WADA, 2003), marked the beginning of a process of intensification, harmonisation and standardisation of anti-doping rules and efforts worldwide. The WADA Code outlined the mutual responsibilities of national and international sports federations and national governments, and thus provided a comprehensive basis for joint efforts against prohibited substances and methods in elite sport worldwide. Doping testing is one of the five main international harmonisation strategies that operate in conjunction with the Code (WADA, 2011a) and a key component of current anti-doping strategies to detect and deter doping in sport. Current anti-doping policy seems more efficient than the former testing regimes (see Section 1.1). However, Houlihan (2014) points out that a major challenge currently undermining anti-doping efforts is related to lack of commitment among a number of important governments and International Federations (IFs) and, moreover, that treating signatories' adherence to rules and their formal implementation as evidence of compliance is misleading. That the current testing regime is indeed facing challenges was confirmed in a recent report prepared for the WADA executive committee in which a number of observed weaknesses in the system were outlined explaining why current testing regimes lack effectiveness. These pertained, for example, to a lack of commitment among some stakeholders, differing standards of compliance and other flaws (WADA, 2013).

Athletes' perceptions of the functioning of the testing system in their sport may influence their views on its deterrent effect, as well as their trust in and support of the system as a whole. Although rules will be enacted and enforced regardless of athletes' perceptions of the efforts, anti-doping authorities depend on the athletes' support and trust in order to prevent doping efficiently in elite sport and to legitimise the rather extensive anti-doping programme. Additionally, athletes' responses to policy must be considered because the policy involves all athletes and is (formally) developed in order "to protect the *Athletes'* fundamental right to participate in doping-free sport . . ." (WADA, 2015:11). In the process of securing athletes' right to doping-free sport, doping testing is a key measure. In this context, the efforts towards establishing harmonised and effective doping testing programmes across the world are key elements in the current anti-doping strategy. Thus, elite athletes' responses to the testing system are the key voice when assessing implications of anti-doping efforts. In addition, there are indications that the recent intensification of anti-doping efforts has created a new kind of inequity and a feeling of unfairness among athletes who believe – or know – that they are subjected to a stricter testing regime than their foreign competitors (Hanstad, Skille, & Thurston, 2009; Overbye & Wagner, 2014; Waddington, 2010). If so, this must be considered a threat to the legitimacy of anti-doping efforts. Consequently, there is a need to further explore athletes' perceptions of the effectiveness of, as well as their trust in, the doping testing system in their sport.

Therefore, based on a quantitative survey (also with open-ended questions) of 645 Danish elite athletes and interviews with current and former elite athletes, this study aims, firstly, to explore how elite athletes perceive the testing system and to what extent they trust the functioning and effectiveness of this system in their sport in a national context and in other countries. Secondly, the study aims to investigate whether or not the athletes' gender, age, sport type, previous experience of doping testing and perceived proximity of doping have an impact on their perceptions of and trust in the doping testing system. In the final section, some implications of the results for current anti-doping policy are outlined.

Before presenting the results, a brief contextualisation is given in order to provide an insight into: (i) the policy, implementation and challenges of the doping testing system; (ii) athletes' assessment of doping testing in sport; and (iii) the theoretical inspiration for this study and the Danish context.

1.1. Policy, implementation and challenges of the doping testing system

The International Olympic Committee (IOC) conducted its first mandatory doping test during the winter Olympics in Grenoble in 1968 (Todd & Todd, 2001). Early testing regimes have been characterised as being merely symbolic: doping tests were only conducted in competition, testing systems were inconsistent, and test results were not very reliable (Dimeo, 2007; Houlihan, 2002; Verroken & Mottram, 2005). Additionally, anti-doping efforts sometimes varied considerably from country to country and among IFs; for example, with regard to the prohibited list, rules for sanctions, and rules for the granting of Therapeutic Use Exemptions (TUEs) (Fraser, 2004; Houlihan, 1999, 2002). Moreover, the IOC, IFs and National Olympic Committees were not very committed to fighting doping, the coordination between these stakeholders was not optimal, and only few national governments took the fight against doping seriously (Houlihan, 1999). This inconsistency and inefficiency in anti-doping efforts, as well as the lack of cooperation between and commitment among stakeholders, was hoped to be eliminated by the establishment of WADA and the implementation of the first WADA code in 2004 (WADA, 2003). Although this intensification of doping controls and harmonisation of anti-doping efforts did indeed eliminate many of the inconsistencies that were dominant in early anti-doping regimes, recent studies paradoxically suggest that current policy – due to great disparities among stakeholders' harmonisation standards and their implementation of the Code, including the International Standards for Testing – has led to a different kind of inconsistency and new forms of inequality for athletes under stricter regimes. For example, studies have shown that the national implementation of the Code takes various forms (Wagner & Hanstad, 2011); that differences exist in the management of missed tests and filing failures across National Anti-Doping Organisations (NADOs) (Dikic, Markovic, & McNamee, 2011); that there is a great variation in the national requirements of athletes' availability for testing, in the criteria for selecting athletes for the registered testing pool and in the

way sanctions are imposed (Hanstad, Skille, & Loland, 2010; Siekmann & Soek, 2010); and, finally, that not all signatories are compliant with the Code (WADA, 2008, 2011b).

Furthermore, research illustrates how the doping testing system is faced with difficulties in detecting some prohibited substances (e.g. Ashenden, Gough, Garnham, Gore, & Sharpe, 2011; Lundby, Robach, & Saltin, 2012), and how the lack of validity of tests can lead to false positive or false negative testing results (e.g. Lundby, Achman-Andersen, Thomsen, Norgaard, & Robach, 2008; Pitsch, 2009). Additionally, despite an increase in the number of tests conducted and the improvement of testing methods, the percentage of positive test results has not increased. Each year, less than 2% of the doping tests conducted reveal positive test results, a percentage that includes positive test results from medications for which a TUE might have been granted (WADA, 2013, 2014a). These low numbers contradict several studies which indicate that the percentage of doping athletes is much higher (e.g. Dimeo & Taylor, 2013; Pitsch & Emrich, 2012). This is further confirmed by recent evidence that illustrates how some doping athletes – even after the WADA Code was implemented – have avoided positive doping tests for years despite frequent testing (for example, Lance Armstrong and several of the riders giving testimony in this case).

1.2. Athletes' assessment of doping testing in sport

Studies show, on the one hand, that a great majority of elite athletes support doping testing in sport (Overbye, 2013; Striegel, Vollkommer, & Dickhuth, 2002; Valkenburg, Hon, & Hilvoorde, 2014); a majority regard drug testing as a deterrent (Dunn, Thomas, Swift, Burns, & Mattick, 2010; Overbye, 2013; Waddington, Malcolm, Roderick, & Naik, 2005); and athletes report that they would be less likely to consider using doping if there was a high chance of being caught and banned from sport (Huybers & Mazanov, 2012; Mazanov & Huybers, 2010; Overbye, Knudsen, & Pfister, 2013). On the other hand, relatively few athletes find the risk of being selected for testing a deterrent (Overbye, 2013) or the risk of being caught by the drug testing authorities to be high (Moston, Engelberg, & Skinner, 2015). Furthermore, studies on doping athletes found that these athletes did not perceive the existing detection systems as credible threats to deterring doping (Engelberg, Moston, & Skinner, 2014; Kirby, Moran, & Guerin, 2011; Pappa & Kennedy, 2013). Additionally, studies assessing athletes' perceptions of the whereabouts system show that they are aware of its unequal implementation and affirm that this causes frustration (Hanstad et al., 2009; Overbye & Wagner, 2014; Waddington, 2010). Moreover, athletes report a remarkably low degree of trust in the effectiveness of anti-doping efforts, such as the whereabouts and TUE systems – in particular those athletes who have had personal experience with these administrative procedures (Overbye & Wagner, 2013, 2014). This suggests that trust in the effectiveness of the doping testing system might be low among some athletes. Despite this, there has been little empirical research into athletes' perceptions of the functioning of, and trust in, the doping testing system in general.

1.3. Theoretical inspiration and the Danish context

A figurational approach is useful (Elias, 1978; Hanstad, 2009; Waddington & Smith, 2009) to understand how actors engaged in the administrative process of fighting doping in sport constitute a network of interdependencies and, at the same time, to understand the complexity of the factors that can influence athletes' response to anti-doping policy. Although this paper does not explicitly have a figurational framework, it is inspired by this approach, which provides a foundation for understanding athletes' perceptions of and reactions to the testing system examined in this paper. Current anti-doping policy can be perceived as a complex process (game) involving a number of individual and organisational players from the sporting world, politics, business, the mass media, the legal system and health care, carried out at national, regional and international levels and consequently creating more than one layer of games (Overbye & Wagner, 2014). The processes (games) in which many individual actors (individuals, organisations, groups) interact become increasingly uncontrollable when the number of individuals increases. The complex processes of social interaction create unpredictable games that will most likely lead to unintended consequences. Concurrently, the individual player becomes aware of this uncontrollability (Elias, 1978).

A study applying a figurational approach based on the ideas of Elias (1978) and carried out by Hanstad (2009) identified the main actors in the fight against doping at four different levels: the global, international, national and athlete levels. Likewise, in the present study, actors who are stakeholders involved in the doping testing system (thus taking part in the game), can be identified at different levels. Stakeholders involved in testing are, for example: WADA, governments, IFs, national federations (affiliated to the IFs), NADOs, National Olympic Committees, regional associations of National Olympic Committees, multi-sport organisations, and major events organisers. Added to these are accredited laboratories, doping control officers, entourages involved in making doping possible for the athlete, such as doping suppliers and people assisting them, coaches, former athletes, team mates, competitors, lawyers, family, friends and the athletes themselves. Each stakeholder is confronted with issues that will influence the functioning of the doping testing system (to varying degrees), and their individual implementation of rules and interdependency may create uncontrollability and unexpected consequences.

The rules leave a great deal of responsibility to stakeholders such as NADOs, IFs and event organisers in carrying out an efficient testing programme. The International Standards for Testing outlines how testing authorities should plan and implement intelligent testing. Although more details of how to plan an effective testing programme have been added to the new international standards (WADA, 2014b), the rules still allow anti-doping organisations great variations in standards. It is

even specified that NADOs will vary in their requirements and priorities (WADA, 2014b, Article 4.4.1b). Depending on the individual implementation of policy, a stakeholder may increase or decrease the effectiveness or the inequality of the system, thus also influencing athletes' response to the doping testing system.

The Danish NADO, Anti-Doping Danmark (ADD), was established in 2000 as a pilot project in Team Danmark (Denmark's national elite sports organisation). Following the (first) Act on the Promotion of Doping-Free Sport, ADD was founded in 2005 as an independent public institution accountable to the Ministry of Culture. ADD is in compliance with the Code (WADA, 2008, 2011b). In line with international standards, ADD's testing strategy is differentiated, strategic and based on a risk evaluation of athletes, sports and substances most likely to be used. Its strategy is divided into three programmes: elite (e.g. elite athletes from high-risk sports and world-class athletes), competition (e.g. sub-elite athletes from high-risk sports and elite athletes from sports with a low risk of doping), and sport-for-all/fitness programmes (e.g. people training in club-based fitness centres or the commercial gyms who have decided to cooperate with ADD). In addition, it performs testing on demand on other groups (such as professional boxing, police and prisoners) (ADD, 2014). Athletes participating in this study will come under either the elite or the competition programme.

Athletes' perception of the testing system may alter during their careers and may depend on their concrete experience – positive or negative – of the system. For example, it seems reasonable to assume that an athlete's personal experience of doping testing may influence his or her perception of the effectiveness of the system. In addition, it can be assumed that factors relating to the proximity of doping; that is, whether or not athletes know personally someone in their own sport with doping experience and/or consider doping to be prevalent in their sport at an elite level, may influence elite athletes' perceptions of and trust in the functioning of the testing system. It is likely that athletes who experience/perceive doping in their close proximity will show a higher degree of distrust in the functioning of the testing system if they can 'observe' how (other) athletes in their sport use doping and get away with it, since presumably not all of them are caught in doping tests. But how athletes respond to or cope with a distrustful view – for example, if they find this frustrating, just ignore it, or accept it – may depend on a range of factors; for instance, the degree to which they believe doping to have an impact on performance levels in their particular sport and their personal moral beliefs about doping. A response might also be to recognise (or even take advantage of) the fact that it is possible to beat the testing system.

Therefore, the present paper aims to explore how the *macro-level* (global) provisions (i.e., the Code and International Standards for Testing) – which at the *meso-level* (international/national) face a great variety of challenges (cf. Section 1.1) – are perceived by Danish elite athletes at the *micro-level* (athlete level). Simultaneously, by investigating how elite athletes perceive the current testing system – if they support it and whether or not they trust the stakeholders'/anti-doping authorities' implementation and administration of rules (policy) – the study approaches issues of the testing system's legitimacy from the point of view of elite athletes.

2. Methodology

2.1. Procedures and participants

A web-based questionnaire was emailed to all Danish elite athletes supported by Team Danmark (73% of the participants) and to additional national team athletes from federations not currently supported by Team Danmark (27% of the participants). Of the athletes supported by Team Danmark, 14% were categorised by Team Danmark as 'world-class athletes' (ranked at least 8th at the most recent World Championship or Olympic Games), 27% were 'elite athletes' (national senior team athletes of a high performance level), and 59% were 'Team Danmark' athletes (upcoming junior team athletes, national team athletes and athletes on the periphery of the national senior team). A total of 645 elite athletes participated in the questionnaire (response rate 43%). The sample consisted of 41% female and 59% male athletes with an average age of 22 years representing 40 sports. Sports were grouped according to the main physical demands of the sport and with inspiration from Alaranta et al. (2006). The overall distribution of athletes within these sport types was: team sports (e.g., team handball and football; 45%); speed and power sports (e.g., sprints and weightlifting; 24%); endurance (e.g., cycling and swimming; 19%); and motor-skill sports (e.g., sailing and golf; 12%). Approximately three-quarters of athletes from endurance (77%), speed and power (75%) and motor skill (77%) sports, and 39% of team sports athletes had competed once or more at a world championship or the Olympics as a junior and/or in the elite category. A majority of the athletes had experience of doping testing (63%, $n = 400$): among these athletes nearly 70% had been tested within the last 12 months; (80% had been tested 1–3 times within the last 12 months; 20% were tested 4 times or more within the last 12 months); and around 31% had been tested (once or more), but not within the past 12 months.

2.2. Measures

The questions used for this study were developed as part of a larger study assessing elite athletes' perception of doping and anti-doping efforts (Overbye, 2013). The study combined qualitative and quantitative approaches. The six items of issues used in this article (see below) were mainly generated from findings in 32 semi-structured interviews with former and current elite athletes. Before the athletes were presented with the items, they were given the following introduction: "Athletes' perceptions of doping control in their sport may vary: for example, whether they believe current anti-doping

efforts are effective and if doping tests are valid.” The athletes were then asked: “How do you perceive doping control efforts in your sport?” and it was noted that this question addressed the athletes’ personal perceptions of the doping control efforts, not concrete knowledge about the controls. Subsequently, six items were presented to the athletes, who were given four answer options: “I agree”, “I mainly agree”, “I mainly disagree” and “I disagree”. In addition, an “I do not know/I do not have an opinion” option was possible.

The items were: (1) the number of tests and the selection of athletes for testing are appropriate; (2) Doping control in foreign countries is not extensive enough; (3) Doping control is downgraded in certain countries because medals are rated higher than moral issues; (4) Doping tests in Denmark are sometimes conducted so unprofessionally that it is possible for athletes to cheat; (5) Doping tests in foreign countries are sometimes conducted so unprofessionally that it is possible for athletes to cheat; and, (6) I believe that some athletes are tested positive without having used doping. Athletes who disagreed to some extent that the number of tests conducted and the athletes selected for control were appropriate (Item 1) were subsequently asked why they were not satisfied with the current testing programme, and five reasons for being dissatisfied (as well as an open-ended answer option) were presented.

The items assessing athletes’ perceptions of testing programmes in other countries were intentionally phrased in general terms to enable athletes to answer these items based on their general perceptions of the efforts. The reason for this was that detailed questions about the many stakeholders engaged in testing programmes in the athletes’ particular sport across the world would be difficult to answer for most athletes (cf. Section 1.3). It must be noted that athletes may not always be able to differentiate between national efforts and those conducted by other stakeholders (cf. Section 1.3). To assess what factors may influence athletes’ perception of and trust in the testing system – and whether these had an independent effect on perceptions and trust – additional items of theoretical interest were included in the analyses (see Sections 1.3 and 2.3). Additionally, qualitative statements from semi-structured interviews with current and former elite athletes and open-ended questions in the questionnaire were used to elaborate on and explain relevant perspectives in relation to the quantitative results (see Section 2.3).

2.3. Data analysis

The data were analysed using SPSS 21. Bivariate distributions and logistic regression analyses were used to examine athletes’ perceptions of, and trust in, the doping testing system and how (or whether) these depended on gender, age, sport type, previous experience with testing and the presumption that doping is used in the sport of the respondent. Differences were assessed using chi-square (χ^2) tests and gamma tests (two-tailed). Values of less than 0.05 were considered statistically significant. Dependent variables were recoded into binary variables (agree/mainly agree vs. disagree/mainly disagree). Using logistic regression analyses (backwards manual stepwise elimination), six separate models were tested, one for each of the six items. Variables entered in the logistic regression model were: (1) gender, age (interval scale), sport type (team sports, speed and power, endurance, motor skills sports), and experience with doping test (yes, no); and (2) if significant on a bivariate level additional variables of theoretical interest were included in the model. These latter variables were: (1) the athlete knows someone with doping experience in his/her particular sport (yes/maybe but I am not absolutely sure vs. no); (2) the perception that doping is used by elite athletes in his/her sport in Denmark (used by many/some/only few vs. no one); and, (3) the perception that doping is used by athletes in his/her sport internationally (athletes from many different countries/from certain countries/only few elite athletes vs. no one is using doping in my sport). All models included any two-factor interaction terms. “I don’t know” answers were excluded from the statistical analysis. Odds ratios (OR) and 95% confidence intervals (95% CI) are reported.

Qualitative statements, assessing how elite athletes experience and perceive the implementation and administration of testing programmes/procedures in their sport, were selected in order to provide more in-depth insights into athletes’ trust in and perception of the functioning and effectiveness of the testing system (e.g., why trust is low or what may impact athletes’ trust in, or perceptions of, the testing system). Thus the qualitative findings help elaborate on, explain and add nuances to the quantitative results. The qualitative findings are presented after the quantitative results, both assessing athletes’ perspectives on the implementation and administration of rules; namely, (i) the implementation of testing programmes and (ii) the stakeholders’ handling of doping control procedures. Athletes’ statements are not representative for all athletes. To ensure the anonymity of the respondents, only type of sport and gender are provided with the quotes.

3. Results

Who is unsure what to believe or does not have an opinion about the doping control efforts?

Answer distribution within the six items was counted to identify how often athletes were unsure what they believed about the control efforts. One-quarter (24%) reported their trust/distrust in all of the six items; 47% reported they were unsure what to believe/did not have an opinion in between one and three items; and 29% reported they were unsure what to believe/did not have an opinion in four items or more. In this last group, athletes were more likely to be younger than 20 years of age (OR 1.62 [CI = 1.07–2.46] $p = 0.024$) and to not yet have any experience with testing (OR 2.59 [CI = 1.70–3.92] $p < 0.001$).

3.1. The implementation of doping testing programmes

3.1.1. Are the number of tests conducted and the athletes selected for doping control appropriate?

One-third (33%) of the athletes who reported their view disagreed to some extent that the numbers of tests and the selection of athletes for doping controls in Denmark (DK) were appropriate (see Table 1). The final logistic model (cf. Section 2.3 and Appendix, Table A1) showed that athletes who knew someone with experience of doping had higher odds (OR 1.59 [95% CI = 1.08, 2.35] $p = 0.019$) of disagreeing that current testing was appropriate.

Athletes who disagreed to some extent that the number of tests and the athletes selected for control in their sport were appropriate ($n = 175$) reported why they were not satisfied in a follow-up question. Of these athletes, a majority (81%) wanted the number of tests increased; only 2% felt that testing was too frequent; 47% felt that too often the same athletes were tested; 30% felt that the number of tests on sub-elite athletes (athletes just below elite level) should be increased; and 29% reported that the ‘wrong’ athletes were selected for control in their sport.

3.1.2. Is doping control in foreign countries extensive enough?

In the group of athletes who reported their view, almost three-quarters (73%) agreed to some extent that doping testing systems outside Denmark were not extensive enough. The final logistic model showed that the perception that doping was used in the respondent’s sport was a significant predictor. Athletes believing that doping was used in their sport had higher odds of being dissatisfied with doping controls in other countries (OR 2.24 [95% CI = 1.07, 4.71] $p = 0.33$).

3.1.3. Is doping control downgraded in certain countries because medals are rated higher than moral issues?

In the group of athletes who reported their opinion, a majority (85%) agreed that doping controls in certain countries were sometimes downgraded to win medals. The final logistic regression model revealed that age and type of sport were significant predictors. The older the athlete, the higher the odds of believing that doping controls were downgraded in certain countries (OR 1.08 [95% CI = 1.01, 1.15] $p = 0.019$). Athletes from speed and power sports (OR 12.08 [95% CI = 3.59, 40.65] $p < 0.0001$), endurance sports (OR 4.2 [95% CI = 1.62, 10.89] $p = 0.003$) and team sports (OR 3.13 [95% CI = 1.36, 7.19] $p = 0.007$) had a higher likelihood than motor-skill sports athletes of believing that doping control was downgraded in some countries.

3.1.4. Qualitative statements about the implementation of testing programmes

Qualitative statements elucidate athletes’ responses to the implementation of testing programmes in their sport, and explain why some athletes have conflicting opinions about these (cf. Section 2.2; see Table A2 for the exact phrasing of quotes marked with a #). Some athletes wished for an increased number of tests, particularly blood tests [#1], or even testing during the night [#2]:

There should be more tests during the night, although it would be disruptive. But that is the time it is possible to detect micro-doses that are out of the body the following day. That is how the “big fish” in my sport have been caught (male, endurance sport).

At the other end of the scale a team sport athlete said he only accepted testing because he was seldom tested and it would be a waste of resources to increase testing because he did not believe doping was a problem in his sport [#3]. In line with this, a female endurance athlete [#4] stated:

There is not a sign of doping in my sport. Nevertheless, we are placed in the “high-risk group” and are FREQUENTLY tested. This is a waste of resources (female athlete, endurance sport).

Some athletes wished for a change in testing priorities because they felt that the obvious candidates were not selected [#5], that testing authorities ought to focus on the testing of sub-elite athletes [#6] or increase their efforts on testing athletes who showed sudden progress [#7]. Being selected for testing at each competition can be perceived as discriminatory [#8], and one athlete [#9] explained how he observed in-competition testing sometimes to be unfair and cheating:

...I know that ‘NN’s’ biggest competitor at the Olympic Games was tested each day after his competition and ‘NN’ was not even tested once! I mean you are not [normally] tested every day, and it is extremely demanding after your competition—I mean all the time, it is complete cheating! So I am convinced that in some cases in some tournaments it is controlled. There they know who will be selected for testing and can... (male, speed and power sport).

Some athletes commented on their distrust of testing programmes in certain other countries, for example not believing that a certain country conducted any out-of-competition testing at all [#10] or that a certain country turned a blind eye to test results and sometimes let their athletes avoid doping controls [#11,#12]:

There are some countries in which the national anti-doping agency turns a blind eye, definitely [...] that is also why the international federation conducts unannounced testing and doesn’t just rely on the Danish controls. Because, although the system functions in Denmark, it is different in some countries. You hear stories, for example from “this country” where they arrive [to conduct testing] and then the athlete says, ‘I don’t have time today; you must come again tomorrow.’ I am sure there are differences in how people handle it! [manage testing] (female, endurance sport).

Table 1
Descriptive values prepared for logistic regression analyses presented without missing values.

Themes	Items ^a	Answers (%)		Main background variables (<i>p</i> -values) ^c				Additional variables of theoretical interest (<i>p</i> -values) ^c		
		Agree/ mainly agree	Dis-agree/ mainly dis-agree	Gender	Age	Sports type	Doping tested	Knows some-one in his/her sport with experience of doping	Doping is used in his/her sport in DK	Doping is used in his/her sport in general
Doping testing programmes	The numbers of tests and the athletes selected for control are appropriate ^b	67%	33%	0.377	0.365	0.292	0.341	0.012*	0.611	0.315
	Doping control in other countries is not extensive enough	73%	28%	0.058	0.010*	0.005**	0.977	0.845	0.070	0.032*
	Doping control is downgraded in certain countries because medals have higher priority	85%	15%	0.544	0.003**	0.000**	0.014*	0.300	0.040*	0.337
Doping control procedures	Doping control in DK is sometimes so unprofessional that it is possible to cheat.	15%	85%	0.752	0.001**	0.057	0.000**	0.038*	0.028*	0.084
	Doping control in other countries is sometimes so unprofessional that it is possible to cheat.	46%	54%	0.732	0.169	0.053	0.014*	0.767	0.651	0.825
	Some athletes are tested positive without being doped.	30%	71%	0.425	0.000**	0.072	0.000**	0.418	0.000**	0.672

^a Items are shortened in this table.

^b Athletes disagreeing/mainly disagreeing with this statement were given an additional question on why they were not satisfied.

^c Variables significant on a bivariate level are described in Appendix Table A1.

Note: Missing values are not illustrated in the table. "I do not know/I have no opinion" answers were between 15% (Item 1) and (particularly high) 56% in Item 5. See Section 4.4 for discussion of these figures.

* *p* < 0.05.

** *p* < 0.01.

One female athlete pointed out that the national system was good because it caught athletes if it could, but it was not like this everywhere – which led her to conclude that the system was falling apart and the money was wasted when not all stakeholders were committed to fighting doping [#13]. General criticism of the implementation of the testing system was expressed by some athletes: one athlete stated that testing programmes were merely symbolic [#14], another that the system discriminated against certain sports in the handling of doping cases [#15] and one athlete [#16] felt that the current anti-doping system distorted competition even more because of, firstly, differences in access to drugs and, secondly, some stakeholders' protection of athletes:

Doping and the anti-doping system distort competition even more because it is those [athletes/countries] with [access to] the drugs and doctors on the front edge that can use it [use doping]. The [drugs] available on the market can be traced in the doping tests, and there are athletes that are saved by their federation/country/team if they get caught and the country is rich, and so they are not punished or banned (female, endurance sport).

3.2. The handling of the doping control procedures

3.2.1. Is doping control in Denmark sometimes conducted so unprofessionally that it is possible for athletes to cheat?

A minority of athletes (15%) who reported their view agreed to some extent that doping tests in Denmark were sometimes conducted so unprofessionally that it was possible to cheat during the controls. The final logistic regression model revealed that age, no experience (yet) of doping testing and personal knowledge of someone with experience of doping were significant predictors. The younger the athlete, the higher the likelihood that they believed it was sometimes possible to cheat during a doping control (OR 0.92 [95% CI = 0.86, 0.99] $p = 0.018$). Athletes with no experience of doping controls had three times higher odds of believing it was possible to cheat when tested (OR 3.16 [95% CI = 1.63, 6.12] $p = 0.001$). Odds of believing it was possible to cheat during controls carried out in Denmark were almost 2.5 times higher among athletes who knew someone with experience of doping in their sport (OR 2.61 [95% CI = 1.43, 4.79] $p = 0.001$).

3.2.2. Are doping controls in foreign countries sometimes conducted so unprofessionally that it is possible for athletes to cheat?

Nearly half (47%) of the athletes who reported their opinion believed that doping controls in other countries were sometimes so unprofessional that it was possible to cheat during the control. The final logistic regression model showed that experience of doping testing and sport type were significant predictors. Athletes with no experience of doping controls had twice as high odds of believing that it was sometimes possible to cheat in controls outside DK (OR 2.28 [95% CI = 1.29, 4.05] $p = 0.005$). Athletes from speed and power sports (OR 3.61 [95% CI = 1.50, 8.67]; $p < 0.0001$), endurance sports (OR 2.36 [95% CI = 1.28, 4.05] $p = 0.005$) and team sports (OR 1.74 [95% CI = 0.77, 3.94] $p = 0.184$) had a higher likelihood than motor-skill sports athletes of believing that it was sometimes possible to cheat during controls outside Denmark.

3.2.3. Are some athletes testing positive without having used doping?

Almost one-third (30%) of athletes who shared their view agreed to some extent that some athletes were tested positive without being doped. The final logistic model showed that age and the belief that doping was used in DK in the respondent's sport at an elite level were significant predictors. The younger the athlete, the higher the odds that they believed that some athletes were tested positive without being doped (OR 0.91 [95% CI = 0.87, 0.96] $p < 0.0001$). Athletes who supposed that doping was used in their sport had a higher likelihood of believing athletes were sometimes tested positive by mistake (OR 0.52 [95% CI = 0.32, 0.86] $p = 0.010$).

3.2.4. Qualitative statements about the handling of the doping control procedures

Qualitative statements elaborate on how athletes' experience of the stakeholders' handling of testing has an impact on their trust in the functioning of and the deterrent effect of the controls (see Table A2). One female team sport athlete explained that she was given prior notice on most of the occasions she was tested [#17], and a male team sport athlete even said that he managed to avoid testing despite being selected for control [#18]:

I am wondering: I was tested negative and asked again one month later, but when I said that I had just been tested negative (as they could see on their paper), then I avoided being tested again. . . a little disconcerting that it is so easy to avoid testing (male, team sport).

This experience clearly lowered this athlete's trust in the testing system. Experience of unprofessional controls was common. A female speed and power athlete explained how she and other athletes from her sport frequently experienced flaws during the controls at international competitions, and the only thing she could do to ensure that nothing went wrong in this situation was to make sure the numbers of the sample containers were correct [#13]. Flaws during controls also led athletes to fear false positive testing results [#19] and contributed to the view that it was possible, on the other hand, to escape punishment [#20]. This last example was related to doping cases in which athletes were acquitted and avoided sanctions because a top lawyer was able to document several procedure failures during their testing.

Athletes had conflicting views on the ability of tests to deter and detect doping athletes. One athlete assumed everything was in order and that no one was using doping substances or methods because the players were tested [#21]. However, an in-depth knowledge of the science behind testing and stakeholders' testing priorities weakened some athletes' trust in the

effectiveness of the testing system. For example, the small number of blood tests led one male endurance athlete to conclude that he could probably use blood doping without being detected [#22], and another male endurance athlete [#23] stated:

People can use drugs like growth hormones, EPO and testosterone without being caught because the window of detection is so narrow (male, endurance sport).

This was confirmed by another male endurance athlete who commented in detail on how it was possible to cheat with testosterone because isotope ratio mass spectrometry (IRMS) analysis was only applied in tests when the testosterone/epitestosterone (T/E) ratio was above 4:1 [#24]. Positive tests results could be avoided by 'doping doctors', who would always be a part of the game because it was more profitable for doctors to cheat than to be honest [#25].

4. Discussion

This study investigates how Danish elite athletes perceive the functioning of the doping testing system in their sport. Thus, the study attempts to link macro-structures at the global policy level, which seems to be faced with different interpretations and challenges when policy is implemented (cf. Sections 1.1 and 1.3), with the micro-orientations of athletes. The results illustrate a variety of perspectives as well as great diversity in the levels of athletes' trust in the current doping testing system. Athletes' differing approaches and the sometimes contradictory perceptions of the system indicate that the implementation of anti-doping policy is simultaneously met with support, trust, distrust and frustration. These findings point towards some interesting aspects of the current doping testing regime which will be discussed in the following section.

4.1. Doping testing programmes: their extent, the way they function and the challenges they face

The stakeholders' interpretations of the rules and the way they implement policy can have an impact on how athletes trust the effectiveness of the system and judge its deterrent effect (cf. Sections 1.1 and 1.3). The results of this study show that athletes had diverging opinions about the appropriateness of the current testing programme in their sport at a national level as well as how the system was perceived to function across the world. Most athletes felt that the current national testing programme in their sport was appropriate; however, in the group of athletes who disagreed on this, most felt that the number of tests should be increased, the selection of athletes for testing should be changed and only few of them found that testing was too extensive. There are several explanations for the diverging opinions about the appropriateness of the current national testing programme, the wish for either an increase or decrease in testing and a change in the stakeholders' testing priorities. First of all, athletes' perceptions might differ because of the differentiated and risk-based selection of athletes/sports (cf. Section 1.3), which means that Danish elite athletes are subject to different testing priorities and thus have a varying degree of personal experience with ADD testing or testing in their sporting environment. Secondly, results suggest proximity of doping matters, and if the athletes disagree on the current risk-based selection of sports and individual athletes, they might also wish for a change in strategy, i.e. an increase or decrease in testing or different priorities in the selection of athletes. Another explanation of why athletes from different sport disciplines in the same country may vary in their perceptions of doping control can be found in the variations between international federations' testing programmes – for example, testing regimes sometimes vary considerably between individual and team sports (WADA, 2013). Moreover, athletes' satisfaction or dissatisfaction with the national testing programme may also relate to whether or not their competitors are from countries with a strict testing regime (cf. Section 1.1) or to the extent they believe doping will enhance performance levels in their sport (cf. Section 1.3).

The results of the current study, in which the majority of athletes who gave their views agreed that testing programmes in other countries were not extensive enough and believed that in certain countries doping control was sometimes downgraded to win medals, suggest that many athletes distrust the implementation of testing programmes in some countries – a perception that was especially common among athletes who might consider doping to be a problem in their sport (e.g. athletes who believed that doping was used in their sport and athletes who came from risk sports). However, results also show that many athletes participating in the study did not have an opinion or were uncertain about their views on this matter (see Section 4.4 for a further discussion of this). The results on athletes' notions of how stakeholders' varying implementation of rules may increase inequality may be unfair or may decrease the legitimacy of anti-doping efforts are consistent with those of other studies (Dikic et al., 2011; Hanstad et al., 2009; Overbye & Wagner, 2014). Moreover, some athletes' suspicions of some stakeholders' lack of commitment in fighting doping or even of supporting doping (e.g. turned a blind eye to test results and sometimes even helped their athletes to avoid doping controls) was confirmed in a recent report to the WADA executive committee which even hinted at suspicion of state-sponsored/state-protected doping in certain countries (WADA, 2013, pp. 4, 6). Organised, state-sponsored or state-protected doping is a well-documented part of the history of doping in sport, in particular in the Cold War era (e.g. Franke & Berendonk, 1997; Spitzer, 1998). Today, the WADA Code makes an efficient state-protected doping programme more difficult. However, an investigation is currently taking place after serious allegations were made in a German documentary (ARD, 2014) about organised doping in Russian athletics involving several stakeholders at different levels.

The following section will examine how athletes' perceptions of differences in testing programmes and in stakeholders' degree of commitment may be interpreted.

4.1.1. 'Sporting xenophobia' or simply the unequal implementation of rules?

The results of this study illustrate that many athletes evaluate the Danish testing system as being more efficient and more effective than testing systems in many other countries. One might regard this result as 'sporting xenophobia', so to speak, a label that covers perceptions such as "anti-doping efforts are stricter in my country" or "there are no dopers in my sport in my country, but this is different in other countries" (Bloodworth & McNamee, 2010; Christiansen & Møller, 2007). Recent studies found that such notions were common among athletes interviewed or surveyed in England (Bloodworth & McNamee, 2010), Scotland (Dimeo, Allen, Tayler, Dixon, & Robinson, 2013), Norway (Hanstad et al., 2009) and Denmark (Christiansen & Møller, 2007; Overbye & Wagner, 2014). There are, however, several reasons for *not* regarding athletes' perceptions as evidence of 'sporting xenophobia'. *Firstly*, testing regimes take various forms and show great diversity across countries and among IFs (cf. Section 1.1). *Secondly*, methodological limitations must be considered when athletes are asked to compare their perceptions of testing programmes in just one country with all other countries. It is reasonable to assume that in most cases this comparison would lead athletes (regardless of their home country) to the conclusion that anti-doping regimes are less strict in *some* or other countries and doping control procedures in *some* places are less efficient. These limitations also apply to the current study. *Finally*, further evidence of less strict regimes in certain countries was contained in the recent report to WADA, which stated:

Doping athletes from nations that ignore, condone or support doping programs know they will likely be tested if they leave their (certain) countries, so they do not travel, while doping athletes from nations that have well-developed anti-doping programs travel to testing "havens" overseas to avoid being tested at home (WADA, 2013:12).

Considering the above notions and the results of the current study, as well as the recent criticism of unequal compliance standards, a more plausible *explanation* is that stakeholders' interpretations and implementations of rules currently differ to an extent which sometimes creates perceptions of a new kind of unfairness and inequality among athletes. This, however, is an inequality which was unintended although it might have been expected due to the complex process of fighting doping and the number of actors involved in it. The awareness of uncontrollability and obstacles in the administration of rules also seems rooted at the athlete level (cf. Section 1.3).

The great disparities among stakeholders' harmonisation standards and their implementation of the WADA Code mean that the global fight against doping is faced with a paradox: namely, that the extensive set of rules developed to ensure the harmonisation of anti-doping efforts and the right of all athletes to fair and equal competition (cf. Section 1.1) seems to have created a new form of inequality for athletes under stricter testing regimes. This unintended consequence now seems to be legitimised because stakeholders can appear to adhere to rules but may be lax in their compliance.

From the preceding it can be seen that many athletes distrust aspects relating to the efficiency of the doping testing programmes initiated in their sport. How stakeholders administer the testing procedures can play a significant role in athletes' perceptions of the effectiveness of the testing system (cf. Section 1.3). The following section will discuss the extent to which athletes trust doping testing procedures and the factors which may have an impact on athletes' trust in these procedures.

4.2. Doping control procedures: flaws and opportunities to cheat

Few athletes participating in the study agreed that doping control procedures in Denmark were sometimes so unprofessional that it was possible for athletes to cheat, whereas a proportionally larger group believed that this was sometimes the case when tested for doping outside Denmark. An important result was that athletes with previous experience of testing were more likely *not* to believe that it was possible to cheat during controls in Denmark as well as outside Denmark. This result suggests that all athletes should be tested at least once in their career. However, results also illustrated that experience of flaws during the testing procedure decreased some athletes' trust in the efficacy and the deterrent effect of controls or led the athlete to worry about being tested positive by mistake. Moreover, it was shown in one study that some athletes experienced negative emotions during the doping control procedure, for example that they felt under suspicion or that their personal privacy was violated because they were observed while urinating (Elbe & Overbye, 2014; Overbye, 2013). Thus, special care must be taken during the testing procedure to avoid flaws and to reduce the negative emotions which athletes may experience.

The current study provides several explanations of why or how experience with flaws during a control increases distrust, particularly in cases in which athletes were given prior notice and managed to avoid testing despite being selected for control or in which they regularly experienced flaws and thus felt that athletes could avoid sanctions just by noting the procedure failures they experienced during a control. Similarly, other studies show that some athletes experience procedural mistakes and language barriers during doping controls (Peters, Postler, & Oberhoffer, 2013) or flaws when reporting whereabouts (Christiansen, 2009; Overbye & Wagner, 2014). In addition, the study mentions some serious issues related to in-competition testing, namely unfair selection for controls and cases of too frequent selection of the same athlete for testing. It is not possible to determine the truth of certain statements, but regardless of this, such situations could be perceived as discriminatory or even cheating and thus contribute to a mistrust of testing programmes at some events. Moreover, in support of these athletes' views, it seems that in-competition testing at some events is superficial and inappropriate. For example, according to the report to WADA (2013), some event organisers inform athletes about whether or not there will be

drug testing at the event, announce which substances will be tested for and even agree not to carry out tests at the event to attract certain athletes (WADA, 2013, p. 13).

4.2.1. False positive test results: unprofessional controls or deficits in the testing

The current study found that nearly one-third of athletes believed that some athletes were tested positive without using doping substances or methods. Particularly younger athletes and athletes who believed doping to be used internationally shared this view. The situation in which an athlete is tested positive without using prohibited substances would be a serious matter for the legitimacy of anti-doping efforts, and particularly challenging for the individual athlete, who would be responsible for proving that the substances did not enter his/her body (*the strict liability principle*, WADA, 2015, Article 2.1.1) and, at worst, risk being penalised with up to four years of ineligibility, depending of the substance (WADA, 2015, Article 10.2). According to researchers, false positive testing results can be linked to mistakes made at the laboratory (Delanghe, Bollen, & Beullens, 2008; Lundby et al., 2008) or be seen as an expected outcome whose frequency will increase or decrease, depending on the standards set by anti-doping authorities (Pitsch, 2009). Similarly, one explanation of athletes' concerns about false positive testing results can be linked to mistakes made during doping tests associated with unprofessional doping controls. A Norwegian study found that among 236 elite athletes surveyed, 10% reported that they had personal experience of doping controls outside Norway in which they feared false positive test results because the control procedures seemed unprofessional, and less than 4% had such experience during controls in Norway (Hanstad & Loland, 2007). Broadly similar to these findings, nearly half of the Danish athletes who were tested stated that they sometimes feared being tested positive during a doping control even though they had not taken any prohibited substances (Elbe & Overbye, 2014; Overbye, 2013). This fear can also be associated with a fear of testing positive due to negligence, for example when an athlete unknowingly or mistakenly consumes prohibited substances. Furthermore, although the current study examines athletes' perceptions of whether or not false positive doping tests can occur, it might be the case that some athletes in the current study associate 'a false positive test' with a 'positive doping test due to negligence'. Cases occasionally happen in which athletes are tested positive, presumably due to their own negligence (or this is often what is claimed). Such cases can occur if an athlete uses a contaminated nutrition supplement (e.g. Geyer et al., 2008) or consumes contaminated meat. In addition, when a TUE is granted, due to the inter-individual metabolic variability of drugs, the taking of medicines prescribed can lead to positive test results above the therapeutic range, even though the drug was administered in the therapeutic doses.

4.2.2. False negative: how to cheat the testing system and avoid a positive test result

Several athletes in the current study showed more in-depth knowledge about the science behind drug testing and the deficits of the testing system – and how these shortfalls made it possible to cheat the system and avoid positive testing results. The recent report to WADA provides further support for the athletes' claims with regard to difficulties in detecting micro-dosages of EPO, growth hormone and testosterone, as well as the insufficient use of EPO and IRMS testing. The report even states that profiles with abnormal *T–E* ratios of 10:1–12:1 have been identified without an IRMS test being performed (WADA, 2013). These weaknesses of testing, as well as the inappropriate implementation of rules in laboratories, are real challenges for the legitimacy of the testing system and weaken its deterrent effect. Moreover, the view that it is possible to cheat the system for athletes who can afford to consult a 'doping doctor' is supported by the recent evidence on how athletes have avoided positive testing results for years despite frequent testing and also on the significant role of doctors in assisting athletes in these cases (e.g. the Armstrong case, Fuentes and the recent case involving Dr. Geert Leinders). It is a common view, moreover, that doctors and the pharmacological industry will always be one step ahead of the testing system; for example, a study found that nearly one-third of the elite athletes surveyed believed that some athletes in their sport were using undetectable drugs/methods (Overbye, 2013).

In the third Code (WADA, 2015), the focus has been broadened, thus possibly shedding light, to a greater extent than previously, on other stakeholders involved in athletes' doping. Investigation and intelligence-gathering responsibilities of anti-doping organisations have been integrated into the International Standards for Testing (WADA, 2015, Article 11, 12). For example, when a minor has committed an anti-doping rule violation, it is now required to investigate whether athletes' support personnel have been involved.

If stakeholders are committed to investigation strategies and collaboration with other stakeholders is prioritised, the new rules should contribute to a more efficient and effective anti-doping system across the world. Yet one can only speculate about how these responsibilities will be implemented by different stakeholders. It seems likely that stakeholders will interpret rules in different ways and that their willingness to initiate and engage in investigations will greatly differ. Additionally, the initiation of investigations might also face obstacles because some stakeholders lack expertise or financial resources. Therefore, unless most stakeholders are committed to investigations, unless additional resources are available for stakeholders and unless the issue of the current divergent standards of compliance is dealt with, introducing more requirements and stricter rules may further increase the discrepancy between stakeholders' commitment and thus the inequality of the system.

4.3. Does previous experience with testing influence athletes' perceptions of the testing system?

It was hypothesised (cf. Section 1.3) that past experience with testing might affect athletes' trust in the testing system. The results show, on the one hand, that athletes with previous experience with testing are more likely to believe that it is not

possible to cheat during controls. On the other hand, they are more likely to believe that controls are sometimes downgraded in certain countries. The results also show that experience with flaws during control can lessen trust in control procedures. The study thus confirms a relationship between (dis)trust in the testing system and personal experience of administrative procedures such as TUEs and whereabouts reporting (Overbye & Wagner, 2013; Overbye & Wagner, 2014). Results relating to athletes' trust in the testing system, however, show in some cases dissimilar and more complex patterns of (dis)trust. Nevertheless, how athletes' previous experience of testing influences their judgement of the effectiveness of the system and its deterrent effect should be investigated further.

4.4. Does the proximity of doping in the athletes' sport influence their perceptions of the testing system?

A further assumption was that the proximity of doping might influence athletes' trust in the testing system (cf. Section 1.3). The results confirm this assumption. The patterns of distrust were somewhat predictable. Athletes' trust in Danish controls was lower when doping occurred in the athletes' close proximity, i.e. when the respondents knew other persons with doping experience personally and believed that doping was used in their sport at a national level. Likewise, when the respondents believed that doping was used by athletes in their sport worldwide, they were more likely to be dissatisfied with control systems outside Denmark. In keeping with this, athletes from speed and power and endurance sports were more likely to be dissatisfied with the testing system outside Denmark not only with regard to the extensiveness of the testing programmes but also with regard to what they presumed to be a less committed fight against doping in certain countries. These results point towards some interesting aspects relating to the implementation of policy and trust. However, the results also cause concern because athletes who (i) assume doping to be used in their sport, (ii) know people in their sport with doping experience personally and (iii) are practising a sport in which doping has a great impact on performance, are (if not doped themselves) the athletes who would especially need the testing system to function across the world.

4.5. Limitations

A limitation of this study is that the study addresses only Danish elite athletes. Culture-specific issues must be considered when reading the results as the national implementation of testing programmes takes various forms and shows great diversity across countries and among international federations (cf. Sections 1.1 and 1.3). Moreover, it is sometimes impossible to make a clear distinction between the Danish testing programme and the testing conducted by other stakeholders (cf. Section 1.3). In addition, it is not always possible to identify when and where athletes experienced, for example, a flaw in the system and which stakeholder involved in the testing caused the flaw. Athletes may refer to incidents that happened long ago. However, this incident may still have an impact on how they perceive the current testing system in their sport. In addition, some questions may have been perceived as 'loaded', and this might have had an impact on some athletes' answers. A further limitation is that many athletes reported in some of the questions that they did not have an opinion or were unsure how they perceived the functioning of the testing system, particularly outside Denmark. Explanations for this might be that some athletes found it difficult to answer specific questions because: (i) they had very little insight into anti-doping efforts in their particular sport; (ii) they did not believe doping to be a problem in their sport; (iii) athletes who had not yet been tested might find it more difficult to relate to the questions; or (iv) athletes found questions on doping control efforts in their sport particularly sensitive and thus decided not to answer – or gave an answer that they perceived to be socially desirable. The issue of *social desirability* frequently arises when investigating sensitive questions about doping (e.g. Gucciardi, Jalleh, & Donovan, 2010; Petróczi & Naughton, 2011; Pitsch & Emrich, 2012). The questions asked in this study always address the way in which the individual athlete perceives the testing system in his or her specific sport. Therefore, answers might reflect some degree of social desirability; for example, the athlete risks bringing him or herself as well as their sport (in Denmark and outside) under suspicion when they criticise the testing programmes and implementation of these.

5. Concluding remarks and implications

This study illustrates how macro-structures at the global policy level – which face challenges in the implementation process – are perceived by elite athletes. In particular, the present study was designed to investigate how elite athletes perceive and trust – the functioning of the doping testing system in their sport in and outside Denmark. As shown, athletes had diverging approaches to the testing system, and there was great diversity in the levels of (dis)trust in the current doping testing system within the group of elite athletes. The athletes diverging approaches indicate that contemporary anti-doping policy is simultaneously met with support, trust, distrust and frustration. Some of the main findings pertained to: (i) a rather high degree of trust in the national testing programme and in the way controls are carried out in Denmark, but relatively low trust in the testing programmes and doping controls in certain countries or at some international sporting events; (ii) that past experience of testing seemed to have a positive influence on trust in the concrete measures. In contrast, athletes with experience of tests and older athletes showed a lower degree of trust when it comes to the implementation of doping testing programmes in some countries; (iii) that experience of flaws

during doping control procedures or good knowledge of the science behind testing decrease the athlete's trust in the functioning of the testing system; (iv) the proximity of doping in an athlete's sport influenced the athlete's perception of the testing system. Athletes who needed the testing system to be effective and functioning well across the world showed greater distrust in the current testing system; and, finally, (v) the results confirmed a relationship between (dis)trust in the testing system and personal experience of administrative procedures (although in some cases athletes' trust in the testing system showed dissimilar and complex patterns of (dis)trust).

The study confirms other studies (cf. Section 1.1) which suggest that the current policy – due to great disparities among stakeholders' harmonisation standards and their depth of compliance with the Code – seems to have led to a different kind of inconsistency and new forms of inequality between athletes subjected to different testing regimes. In line with this, Houlihan (2014:7) states that although implementation seems successful in terms of output (e.g. the number of tests and Code signatories), there is a certain suspicion that compliance is weak among some IFs and governments and these inadequate compliance standards undermine the efforts of the current policy regime. The current study adds knowledge to this problem by showing how suspicion towards certain stakeholders (in their implementation of doping testing programmes and presumably weak monitoring of athletes) seems deeply rooted at the athlete level. Moreover, the study provides additional evidence of the challenges facing WADA and offers an insight into additional problems regarding the implementation of policy: namely, some athletes' remarkably low degree of trust in the functioning of the testing system in certain countries; athletes' experiences of flaws; some athletes' frustration, distrust or dissatisfaction with different elements of the current testing system (e.g. the feeling of unfairness or greater dissatisfaction among some of the athletes who particularly need the system to be effective) and why some athletes do not regard the current testing system as a great deterrent. It must be noted, however, that a great majority of athletes in the current study reported that they supported doping testing in sport, as well as the compilation of a prohibited list (Overbye, 2013). Thus, distrust, dissatisfaction or frustration do not relate to the measure itself or to the rules prohibiting doping but to the implementation of doping testing regimes per se. Anti-doping authorities depend on athletes' support and trust in order to effectively prevent doping in elite sport and to legitimise the extensive anti-doping programme. Therefore, athletes' distrust and sense of injustice are issues that need to be dealt with.

To increase the athletes' trust in the testing system and enhance its deterrent effect, it may be recommended that anti-doping authorities consider the following points:

1. Information and transparency with regard to how the testing system is implemented by the different stakeholders should be increased. This may encourage (or force) stakeholders who currently just adhere to rules to move towards greater compliance. Moreover, increased transparency may also decrease suspicion arising from athletes' lack of knowledge of how the testing system functions in certain countries or reverse.
2. The level of information and the education of stakeholders engaged in doping controls (e.g. doping control officers and event organisers) should be increased in order to ensure that controls are always carried out according to the rules in a professional and respectful way.
3. Stakeholders involved in testing should be aware of how their test distribution plan influences athletes' perceptions of and trust in the functioning of the system. Moreover, blood tests are an important element if testing programmes are meant to be a deterrent.
4. It may be recommended that WADA clearly outline what is considered an efficient testing programme and initiate better measurement tools to decide whether a stakeholder's testing programme is sufficient. Simultaneously, it should initiate more discussions among stakeholders engaged in testing about their interpretations and implementations of rules and guidelines for best practices, for example about how they interpret "risk".
5. Lastly, inadequate compliance standards need to be dealt with. Inconsistent implementation of the Code and inadequate compliance standards create a new type of inequality between athletes subjected to different testing regimes. Thus, this study supports Houlihan's (2014) conclusions that the current monitoring and compliance system needs reforming if the current momentum in anti-doping policy is to be maintained and supports his proposals for achieving greater compliance in the future.

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Appendix A

See Tables A1 and A2.

Table A1

Overview of variables significant on a bivariate level, the logistic regression starting model and the final model.

	Variables significant on a bivariate level (see Table 1)	Start model ^a	Final model (see Sections 3.1 and 3.2)
1	Athletes who personally knew someone with experience of doping in their own sport were more likely to disagree that the current national testing system was appropriate (40% vs. 29% of athletes who did not know someone with experience of doping in their sport).	Gender, age, sport type, doping tested + know someone in his/her sport with experience of doping [and their two-factor interaction terms]	Age, the perception that doping is used in his/her sport in DK The final model was significant ($\chi^2 = 26.89$, $df = 2$, $p < 0.0001$; Cox and Snell $R^2 = 0.072$; Nagelkerke $R^2 = 0.104$)
2	Athletes of 20 years and older (77% vs. 64% younger than 20 years of age), those who practised speed and power (83%) or endurance sports (77%) (vs. 59% MS/67% of TS athletes) and athletes who believed that doping was used in their sport at an elite level in different countries (73% vs. 56% athletes who did not believe doping was used) were more likely to agree that the control system outside Denmark was not extensive enough.	Gender, age, sport type, doping tested + the perception that doping is used by athletes in his/her sport internationally [and their two-factor interaction terms]	Gender, age, sport type, the perception that doping is used by athletes in his/her sport internationally, sport type*gender. The final model was significant ($\chi^2 = 31.53$, $df = 8$, $p < 0.0001$; Cox and Snell $R^2 = 0.101$; Nagelkerke $R^2 = 0.146$)
3	Athletes of 20 years and older (90% vs. 77% of athletes younger than 20 years of age), who practised speed and power sports (96% vs. 88% ES/83% TS/62% MS), those who were tested for doping (89%/ particularly those tested four times or more within the previous 12 months, 98% vs. 77% not yet tested) and athletes who did not believe that doping was used in their sport in DK (90% vs. 82% who believed that) were more likely to agree that doping control was downgraded in some countries.	Gender, age, sport type, doping tested + the perception that doping is used in his/her sport in DK [and their two-factor interaction terms]	Age, sport type. The final model was significant ($\chi^2 = 29.14$, $df = 4$, $p < 0.0001$; Cox and Snell $R^2 = 0.085$; Nagelkerke $R^2 = 0.149$)
4	Athletes below 20 years of age (25% vs. 11% of athletes 20 years or older), those who did not have any experience of doping testing (31% vs. 10% who had been tested), those who believed that there were athletes who used doping in their sport at an elite level in DK (19% vs. 11% who did not believe that) and those who knew persons in their sport with experience of doping (21% vs. 12% did not know persons in their sport with experience of doping) were more likely to agree that it was sometimes possible to cheat during controls in DK.	Gender, age, sport type, doping tested + the perception that doping is used in his/her sport in DK + know someone in his/her sport with experience of doping [and their two-factor interaction terms]	Age, doping tested, know persons in his/her sport with experience of doping. The final model was significant ($\chi^2 = 36.70$, $df = 3$, $p < 0.0001$; Cox and Snell $R^2 = 0.090$; Nagelkerke $R^2 = 0.156$)
5	Athletes who had not (yet) been tested (58% vs. 41% who had been tested) were more likely to agree that it was sometimes possible to cheat during controls in foreign countries.	Gender, age, sports type, doping tested [and their two-factor interaction terms]	Sport type, doping tested. The final model was significant ($\chi^2 = 15.87$, $df = 4$, $p < 0.003$; Cox and Snell $R^2 = 0.057$; Nagelkerke $R^2 = 0.076$)
6	Athletes who were younger than 20 years of age (43% vs. 22% of athletes 20 years or older), athletes who had not (yet) experienced a doping test (43% vs. 23% who had been tested) and those who believed doping was used in their sport in DK at an elite level (36% vs. 20% who did not believe that) were more likely to believe that some athletes would be tested positive without being using doping.	Gender, age, sport type, doping tested + the perception that doping is used in his/her sport in DK [and their two-factor interaction terms]	Gender, age, believe doping is used in his/her sport, age*gender. The final model was significant ($\chi^2 = 13.18$, $df = 4$, $p < 0.010$; Cox and Snell $R^2 = 0.025$; Nagelkerke $R^2 = 0.035$)

Note: The analyses were performed using backwards manual stepwise elimination (see Section 2.3).

^a Gender, age, sport type, experience of doping testing are always included in the model. Variables of theoretical interest are only included in the model when significant at a bivariate level.

Table A2

Statements made by athletes relating to their experiences with and perceptions of the implementation of testing programmes and stakeholders' handling of the doping control procedures.

#1	More doping testing would be better, particularly blood testing (female, endurance sport)
#2	There should be more tests during the night, although it would be disruptive. But that is the time it is possible to detect micro-doses that are out of the body the following day. That is how the "big fish" in my sport have been caught (male, endurance sport).
#3	I think it's okay to be tested for drugs, but only because we are seldom tested and therefore I can live with it. But if we were tested more often, I would think it was a waste of resources and my time as I don't believe that doping is in any way a problem in football (male, team sport)
#4	There is not a sign of doping in my sport. Nevertheless, we are placed in the "high-risk group" and are FREQUENTLY tested. This is a waste of resources (female athlete, endurance sport).
#5	Way too often, I see that those from Anti-doping Denmark select the wrong athletes, in cases where there are often some "obvious" candidates (male, speed and power sport)
#6	They should be more progressive and test some of the athletes in my sport that are not the best, because the best athletes know they are tested all the time internationally and nationally, but those athletes just on their way to being good, they could decide to use it [decide to use doping] (male, endurance)
#7	They should look more often in a more subjective manner at which athletes are selected. Great, sudden progress should always cause suspicion and result in testing, instead of just testing, for example, the athletes that won the medals (male, endurance athlete).
#8	One year I was tested at all competitions, it felt discriminating (female, motor-skill sport)
#9	... I know that 'NN's' biggest competitor at the Olympic Games was tested each day after his competition and 'NN' was not even tested once! I mean you are not [normally] tested every day, and it is extremely demanding after your competition—I mean all the time, it is complete cheating! So I am convinced that in some cases in some tournaments it is controlled. There they know who will be selected for testing and can... (male, speed and power sport).
#10	Well you can say there would be a reason to go to "this country" and test their athletes, or go to "that country" to test their athletes when they are away for half a year. What are they doing out there? No one knows what is going on! (male, speed and power sport)
#11	And the worst part is that you don't really have a feeling of how frequently they are tested [...] I also think it looks like it is extremely difficult to test athletes in this country, because I also think "anti-doping X" just ignore it, like this is medals to us. (female, speed and power sport)
#12	There are some countries in which the national anti-doping agency turns a blind eye, definitely [...] that is also why the international federation conducts unannounced testing and doesn't just rely on the Danish controls. Because, although the system functions in Denmark, it is different in some countries. You hear stories, for example from "this country" where they arrive [to conduct testing] and then the athlete says, 'I don't have time today; you must come again tomorrow.' I am sure there are differences in how people handle it! [manage testing] (female, endurance sport).
#13	Once, I got a form in my hand in Spanish, and the man talked Spanish to me [...] It is unprofessional when someone comes—and they were from WADA – firstly, they have to speak English, it has to be a female [DCO]. There was a female [DCO] but she also went in with the males. We experience this time after time when we are out. I just make sure my numbers are correct [on the sample containers and the doping control form], that is the only thing I can do to ensure myself [not to have the samples changed by mistake with the sample of another athlete]! I just think it is a shame. We have a super good system at home because they catch athletes, if they can. And then it is not like this elsewhere. Then it [the system] just falls apart, and then I think the money is wasted! (female, speed and power sport).
#14	You are forced to have it [doping testing] and also the preventive work, but they don't make any difference in my eyes. They are forced to have it because they would be criticised if they did not have it as a nation—a sport nation. But I do not really think there is more to it. It is only because it is necessary to have it, to keep their backs free. (male, endurance sport)
#15	Internationally, the focus is mainly on cycling as a 'doping sport'. However, it is incredible that no one, for example, does anything about the soccer players that die on the field due to a heart failure. Instead they come up with stories about being born with a heart defect. And there is 'Operation Puerto', in which 150 athletes were doped. Only cycling was criticised for having 20 riders involved, while all the other doping sinners from soccer, tennis, team handball, etc. got away without being mentioned in the case—it is ridiculous! (male, endurance sport)
#16	Doping and the anti-doping system distort competition even more because it is those [athletes/countries] with [access to] the drugs and doctors on the front edge that can use it [use doping]. The [drugs] available on the market can be traced in the doping tests, and there are athletes that are saved by their federation/country/team if they get caught and the country is rich, and so they are not punished or banned (female, endurance sport)
#17	Most of the times I was tested, I was informed where to meet up the following morning, the day before the testing. (female, team sport)
#18	I am wondering: I was tested negative and asked again one month later, but when I said that I had just been tested negative (as they could see on their paper), then I avoided being tested again... a little disconcerting that it is so easy to avoid testing (male, team sport).
#19	You hear a lot about mistakes with the doping tests, etc. so I sometimes worry about being suspected by mistake (male, motor skill sport).
#20	There are too many slip-ups. So if there finally is someone in trouble, then they just hire a top lawyer that can identify 3–4 procedure failures [...] It is not something I practise, but you could make a note. You could write "there are too many people in the room", or "I am alone, I do not have a doping control officer with me", you could come far [in a doping defence] by writing a note, but I do not do that (male, endurance sport)
#21	Players are tested by my federation, so no one is using doping? (female, team sport)
#22	[...] I never had a blood test taken. They cannot detect it in urine. So I could [use blood doping without being detected], if I would. (male, endurance sport)
#23	People can use drugs like growth hormones, EPO and testosterone without being caught because the window of detection is so narrow (male, endurance sport).
#24	... the T/E ratio with Testosterone and Epitestosterone should be more than 4:1 before they [the testing authorities] care to do something about it. If you train hard, it decreases, of course only for males [...] if you go on a one-month training camp, then it will drop and then you can compensate for the decrease—let us say you normally naturally have 2.5:1 [T/E ratio]—and then it drop to 0.5:1; then you can take it up to 2.5:1 because of the decrease—just to compensate without it looking suspicious. And those tests are expensive, the Isotope test [IRMS]. I assume that is why they do not test if it is artificial or natural Testosterone [when T/E ratios is lower than 4:1]. (male, endurance sport)
#25	The 'doping doctors' are extremely capable [...] and there is more money in cheating than being honest, that is for the doctors! So I think the best doctors will certainly try to cheat. That is, they develop methods to cheat. I think, if you have enough money, you can cheat. (male, endurance sport).

Note: Author's translation. Athlete's statements are not representative for all athletes.

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