

ATTITUDES, BELIEFS, AND BEHAVIORS OF ELITE SINGAPORE ATHLETES TOWARDS DOPING

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Summary

This study investigated the current attitudes, beliefs, and behaviors of elite Singapore athletes towards doping through examining the theoretical components proposed in the Sport Drug Control Model. Participants (N = 245) completed a survey consisting of 52 items measuring the various constructs. Results indicated that the majority of participants generally held negative attitudes towards doping and claimed to have never engaged in doping behaviour. Consistent to these findings, a large majority of participants also had strong moral beliefs against doping and perceived that their reference groups (e.g., coaches, parents, and teammates) would disapprove doping. However, a significant proportion of participants were unaware of the negative health effects of various performance enhancing substances (PES), as well as the legitimacy of anti-doping organisations. These findings elucidate the need for Anti-Doping Singapore to provide more information on the different types of PES and their ill effects in drug education programmes. Anti-doping initiatives should also focus on increasing athletes' perceptions of the fairness and accuracy of drug testing procedures.

Keywords – Doping, Athlete, Singapore, Perceptions, Attitudes, Beliefs, Behaviour

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Introduction

In Singapore, the sporting culture and participation rates have been steadily growing over the years. Based on the 2015 Sports Index, more than half of Singaporeans (54%) engage in physical activity regularly (Sport Singapore, 2016). In addition to the rising participation rates in recreational sports, Singapore's achievements in the competitive sports scene have also received considerable attention, such as Joseph Schooling's swimming gold medal in the 2016 Summer Olympics.

While the glory of triumphs is the pinnacle that every athlete hopes to achieve, to cope with the despair of defeats can also be particularly challenging. The fine margins in sports, coupled with increasing pressures to perform, imply that athletes have to constantly need to strive harder to gain an edge over their competitors. Amongst many, one temptation athletes may face throughout their careers is considering the use of performance enhancing substances (PES), or doping.

The phenomenon of doping in sports is fast becoming a perennial issue around the world, with past research indicating that approximately 14-39% of current elite athletes have deliberately used PES (de Hon, Kuipers, & van Bottenburg, 2014) for aiding athletic performance. Singapore has also had to grapple with cases of doping, with the highest profile case involving seven bodybuilders being suspended for two years after failing the drug test whilst participating in a local competition (Anti-Doping Singapore, [ADS], 2012). This highlights the need for informing athletes of the consequences of doping, which coincided with the establishment of ADS in 2010 to enforce anti-doping regulations and develop mechanisms of enhancing awareness and education related to drug abuse in sports amongst athletes and coaches.

There have been various reasons cited for athletes who admitted to using PES over the years, including facilitating recovery, improving performance as well as the false consensus

effect, wherein athletes perceive that others engage in doping (Morente-Sánchez & Zabala, 2013). However, these reasons by themselves are not adequate in explaining doping behaviour from a holistic perspective. Even when combined, they fail to account for why only some athletes choose to dope whereas others are able to resist the temptation and stay drug-free. While the methods to detect PES (urine, blood, gene, athlete biological passport) continue to evolve and get more sophisticated in the efforts to keep sports clean and deter athletes from using PES, psycho-social variables (perceptions, attitudes, beliefs) may be the key factors in developing awareness and education amongst athletes to prevent doping in sport (Backhouse, Atkin, McKenna & Robinson, 2007). Consequently, a number of cognitive decision making (Strelan & Boeckmann, 2006), behavioural science (Lucidi, Zelli, Mallia et al., 2008), and theory of planned behaviour (Ajzen, 1991) related models have been applied to doping studies to gain insights into the possible social and non-social cognitive processes underlying the phenomenon of doping in sport. However, the aforementioned and other similar studies had limited focus and could not comprehensively elucidate the complex nature of doping behaviour and the interactions between the multiple socio-behavioural correlates associated with it.

One of the models providing a comprehensive understanding of the use of PES amongst athletes was the Sport Drug Control Model (SDCM) developed by Donovan et al. (2002). The SDCM represents a comprehensive framework developed from social cognitive theories that have been empirically tested and widely accepted in health promotion, such as the Theory of Reasoned Action (Gucciardi, Jalleh, & Donovan, 2011). The Theory of Reasoned Action originally proposed by Fishbein and Ajzen (1975) postulated that behavior is a result of intention that can be predicted based on an individual's attitudes and subjective norms. In other words, one's own pre-existing attitudes and their perceptions of others' attitudes towards doping can greatly affect whether an athlete intends to use prohibited

substances (Lucidi, Grano, Leone, Lombardo, & Pesce, 2004). Hence, this points towards a growing evidence that the behaviour of doping extends beyond the self to societal pressures, whereby athletes are able to mutually influence one another and thus create a culture where doping is tolerated.

Based on these findings, the premise of the SDCM is that athletes' attitudes towards the use of PES is a key determinant of their actual behaviour of PES use. Attitudes are said to be shaped by six central factors, namely: (1) personal morality, (2) legitimacy perceptions, (3) benefit appraisal, (4) threat or deterrence appraisal, (5) personality factors, and (6) reference group opinion (Donovan et al., 2002). Additionally, two 'market factors' are also said to be able to influence an individual's behaviour of PES use: (1) availability and (2) affordability of the PES (Donovan et al., 2002).

All of the eight factors mentioned above are related to an athlete's individual beliefs about issues related to doping. Personal morality refers to an individual's moral stance regarding the use of banned PES, that is, the extent to which he/she believes whether doping is morally right or wrong (Donovan et al., 2002). Legitimacy perceptions are more concerned with athletes' beliefs about the constitution of anti-doping organisations, which are influenced by three dimensions of justice: (1) distributive justice – fairness of outcomes in drug testing, (2) procedural justice – fairness of the appeal process, and (3) interactional justice – interpersonal treatment received during drug testing procedures (Donovan et al., 2002). Benefit appraisal is operationalised through an athlete's beliefs about the impact of using PES on sport performance whereas threat appraisal involves athletes' beliefs about the negative consequences of doping such as likelihood of being caught and subsequent sanctions as well as the ill health effects of PES use (Donovan et al., 2002). Personality factors can include athletes' self-efficacy in refraining from doping, which deals with their beliefs in their ability to avoid or resist using PES (Lucidi et al., 2008). Reference group opinion, also

known as subjective norms, refer to athletes' beliefs about whether 'important others' will support doping (Finlay, Trafimow, & Moroi, 1999). Finally, athletes may have differing beliefs regarding the availability of PES (i.e., the ease of acquiring PES) and the affordability of PES.

The behavior of athletes with regard to doping is another important yet problematic measure, given the difficulties involved in getting athletes to reveal information that may ultimately put their sporting careers at stake (Morente-Sánchez & Zabala, 2013). Objective measures (i.e., drug testing) may not truly reflect the prevalence of doping considering the fact that not all athletes are subjected to mandatory drug testing and even so, chemical analyses can only detect traces of PES at the time of sample collection (Hatton, 2007). For subjective measures involving questionnaires or interviews, there are also a number of practical limitations that may hinder researchers from obtaining accurate figures of doping, such as gaining access to the target population and the reluctance of athletes to share their opinions on doping even with the guarantee of anonymity (Bloodworth & McNamee, 2010).

Previous studies on athletes' attitudes and beliefs have found that athletes generally show anti-doping attitudes and the conception that using PES is a form of cheating behaviour (Morente-Sánchez & Zabala, 2013). For instance, a study in France found that more than 90% of student elite athletes described doping as dishonest and unhealthy due to sanctions (Peretti-Watel et al., 2004). Similarly, another study showed that 91% of Dutch elite athletes would experience feelings of guilt if they were to use PES (de Hon, Eijs, & Havenga, 2011).

On the other hand, past research on athletes' doping behaviour has offered little indication of the actual prevalence in light of the reasons mentioned previously. While findings from doping control tests suggested an estimated 1-2% of elite athletes using PES in an average year, this figure was commonly believed to be a less than ideal representation of

athletes' actual behaviour (de Hon et al., 2014). Self-reported use studies typically yield a wider range of 1.2% to 26%, with the discrepancy between the two ends attributed to the type of population being sampled (Uvacsek et al., 2011). This emphasises the need for more expansive and reliable information on the doping prevalence across different populations (e.g., type of sport or culture).

Thus far, there appears to be a limited body of research regarding the doping scene in Singapore. To date, the only related doping studies conducted in a Singapore context involved measuring national athletes' awareness, knowledge and perceptions towards anti-doping (Wong, 2015; unpublished data) and another examining the use of dietary supplements among elite athletes (Slater, Tan, & Teh, 2003). To address this research gap, this study aims to assess the attitudes, beliefs and behaviors of elite Singapore athletes towards doping in order to evaluate the effectiveness of current anti-doping policies in Singapore. Results from this study will provide valuable information to the National Anti-doping Organisation (NADO)- Anti-doping Singapore (ADS), to review and refine future education and awareness programmes for athletes on various aspects related to doping. In the long run, this can help to deter doping in sport, while positively influence athletes' values towards fair play.

Methods

Instrument

A package consisting of a 14-page questionnaire from the WADA Social Science Research Package, a reply-paid envelope and a covering letter encouraging voluntary participation was mailed to the entire pool of Singapore's carded athletes competing in one of the following four categories listed in Table 1. Ethical approval for this study was granted by the Nanyang Technological University's Institutional Review Board (IRB) prior to the commencement of the study (Approval letter no. IRB-2017-05-012, dated 18 Jul 2017; Appendix A). Informed consent was also obtained through athletes' signatures on the consent form before their participation.

Table 1

Categorical Levels of Singapore Carded Athletes

Level 1	Top 8 at Olympic Games/World Championships
Level 2	Top 6 at Asian Games/Top 3 at Commonwealth Games
Level 3	Top 4 at last South East Asian Games
Level 4	Top 3 at a National Championships for individual sports and for team sports, a medal placement at a regional championship with at least six teams participating

The questionnaire used was a standardised survey comprising of 52 questions (Appendix B) which could be found in the World Anti-Doping Agency (WADA) Social Science Research Package by Donovan, Jalleh, and Gucciardi (2015). This package has already been used on a similar study on Australian athletes (Gucciardi, Jalleh, & Donovan, 2010) and its standardized methodology facilitates the cross-comparison of research data among

international anti-doping agencies, as well as comparisons between this study and any future anti-doping studies carried out in Singapore. The sample items in the questionnaire, which represent the constructs mentioned in the SDCM can be found in Table 2. These include attitudes towards PES use, doping behaviour, and the eight factors related to an athletes' beliefs about doping issues.

Table 2

Overview of the study constructs, sample items and response scales/categories in the questionnaire

Construct	Sample Item	Range
Doping behaviour	Which one of the following most applies to you?	(1) Never considered using PES to (7) Regularly try or use banned PES
Attitudes towards doping	If you were offered a banned PES under medical supervision at low or no financial cost and the banned PES could make a significant difference to your performance and was currently not detectable, how much consideration do you think you might give to this offer?	(1) None at all to (4) A lot of consideration
Personal morality	Regardless of whether you believe performance enhancing substances or methods (PESM) should be banned or allowed, which of the following statements best describes your own personal feelings about deliberately using banned PESM?	(1) Morally wrong under any circumstances to (3) Morally OK under any circumstances
Legitimacy perceptions	How fair is the (insert name of NADO) in terms of treating all athletes equally?	(1) Very fair to (4) Very unfair, (9) Don't know
Benefit appraisal	If you were to use a banned PES of your choice, how likely is it that you would improve your performance in your sport?	(1) Definitely would not to (5) Definitely would, (9) Don't know
Threat appraisal	How much harm to your health do you think would be caused by using each of the following substances regularly? 1. Anabolic steroids, 2. Beta-blockers, 3. Designer steroids like tetrahydrogestrinone (THG), 4. Erythropoietin (EPO) and other similar substances, 5. Human growth hormones, 6. Diuretics	(1) No harm to (4) A lot of harm, (9) Don't know

Personality factors (self-efficacy)	How confident are you in being able to resist pressure from your team mates to use a banned substance?	(1) Very confident could resist to (5) Wouldn't want to resist
Reference group opinion	If you decided to use a banned PES, to what extent do you think each of the following people would approve or disapprove, or would not care either way if you did that? 1. Your coach, 2. Parents, 3. Team mates/training partners, 4. Team doctor, 5. Close friends, 6. Trainer	(1) Would definitely approve to (5) Definitely disapprove
Availability of PES	How easy or difficult would it be for you to get each of the following types of substances if you wanted to? 1. Anabolic steroids, 2. Beta-blockers, 3. Designer steroids like tetrahydrogestrinone (THG), 4. Erythropoietin (EPO) and other similar substances, 5. Human growth hormones, 6. Diuretics	(1) Probably impossible to (5) Very easy, (9) Don't know
Affordability of PES	How expensive would it be for you personally to buy each of the following types of substances? 1. Anabolic steroids, 2. Beta-blockers, 3. Designer steroids like tetrahydrogestrinone (THG), 4. Erythropoietin (EPO) and other similar substances, 5. Human growth hormones, 6. Diuretics	(1) Very cheap to (5) Very expensive, (9) Don't know

Participants

A total of 245 carded Singapore athletes responded to the survey (response rate 19.9%), with a mean age of 25.16 years (SD = 10.91) ranging from 12 to 70 years old. The sample included an even spread of male (n = 114) and female (n = 127) participants (not specified: n = 4). The sports represented covered a broad spectrum of individual (e.g., athletics, bowling) and team sports (e.g., football, rugby), with athletics (10.9%) being the

most represented sport from the total sample (see Table 3). The highest level which athletes have competed at included the Olympic Games (5%), international events (76.1%), national competitions (8.1%), and regional/district competitions (9.9%). 73.4% had held international (30.6%) or national titles (42.8%) and most of the participants (82%) had competed in their main sport for five or more years. Amongst the respondents, 12.2% competed in events for athletes with a disability.

Table 3 *Distribution of responding athletes from different sports*

Sport	Percentage (%)
Athletics	10.9
Sailing	9.9
Shooting	8.7
Bowling	5.9
Wushu	5.0
Fencing	3.6
Dragonboat	3.3
Football	3.2
Silat	3.2
Swimming	3.2
Table Tennis	3.2
Archery	2.7
Basketball	2.7
Waterpolo	2.7
Canoeing	2.3
Gymnastics	2.3
Baseball	1.8
Cricket	1.8
Cycling	1.8
Ice Skating	1.8
Lawn Bowls	1.8
Contract Bridge	1.4
Dancesports	1.4
Netball	1.4
Rugby	1.4
Badminton	0.9
Hockey	0.9
Rowing	0.9
Softball	0.9
Synchronised Swimming	0.9
Triathlon	0.9
Waterski	0.9
Wrestling	0.9
Boxing	0.5

Cuesports	0.5
Diving	0.5
Equestrian	0.5
Judo	0.5
Muay Thai	0.5
Squash	0.5
Taekwondo	0.5
Tennis	0.5
Weightlifting	0.5
No response	1.8

Statistical Analysis

The data was analysed using IBM SPSS Statistics version 24. Descriptive statistics were computed, that were based on constructs included in the SDCM (Donovan et al., 2002). The overview of the findings regarding athletes' attitudes, beliefs and behaviour towards doping are presented in figures and percentages.

Results

Attitudes

Attitudes towards doping were assessed from (a) susceptibility to doping and (b) intention to dope in the near future. Athletes' responses to the questions measuring these constructs of attitudes were presented in Table 4. In general, a majority of athletes (74.4%) responded as they would not consider using PES, even when the consequences of using them were not present. Remarkably, despite the pressure to win, 92.1% athletes responded that they were confident of refusing any offer to use PES. Regarding intention to dope in the near future, the substantial majority (96.9%) athletes responded that they did not intend to use PES during the present season. These responses suggest that Singapore's elite athletes generally held a negative attitude towards doping.

Table 4

Overview of items measuring attitudes towards doping and their corresponding responses

Construct	Item	Options	Percentage
Susceptibility to doping	If you were offered a banned performance enhancing substance under medical supervision at low or no financial cost and the banned performance enhancing substance could make a significant difference to your performance and was currently not detectable, how much consideration do you think you might give to this offer?	None at all A little consideration Some consideration A lot of consideration No response	74.4 15.3 6.8 4.8 0.0
Susceptibility to doping	Given the pressures athletes are often under to win, how confident are you that you could refuse this offer?	Very confident could refuse Quite confident could refuse Not very confident could refuse Not confident at all could refuse Wouldn't want to refuse No response	75.4 16.7 5.0 1.8 0.0 0.5
Susceptibility to doping	How confident are you in being able to resist pressure from your team mates to use a banned substance?	Very confident could resist Quite confident could resist Not very confident could resist Not confident at all could resist Wouldn't want to resist No response	79.1 16.7 2.7 0.9 0.0 0.9

Intention to dope in the near future	Do you intend to use prohibited substances or methods to enhance your performance or gain a competitive edge against your opponents during this season?	Definitely not	96.9
		Probably not	1.8
		Might or might not	0.9
		Probably will	0.0
		Definitely will	0.0
		No response	0.5

Behavior

Table 5 shows the percentage of athletes' that reported use of various PES, for whichever reason. In general, the majority of athletes (98.7%) responded to have never used any PES in their sporting career and almost 100% in the last 12 months.

Table 5

Self-reported history of PES use

	Have never used (%)	Did not use in the last 12 months (%)	1 to 2 times (%)	3 to 5 times (%)	6 to 10 times (%)	More than 10 times (%)
Anabolic steroids	98.7	99.6	0.4	0.4	0.0	0.0
Beta-blockers	100	100	0.0	0.0	0.0	0.0
Designer steroids like tetrahydrogestrinone (THG)	100	100	0.0	0.0	0.0	0.0
Erythropoietin (EPO) and other similar substances	100	100	0.0	0.0	0.0	0.0
Human growth hormones (hGH)	100	100	0.0	0.0	0.0	0.0
Diuretics	100	100	0.0	0.0	0.0	0.0
Doping methods	100	100	0.0	0.0	0.0	0.0
Alphabodies	100	100	0.0	0.0	0.0	0.0

Of the remaining 1.3% of athletes who reported PES use, all of them responded having used anabolic steroids with varying frequencies, but not other PES or doping methods.

Additionally, responses to another item measuring doping behaviour found that only 0.5% of athletes reported using PES that was not permitted. This figure may be a more accurate reflection of *illicit* PES use in the sporting context, given that the figure of 1.3% may include those who were using PES with therapeutic use exemptions.

Beliefs

Personal morality. The vast majority of athletes (88.9%) believed that using banned PES to improve performance is morally wrong under any circumstances, while less than 2% of athletes felt that using banned PES is morally acceptable under any circumstances (Table 6). This seems to suggest that Singapore's athletes largely hold strong moral norms and beliefs against doping.

Table 6

Items measuring moral beliefs towards doping and its corresponding responses

Construct	Item	Options	Percentage
Personal morality	Regardless of whether you believe performance enhancing substances or methods (PESM) should be banned or allowed, which of the following statements best describes your own personal feelings about deliberately using banned PESM?	I believe deliberately using banned PESM to improve performance is morally wrong under any circumstances	88.9
		I believe deliberately using banned PESM to improve performance is morally OK under some circumstances, but wrong under others	9.9
		I believe deliberately using banned PESM to improve performance is morally OK under any circumstances	1.4

Legitimacy perceptions. Athletes' legitimacy perceptions were measured from the items listed in Table 7 and Table 8. With respect to perceptions of distributive justice, almost half of all athletes (47.3%) had no knowledge regarding the fairness of ADS towards equitable treatment of athletes, while slightly more than a half (51%) responded as not knowing the security of testing procedures in Singapore. Similarly, a substantial majority (~70%) of athletes did not know the accuracy of current drug tests in identifying the substance correctly, from 68.9% for anabolic steroids to 71.8% for beta-blockers (Table 8).

Table 7

Overview of items measuring legitimacy perceptions and their corresponding responses

Construct	Item	Options	Percentage
Legitimacy perceptions (Distributive justice)	How fair is the (insert name of NADO) in terms of treating all athletes equally?	Very fair Fair Unfair Very unfair Don't know	18.5 29.7 4.5 0.5 47.3
Legitimacy perceptions (Distributive justice)	How secure is the (insert name of NADO)'s drug testing procedures in (country)? That is, in the taking of samples and the care of samples?	Very secure Quite secure Not really secure Not at all secure Don't know	23.4 24.3 0.5 0.5 51.0
Legitimacy perceptions (Procedural justice)	How satisfied are you that athletes who appeal a positive test in (insert name of country) will be given a fair hearing?	Very satisfied Somewhat satisfied Somewhat dissatisfied Very dissatisfied Don't know	20.8 28.9 4.8 2.4 42.2
Legitimacy perceptions (Procedural justice)	How satisfied are you that athletes in your sport who test positive will be given a fair hearing before a decision is made about applying a penalty?	Very satisfied Somewhat satisfied Somewhat dissatisfied Very dissatisfied Don't know	22.1 30.2 3.2 2.8 41.6
Legitimacy perceptions (Procedural justice)	How satisfied are you that athletes who appeal a positive test before the Court of Arbitration in Sport will be given a fair hearing?	Very satisfied Somewhat satisfied Somewhat dissatisfied Very dissatisfied Don't know	20.0 29.7 4.0 2.8 42.8
Legitimacy perceptions (Interactional justice)	Did you find the experience of being tested traumatic or upsetting in any way?	No Yes – somewhat Yes – very much No response	78.6 18.5 0.0 3.3
Legitimacy perceptions (Interactional justice)	How would you describe the conduct of the testing personnel?	Courteous Rude Neither No response	72.8 1.1 21.7 4.3
Legitimacy perceptions (Interactional justice)	How would you describe the conduct of the testing personnel?	Helpful Unhelpful Neither No response	80.5 1.1 16.3 3.3
Legitimacy perceptions (Interactional justice)	How would you describe the conduct of the testing personnel?	Friendly Unfriendly Neither No response	82.5 1.1 13.0 3.3
Legitimacy perceptions (Interactional justice)	How would you describe the conduct of the testing personnel?	Sensitive Insensitive Neither No response	58.2 5.4 32.6 5.4

Athletes' perceptions of procedural justice were measured from their satisfaction in receiving fair hearings in the event of positive doping test results. While the dissatisfaction levels of a fair hearing for each of the three scenarios were mostly low ($< 8\%$), there were still about $>42\%$ of athletes who were unaware of the perceived fairness of the appeals process.

Interactional justice was measured from athletes' interpersonal experiences of doping tests. Out of 103 responding athletes who had been drug tested, a large majority of athletes felt that the testing personnel was friendly (82.5%), helpful (80.5%) and courteous (72.8%), and they did not find the entire testing experience upsetting or traumatic (78.6%). However, the percentage of athletes who rated the testing personnel as sensitive was substantially lower (58.2%).

Table 8

Perceptions of distributive justice based on perceived accuracy of testing procedures

	Very accurate (%)	Quite accurate (%)	A little accurate (%)	Not accurate (%)	Not at all accurate (%)	Don't know (%)
Anabolic steroids	15.1	11.0	3.2	0.5	0.8	69.3
Beta-blockers	14.2	10.2	2.4	0.5	0.8	71.8
Designer steroids like tetrahydrogestrinone (THG)	14.2	10.2	3.2	0.8	1.2	70.6
Erythropoietin (EPO) and other similar substances	14.2	10.1	2.4	1.2	1.2	71.4
Human growth hormones (hGH)	15.5	8.9	3.2	0.8	0.8	70.6
Diuretics	15.1	10.9	2.0	0.8	0.8	70.6

Benefit appraisal. The majority of athletes indicated that they did not know about the impact of PES use on their sport performance, ranging from 36.3% for PES of own choice to 56.7% for designer steroids and erythropoietin and related substances (Table 9). Out of the five categories of PES given (excluding PES of own choice), anabolic steroids were considered by athletes to have the most beneficial impact in sport performance ('probably/definitely would': 19.5%), followed by human growth hormone

(‘probably/definitely would’: 18.7%), and erythropoietin and related substances (‘probably/definitely would’: 14.6%).

Table 9

Perceived impact of PES on sport performance

	Definitely would not (%)	Probably would not (%)	Might or might not (%)	Probably would (%)	Definitely would (%)	Don't know (%)	No response (%)
Anabolic steroids	15.5	5.7	12.6	13.4	6.1	46.5	0.5
Beta-blockers	14.2	3.6	11.8	7.7	6.1	56.3	0.5
Designer steroids like tetrahydrogestrinone (THG)	15.9	4.1	9.8	10.2	3.2	56.7	0.5
Erythropoietin (EPO) and other similar substances	15.1	4.4	8.5	6.9	7.7	56.7	0.5
Human growth hormones (hGH)	15.9	6.9	11.4	11.8	6.9	46.9	0.5
PES of own choice	11.8	6.5	18.3	18.3	8.1	36.3	0.0

Threat appraisal. Athletes' beliefs about the short and long-term health effects of using PES is presented in Table 10.

Table 10

Perceived health risk of short-term and regular PES use

	No harm (%)	A little harm (%)	Some harm (%)	A lot of harm (%)	Don't know (%)	No response (%)
Anabolic steroids	1.6 (0.5)	4.1 (0.5)	24.1 (11.4)	22.8 (46.9)	47.3 (40.8)	0.0 (0.0)
Beta-blockers	2.0 (0.8)	6.5 (1.2)	18.7 (12.6)	16.3 (37.1)	56.3 (48.1)	0.0 (0.0)
Designer steroids like tetrahydrogestrinone (THG)	1.2 (0.5)	3.2 (0.5)	20.4 (9.7)	20.8 (42.4)	54.2 (46.9)	0.5 (0.0)
Erythropoietin (EPO) and other similar substances	3.2 (0.5)	5.7 (1.6)	15.5 (10.2)	17.5 (37.5)	57.9 (49.7)	0.5 (0.5)
Human growth hormones (hGH)	2.4 (0.5)	6.1 (2.0)	17.1 (11.0)	23.6 (44.0)	50.6 (42.4)	0.5 (0.0)
Diuretics	2.4 (0.0)	8.5 (1.6)	17.1 (11.4)	17.9 (37.9)	53.8 (48.1)	0.5 (0.5)

Note: Perceived health risk of **regular** PES use in parentheses

In general, about half of the athletes (ranging from 47.3% to 57.9%) indicated that they were unaware of the health risks of *short-term* PES use. Not surprisingly, the proportion of athletes perceiving greater harm from *regular* PES use was generally higher than that of short-term

use. However, there was still a significant proportion of athletes unaware of the ill health effects of regular PES use, ranging from 40.8% to 49.7%. Amongst the six categories of PES, the responding athletes perceived that the maximum harm would be caused by regular use of anabolic steroids (46.9%), human growth hormones (44%) and designer steroids (42.4), when regularly used.

Athletes' threat appraisal relating to enforcement is presented in Table 11. Majority of athletes believed that it was likely that athletes at their level would be drug tested both in (70.5%) and out of competition (43.6%) at least once a year. While more than half (52.9%) of athletes believed that it was unlikely for them to evade detection for taking PES while competing, 19.9% athletes responded that their being able to get away with use of banned PES was a likely possibility. Furthermore, there was a substantially larger proportion of athletes who felt that it was likely to avoid detection for taking PES while *out of competition* (37.5%). Regarding beliefs towards sanctions for doping, a substantial majority (81.1%) of athletes felt that the punishments for positive drug tests in their sport were considered fairly or very severe.

Table 11

Overview of items measuring threat appraisal relating to enforcement

Construct	Item	Options	Percentage
Threat appraisal	How likely is it that athletes at your level would be drug tested in competition at least once a year?	Very likely Quite likely A little likely Not likely Not at all likely Don't know	28.9 25.7 15.9 13.0 5.3 11.4
Threat appraisal	How likely is it that athletes at your level would be drug tested out of competition at least once a year?	Very likely Quite likely A little likely Not likely Not at all likely Don't know	11.0 16.7 15.9 20.8 18.3 17.1

Threat appraisal	From what you know or have heard, if you were to take banned performance-enhancing substances while competing, how likely do you think that you could get away with it if you really tried to?	Very likely Quite likely A little likely Not likely Not at all likely Don't know	2.8 5.3 11.8 24.8 28.1 26.9
Threat appraisal	From what you know or have heard, if you were to take banned performance-enhancing substances out of competition, how likely do you think that you could get away with it if you really tried to?	Very likely Quite likely A little likely Not likely Not at all likely Don't know	5.7 15.9 15.9 15.1 20.0 26.9
Threat appraisal	From what you know or have heard, are the penalties for a positive drug test in your sport severe or lenient?	Very severe Fairly severe Fairly lenient Very lenient Don't know	56.7 24.4 4.4 0.0 14.2

Self-efficacy. 95% of athletes were either 'quite confident' or 'very confident' in their ability to resist external pressure from their team mates to use PES (see Table 12).

Table 12

Item measuring self-efficacy to refrain from doping and its corresponding responses

Construct	Item	Options	Percentage
Personality factors (self-efficacy)	How confident are you in being able to resist pressure from your team mates to use a banned substance?	Very confident could resist Quite confident could resist Not very confident could resist Not confident at all could resist Wouldn't want to resist No response	79.1 15.9 2.8 1.2 0.0 0.8

Reference group opinion. Athletes' beliefs about their reference groups' attitudes towards doping is presented in Table 13. The large majority of athletes felt that their reference groups would definitely disapprove if they had decided to use PES, from 75.5% for teammates, to 89.7% for parents.

Table 13

Beliefs about reference groups' endorsement of PES

	Would definitely approve (%)	Would probably approve (%)	Wouldn't care either way (%)	Probably disapprove (%)	Definitely disapprove (%)	No response (%)
Your coach	0.0	1.6	2.0	8.9	86.5	0.8
Parents	0.0	1.6	2.3	7.7	89.7	0.8
Team mates/training partners	0.0	0.5	6.9	17.1	75.5	0.8
Team doctor	0.0	0.0	1.2	11.8	86.9	1.2
Close friends	0.0	1.6	5.3	11.0	82.0	0.8
Trainer	0.0	0.8	2.4	8.9	85.7	1.2

Availability of PES. Athletes' beliefs about the ease of acquiring PES is shown in Table 14. About 72% of athletes did not know about the availability for each of the PES stated in the study. Out of the six types of PES, anabolic steroids (9.7%), diuretics (10.1%) and beta-blockers (9.9%) were perceived as the easiest to acquire.

Table 14

Perceived ease of acquiring PES

	Probably impossible (%)	Very hard (%)	Fairly hard (%)	Fairly easy (%)	Very easy (%)	Don't know (%)	No response (%)
Anabolic steroids	4.8	8.5	4.4	8.5	1.2	72.2	0.0
Beta-blockers	5.7	7.7	4.8	6.9	2.0	72.6	0.5
Designer steroids like tetrahydrogestrinone (THG)	6.5	8.9	6.9	2.4	0.5	74.6	0.0
Erythropoietin (EPO) and other similar substances	6.5	8.5	6.5	3.2	0.5	74.6	0.0
Human growth hormones (hGH)	5.7	8.1	6.9	5.3	0.5	73.4	0.0
Diuretics	4.8	7.3	4.4	6.5	3.6	73.0	0.0

Affordability of PES. Athletes' beliefs about the affordability of PES can be found in Table 15. Over 77% of the athletes indicated that they were unaware of the monetary costs of acquiring PES for each of the types stated in the questionnaire. Out of the six types of PES, diuretics was believed to be the cheapest option (4%), followed by beta-blockers (2.1%).

Table 15

Perceived affordability of PES

	Very cheap (%)	Quite cheap (%)	Neither (%)	Quite expensive (%)	Very expensive (%)	Don't know (%)
Anabolic steroids	0.0	0.8	3.2	6.5	11.8	77.5
Beta-blockers	0.5	1.6	3.2	5.7	11.4	77.5
Designer steroids like tetrahydrogestrinone (THG)	0.0	0.0	2.0	5.3	14.2	78.3
Erythropoietin (EPO) and other similar substances	0.0	0.5	2.8	3.6	13.8	79.1
Human growth hormones (hGH)	0.0	0.0	2.8	4.8	14.2	77.9
Diuretics	1.2	2.8	3.6	4.0	11.0	77.1

Discussion

These results of the present study suggest that elite athletes in Singapore generally hold negative attitudes towards doping, and have strong moral norms and beliefs against doping. Most athletes reported that they had no intention to use banned PES in the present season and that they would not succumb to external pressures for considering doping to boost sport performance. Nevertheless, it was noteworthy that there was still a substantial proportion of athletes (25.7%) that might consider the possibility of using PES if it was beneficial to performance and not detectable. This evidence highlights that athletes do consider some form of cost-benefit analysis in their decision making, which is in agreement with the assumptions underlined by Donovan et al.'s (2002) model.

Self-reported use of PES was in the range of 0.5-1.5%, including those who might have any therapeutic use exemptions. While this percentage appears to be low, it might not be an accurate representation of the actual figures given that athletes might still be fearful of admission and its possible consequences despite the assurance of anonymity.

Athletes in this study seemed to hold strong moral values and beliefs against doping, while possessing high self-efficacy in their ability to refrain from doping. Their subjective norms also indicated that their reference groups would not be supportive of doping. In addition, many athletes were doubtful about the possibility of avoiding detection for taking PES in competition, and found the sanctions for doping severe.

An important finding of the study was that many of the athletes lacked the knowledge regarding the processes involved in drug testing, which could influence their beliefs on the legitimacy of functional role of ADS, and of the entire process of drug testing in general. Specifically, most athletes were unaware of the equality of treatment to all athletes, the security of drug testing procedures, the accuracy of tests in identifying the relevant PES as well as the fairness of the appeals process. This represents an important aspect of athlete awareness and education, and should be considered for inclusion in the anti-doping education programmes. Furthermore, many athletes had little knowledge of the health risks of using PES in the short and long term, especially for lesser-known PES such as beta-blockers and erythropoietin. This finding is in accord with previous studies on doping knowledge. El-Hammadi and Hunien (2013) found that 90% of Syrian pharmacy students were unaware that beta-blockers and diuretics could be utilised as doping agents. The lack of understanding of the health risks and consequences of using PES represents a significant knowledge gap, and may lead to athletes being unable to make informed decisions regarding the use of PES. Another area that may be of concern to the ADS is the belief of athletes (37.5%) that they could get away, or evade detection if they use PES out of competition. Finally, while athletes

were generally uninformed about the availability and affordability of PES, this knowledge may be desirable as it indicates that they have little exposure to these substances (Donovan et al., 2015).

Based on the findings from the present study, it is reasonably apparent that the current anti-doping policies in Singapore have been effective in inculcating the right attitudes amongst athletes towards doping. Athletes' subjective norms further illustrate the culture of zero tolerance towards doping that has been established in Singapore. The swift sanctions imposed upon athletes with positive drug tests, coupled with education initiatives such as workshops and outreach sessions (ADS, n.d.), are some of the efforts which ADS have invested in advocating a doping-free vision for sport in Singapore.

Despite these positive results, there are still areas in which ADS could further intervene on. Firstly, anti-doping education programmes should address athletes' perceptions regarding the fairness, security and accuracy of drug testing procedures. Only when athletes are convinced about the transparency and legitimacy of anti-doping policies, they would be more willing to comply with the regulations (Donovan et al., 2002). Conversely, the lack of legitimacy would cause the overreliance on rewards and sanctions to maintain control over the current doping situation, which is unsustainable in the long run (Efverström, Ahmadi, Bäckström, & Hoff, 2014). ADS should also continually remind its testing personnel on the importance of being sensitive to athletes when conducting doping tests, given that interactional justice is a key aspect of legitimacy. It may also be helpful to conduct focus group discussions involving athletes to get their views on some of their concerns relating to testing, for instance privacy matters.

Secondly, anti-doping education programmes should emphasise the health risks and downplay the performance-enhancing benefits of the more commonly used PES. For

instance, anabolic steroids and human growth hormones were perceived by athletes in this study as being the most beneficial to performance yet posing the largest risk to health. Hence, by making the negative aspects of using such substances more salient whilst minimising athletes' perceptions of the efficacy of such drugs, athletes would be less likely to consider using them. Additionally, ADS can incorporate more information on the less commonly known PES in education programmes and reinforce their detrimental effects on health, so that athletes would be made aware of their adverse effects and not consider them as potential substitutes to the more commonly used PES.

Thirdly, ADS could consider increasing the frequency of out-of-competition drug testing in view of athletes' beliefs that they are less common. This is often seen as an essential component of a comprehensive anti-doping strategy (Lippi, Banfi, Franchini, & Guidi, 2008). The random and sudden nature of such a control can serve as strong deterrence while simultaneously facilitating the detection of PES with greater effectiveness. Nevertheless, it should be executed with prudence especially in light of certain drawbacks such as privacy concerns and cost issues (Borrie et al., 2018; McGarry & Pendlebury, 2009).

Limitations and future studies. The percentage of responses indicating 'Don't know' in some questions were considerably high. Thus, it is often difficult to ascertain if participants were truly unaware of the content being asked or if the response was simply a convenient way for them to disengage and avoid answering the question directly (Oppenheim, 1992). Future researchers could conduct an in-depth study of athletes' current knowledge of doping methods/substances to identify potential areas for intervention. The cross-sectional design of this study also meant that it is difficult to draw meaningful inferences regarding the variables in question. Future studies could utilise longitudinal or experimental designs that help to support these findings and establish causal relations among various components in the model. Moreover, given that this study is only limited to elite athletes at the competitive level, future

studies could delve into athletes of various demographics (e.g., youth; recreational or amateur or professional level) to uncover the prevalence and trends of doping attitudes, beliefs and behaviour in other athlete populations.

Conclusion

While doping is seemingly not a major issue in Singapore, ADS should continue to work with the relevant sport governing bodies to reinforce desirable anti-doping attitudes amongst athletes and coaches through strict enforcement as well as education. The results and recommendations of the present study can serve to enrich and refine the anti-doping education programmes and specifically address the knowledge gaps identified especially related to the adverse effects and long-term consequences of PES on health. Furthermore, through strengthening athletes' legitimacy perceptions about anti-doping related operational processes, greater mutual trust can be fostered thus enhancing the likelihood of encouraging the athletes to advocate for a cleaner sport by their own accord.

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Conflict of interest:

We declare no conflict of interest with regard any aspect of this study.

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Appendix A



Research Integrity and Ethics Office

Reg. No. 200604393R

IRB-2017-05-012

18 July 2017

Assistant Professor Swarup Mukherjee
National Institute of Education

NTU INSTITUTIONAL REVIEW BOARD APPROVAL

Project Title: Attitudes, Beliefs, and Behaviors of Elite Singapore Athletes Towards Doping

I refer to your application for ethics approval with respect to the above project.

The Board has considered your application and noted from your application that your research involves collecting behavioral data from participants through surveys.

You have also confirmed that informed consent will be obtained from the participants and you have guaranteed the confidentiality of your participants' biodata obtained from them.

The documents reviewed are:

- a) NTU IRB application form dated **27 June 2017**
- b) Participant information sheet and consent form: version 2 dated **04 July 2017**
- c) Data collection form: version 1 dated **27 June 2017**

The Board is therefore satisfied with the bioethical consideration for the project and approves the ethics application under **Expedited** review. The approval period is from **18 July 2017** to **17 July 2018**. The NTU IRB reference number for this study is **IRB-2017-05-012**. Please use this reference number for all future correspondence.

The following protocol and compliances are to be observed upon NTU IRB approval

1. All research involving procedures greater than minimal risk on minors (individuals who are less than the legal age of 21 years old) requires IRB approved written Parental Consent and assent from the participant to be obtained before any research protocols can be administered. Minimal risk refers to an anticipated level of harm and discomfort that is no greater than that ordinarily encountered in daily life, or during the performance of routine educational, physical, or psychological examination.
2. Only the approved Participants Information Sheet and Consent Form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject should be given a copy of the signed consent form.



Research Integrity and Ethics Office

3. Consent forms are important documents therefore they should be stored in the strictest arrangement. Loss of consent form would result in disciplinary action.
4. No deviation from, or changes of, the protocol should be initiated without prior written NTU IRB approval of an appropriate amendment.
5. The Principal Investigator should report promptly to NTU IRB regarding:
 - a. Deviation from, or changes to the protocol.
 - b. Changes increasing the risk to the subjects and/or affecting significantly the conduct of the trial
 - c. All serious adverse events (SAEs) which are both serious and unexpected.
 - d. New information that may affect adversely the safety of the subjects of the conduct of the trial.
 - e. Completion of the study.
6. Continuing Review Request/ Notice of Study completion form should be submitted to NTU IRB for the following:
 - a. Annual review: Status of the study should be reported to the NTU IRB at least annually using the Continuing Review Request/ Notice of Study completion form.
 - b. Study completion or termination: Continuing Review Request/ Notice of Study completion form is to be submitted within 4 to 6 weeks of study completion or termination.
7. All Principal Investigators should comply with existing legislation that would have an impact on the domain of their research.

A handwritten signature in black ink, appearing to read "Lionel", is positioned above the printed name.

Professor Lionel Lee

Chair, NTU Institutional Review Board

encl.

Appendix B



Survey of Elite Athletes' Opinions on Sport Issues

Thank you for completing this survey. This survey asks for your attitudes and opinions on sport issues. Participation in this survey is voluntary. No question is compulsory. There are no right or wrong answers. We just want your opinion. All your responses are strictly confidential. Do not write your name on this survey. All completed surveys will be returned to the National Institute of Education for processing.

Your participation in completing this survey is very much appreciated.

Instructions: For most questions, there is a choice of answers. Simply pick the one that's true for you and circle the number corresponding to it. There are some questions where you need to write in an answer. For these questions, a space will be provided for you.

It is important that you answer every question as best as you can. There are no right or wrong answers, we just ask you to be completely honest.

Please start with Q1.



Q1. What is the main sport you are or have been involved in?

Q2. How many years have you competed in your main sport?

Less than 1 year (or season).....1
 1 or 2 years (or seasons).....2
 More than 2 but less than 5 years (or seasons).....3
 5 or more years (or seasons).....4

Q3. What is the highest level you have competed at?

Olympic games.....1
 World championship events/international events.....2
 National competition.....3
 State competition.....4
 Regional competition.....5
 City/district competition.....6

Q4. Do you hold or have you ever held titles?

Yes – National title.....1
 Yes – International title.....2
 Yes – State title.....3
 No.....4

Q5. Have you ever had a Therapeutic Use Exemption?

Yes – and still have.....1
 Yes – but no longer.....2
 No.....3

Q6. Do you compete in events for athletes with a disability?

Yes.....1
 No.....2

Q7. How much would you personally like these outcomes for performing well in your sport?

	A lot	A little	Not at all
1. National celebrity status.....	1.....	2.....	3.....
2. Lucrative financial sponsorship deals.....	1.....	2.....	3.....
3. Personal best achievements.....	1.....	2.....	3.....
4. Opportunities for remaining in the sport as coach, trainer or administrator.....	1.....	2.....	3.....
5. Future financial security.....	1.....	2.....	3.....
6. International celebrity status.....	1.....	2.....	3.....

Q8. To what extent does your sport offer athletes these outcomes if they perform well?

	A lot	A little	Not at all
1. National celebrity status	1	2	3
2. Lucrative financial sponsorship deals.....	1	2	3
3. Personal best achievements.....	1	2	3
4. Opportunities for remaining in the sport as coach, trainer or administrator	1	2	3
5. Future financial security.....	1	2	3
6. International celebrity status	1	2	3

Q9. If you were to use the following substances, how likely is it that these substances would improve your performance in your sport?

	Definitely would not	Probably would not	Might or might not	Probably would	Definitely would	Don't know
1. Anabolic steroids.....	1	2	3	4	5	9
2. Beta-blockers	1	2	3	4	5	9
3. Designer steroids like tetrahydrogestrinone (THG)	1	2	3	4	5	9
4. Erythropoietin (EPO) and other similar substances.....	1	2	3	4	5	9
5. Human growth hormones (hGH)	1	2	3	4	5	9

Q10. If you were to use a banned performance enhancing substance of your choice, how likely is it that you would improve your performance in your sport?

Definitely would not	1
Probably would not	2
Might or might not	3
Probably would.....	4
Definitely would	5
Don't know	9

Q11. How much pressure, directly or indirectly, do you think the (country) government or the (country) Olympic Committee puts on elite athletes to win Olympic gold medals?

No pressure at all.....	1
A little pressure	2
Moderate pressure.....	3
A lot of pressure	4

Q12. To what extent, if at all, do you think commercial influences on the Olympics and sport in general have increased a 'win at all costs' attitude amongst elite athletes?

Had no effect	1
Increased a little	2
Increased somewhat	3
Increased a lot	4

Q13. To what extent, if at all, do you think commercial influences on the Olympics and sport in general have increased the temptation amongst elite athletes to use banned performance enhancing substances?

- Had no effect.....1
 Increased a little.....2
 Increased somewhat.....3
 Increased a lot.....4

Q14. Have you ever been drug tested?

- Yes.....1
 No.....2

→ Go to Question Q18.

Q15. Have you been drug tested in the past year?

- Yes.....1
 No.....2

Q16. Did you find the experience of being tested traumatic or upsetting in any way?

- No.....1
 Yes – somewhat.....2
 Yes – very much.....3

Q17. How would you describe the conduct of the testing personnel?

- | | | | | |
|---------------|-----------|-------------|-----------|---------|
| (a) Courteous | <u>OR</u> | Rude | <u>Or</u> | Neither |
| 1..... | | 2..... | | 3..... |
| (b) Helpful | <u>OR</u> | Unhelpful | <u>Or</u> | Neither |
| 1..... | | 2..... | | 3..... |
| (c) Friendly | <u>OR</u> | Unfriendly | <u>Or</u> | Neither |
| 1..... | | 2..... | | 3..... |
| (d) Sensitive | <u>OR</u> | Insensitive | <u>Or</u> | Neither |
| 1..... | | 2..... | | 3..... |

Q18. Failing is a natural part of athletic pursuits. The following statements capture the different ways in which athletes might respond to or interpret failure. Please rate the extent to which you believe each of the following statements based on how you would currently describe yourself.

- | | Do not
believe at all | | | | Believe 100%
of the time |
|--|--------------------------|--------|--------|--------|-----------------------------|
| 1. When I am failing, I am afraid that I might not have enough talent..... | 1..... | 2..... | 3..... | 4..... | 5..... |
| 2. When I am failing, it upsets my "plan" for the future..... | 1..... | 2..... | 3..... | 4..... | 5..... |
| 3. When I am not succeeding, people are less interested in me..... | 1..... | 2..... | 3..... | 4..... | 5..... |
| 4. When I am failing, important others are disappointed..... | 1..... | 2..... | 3..... | 4..... | 5..... |
| 5. When I am failing, I worry about what others think about me..... | 1..... | 2..... | 3..... | 4..... | 5..... |

Q19. To what extent do you think that athletes who have been given Therapeutic Use Exemptions have been thoroughly evaluated and that their exemptions are justified?

None justified	1
Most not justified	2
Some are justified, others are not	3
Most justified	4
All justified	5
Don't know	9

Q20. How much harm to your health do you think would be caused by using each of the following substances for a short time say up to two months?

	No harm	A little harm	Some harm	A lot of harm	Don't know
1. Anabolic steroids	1	2	3	4	9
2. Beta-blockers	1	2	3	4	9
3. Designer steroids like tetrahydrogestrinone (THG)	1	2	3	4	9
4. Erythropoietin (EPO) and other similar substances	1	2	3	4	9
5. Human growth hormones (hGH)	1	2	3	4	9
6. Diuretics	1	2	3	4	9

Q21. How much harm to your health do you think would be caused by using each of the following substances regularly?

	No harm	A little harm	Some harm	A lot of harm	Don't know
1. Anabolic steroids	1	2	3	4	9
2. Beta-blockers	1	2	3	4	9
3. Designer steroids like tetrahydrogestrinone (THG)	1	2	3	4	9
4. Erythropoietin (EPO) and other similar substances	1	2	3	4	9
5. Human growth hormones (hGH)	1	2	3	4	9
6. Diuretics	1	2	3	4	9

Q22. How expensive would it be for you personally to buy each of the following types of substances?

	Very cheap	Quite cheap	Neither	Quite expensive	Very expensive	Don't know
1. Anabolic steroids	1	2	3	4	5	9
2. Beta-blockers	1	2	3	4	5	9
3. Designer steroids like tetrahydrogestrinone (THG)	1	2	3	4	5	9
4. Erythropoietin (EPO) and other similar substances	1	2	3	4	5	9
5. Human growth hormones (hGH)	1	2	3	4	5	9
6. Diuretics	1	2	3	4	5	9

Q23. How easy or difficult would it be for you to get each of the following types of substances if you wanted to?

	Probably impossible	Very hard	Fairly hard	Fairly easy	Very easy	Don't know
1. Anabolic steroids	1	2	3	4	5	9
2. Beta-blockers	1	2	3	4	5	9
3. Designer steroids like tetrahydrogestrinone (THG)	1	2	3	4	5	9
4. Erythropoietin (EPO) and other similar substances	1	2	3	4	5	9
5. Human growth hormones (hGH)	1	2	3	4	5	9
6. Diuretics	1	2	3	4	5	9

Q24. If you wanted to get and use a banned performance-enhancing substance, which of the following people, if any, do you think would help you if you asked them to do so?

	Would definitely help me	Would probably help me	Might or might not help me	Probably would not help me	Definitely would not help me	Don't know
1. Your coach	1	2	3	4	5	9
2. Parents	1	2	3	4	5	9
3. Team mates/training partners	1	2	3	4	5	9
4. Team doctor	1	2	3	4	5	9
5. Sports psychologist	1	2	3	4	5	9
6. Trainer	1	2	3	4	5	9

Q25. If you wanted to use a banned performance-enhancing substance, how easy would it be to get good medical advice on how to use the substance?

Probably impossible	1
Very hard	2
Fairly hard	3
Fairly easy	4
Very easy	5
Don't know	9

Q26. Do you intend to use prohibited substances or methods to enhance my performance or gain a competitive edge against your opponents during this season?

Definitely not	1
Probably not	2
Might or might not	3
Probably will	4
Definitely will	5

Q27. How often have you used any of these nutritional supplements in the past 12 months?

	Never	Rarely	Sometimes	Frequently	Very frequently	Systematically
1. Vitamin or mineral supplements	1	2	3	4	5	6
2. Herbal products	1	2	3	4	5	6
3. Creatine.....	1	2	3	4	5	6
4. Sports drinks	1	2	3	4	5	6
5. Energy bars	1	2	3	4	5	6
6. Caffeine.....	1	2	3	4	5	6
7. Protein-carbohydrate shakes.....	1	2	3	4	5	6

Q28. In the last 12 months, how often have you used any of the following, for whatever reason?

	Have never used	Did not use in the last 12 months	1 to 2 times	3 to 5 times	6 to 10 times	More than 10 times
1. Anabolic steroids.....	1	2	3	4	5	6
2. Beta-blockers	1	2	3	4	5	6
3. Designer steroids like tetrahydrogestrinone (THG)	1	2	3	4	5	6
4. Erythropoietin (EPO) and other similar substances.....	1	2	3	4	5	6
5. Human growth hormones (hGH)	1	2	3	4	5	6
6. Diuretics	1	2	3	4	5	6
7. Doping methods.....	1	2	3	4	5	6
8. Allobodies	1	2	3	4	5	6

Q29. How serious do you feel the following authorities are in preventing trafficking of banned performance enhancing substances in (country)?

	Not at all serious	Not serious	A little serious	Quite serious	Very serious
1. Police.....	1	2	3	4	5
2. Customs officers.....	1	2	3	4	5

Q30. Overall, how effective do you feel the following authorities are in preventing trafficking of banned performance enhancing substances in (country)?

	Not at all effective	Not effective	A little effective	Quite effective	Very effective
1. Police.....	1	2	3	4	5
2. Customs officers.....	1	2	3	4	5

Q31. Which one of the following most applies to you?

- I have never considered using a banned performance-enhancing substance 1
- At one stage I thought briefly about using a banned performance-enhancing substance 2
- At one stage I thought quite a bit about using a banned performance-enhancing substance 3
- I still think occasionally about using a banned performance-enhancing substance because other athletes are using them 4
- I briefly used a banned performance-enhancing substance in the past but no longer do so 5
- I occasionally use a banned performance-enhancing substance now for specific purposes 6
- I regularly try or use banned performance-enhancing substances 7

Q32. If you were offered a banned performance enhancing substance under medical supervision at low or no financial cost and the banned performance enhancing substance could make a significant difference to your performance and was currently not detectable, how much consideration do you think you might give to this offer?

- None at all 1
- A little consideration 2
- Some consideration 3
- A lot of consideration 4

Q33. Given the pressures athletes are often under to win, how confident are you that you could refuse this offer?

- Very confident could refuse 1
- Quite confident could refuse 2
- Not very confident could refuse 3
- Not confident at all could refuse 4
- Wouldn't want to refuse 5

Q34. How confident are you in being able to resist pressure from your team mates to use a banned substance?

- Very confident could resist 1
- Quite confident could resist 2
- Not very confident could resist 3
- Not confident at all could resist 4
- Wouldn't want to resist 5

Q35. Regardless of whether you believe performance enhancing substances or methods (PESM) should be banned or allowed, which of the following statements best describes your own personal feelings about deliberately using banned PESM?

- I believe deliberately using banned PESM to improve performance is morally wrong under any circumstances 1
- I believe deliberately using banned PESM to improve performance is morally OK under some circumstances, but wrong under others 2
- I believe deliberately using banned PESM to improve performance is morally OK under any circumstances 3

Q36. If you were caught using banned performance enhancing substances or methods, to what extent would you experience the following feelings:

	Not at all			A great extent	
1. Ashamed	1	2	3	4	5
2. Embarrassed	1	2	3	4	5
3. Guilty	1	2	3	4	5

Q37. If you decided to use a banned performance enhancing substance, to what extent do you think each of the following people would approve or disapprove, or would not care either way if you did that?

	Would definitely approve	Would probably approve	Wouldn't care either way	Probably disapprove	Definitely disapprove
1. Your coach.....	1	2	3	4	5
2. Parents	1	2	3	4	5
3. Team mates/training partners.....	1	2	3	4	5
4. Team doctor	1	2	3	4	5
5. Close friends.....	1	2	3	4	5
6. Trainer	1	2	3	4	5

Q38. The following statements are intended to provide an insight into your beliefs regarding other athletes' use of doping.

	Percentage (%)
1. Out of 100%, how many athletes in your sport do you believe engage in doping to enhance their performance?	_____
2. Out of 100%, how many elite athletes in your country do you believe engage in doping to enhance their performance?	_____
3. Out of 100%, how many elite athletes do you believe will be engaged in doping during the next 2 years to enhance their performance?	_____
4. Out of 100%, how many coaches in your sport do you believe would encourage their athletes to use doping to enhance their performance?	_____
5. Out of 100%, how many coaches in elite sports in your country do you believe would encourage their athletes to use doping to enhance their performance?	_____

Q39. How likely is it that athletes at your level would be drug tested at least once a year?

(a) In competition at least once a year:

Very likely.....	1
Quite likely.....	2
A little likely.....	3
Not likely.....	4
Not at all likely.....	5
Don't know.....	9

(b) Out of competition at least once a year:

Very likely.....	1
Quite likely.....	2
A little likely.....	3
Not likely.....	4
Not at all likely.....	5
Don't know.....	9

Q40. It has been said that athletes who take banned substances can use various methods to avoid testing positive.

(a) From what you know or have heard, if you were to take banned performance-enhancing substances while competing, how likely do you think that you could get away with it if you really tried to?

Very likely.....	1
Quite likely.....	2
A little likely.....	3
Not likely.....	4
Not at all likely.....	5
Don't know.....	9

(b) From what you know or have heard, if you were to take banned performance-enhancing substances out of competition, how likely do you think that you could get away with it if you really tried to?

Very likely.....	1
Quite likely.....	2
A little likely.....	3
Not likely.....	4
Not at all likely.....	5
Don't know.....	9

Q41. From what you know or have heard, are the penalties for a positive drug test in your sport severe or lenient?

Very severe.....	1
Fairly severe.....	2
Fairly lenient.....	3
Very lenient.....	4
Don't know.....	9

Q42. How fair is the (insert name of NADO) in terms of treating all athletes equally?

Very fair 1
 Fair 2
 Unfair 3
 Very unfair 4
 Don't know 9

Q43. How secure is the (insert name of NADO)'s drug testing procedures in (country)? That is, in the taking of samples and the care of samples?

Very secure 1
 Quite secure 2
 Not really secure 3
 Not at all secure 4
 Don't know 9

Q44. How accurate do you feel the current drug tests are in terms of being able to correctly identify the following substances?

	Very accurate	Quite accurate	A little accurate	Not accurate	Not at all accurate	Don't know
1. Anabolic steroids.....	1	2	3	4	5	9
2. Beta-blockers	1	2	3	4	5	9
3. Designer steroids like tetrahydrogestrinone (THG)	1	2	3	4	5	9
4. Erythropoietin (EPO) and other similar substances.....	1	2	3	4	5	9
5. Human growth hormones (hGH)	1	2	3	4	5	9
6. Diuretics	1	2	3	4	5	9

Q45. How satisfied are you that athletes who appeal a positive test in (insert name of country) will be given a fair hearing?

Very satisfied 1
 Somewhat satisfied 2
 Somewhat dissatisfied..... 3
 Very dissatisfied..... 4
 Don't know 9

Q46. How satisfied are you that athletes in your sport who test positive will be given a fair hearing before a decision is made about applying a penalty?

Very satisfied 1
 Somewhat satisfied 2
 Somewhat dissatisfied..... 3
 Very dissatisfied..... 4
 Don't know 9

Q47. How satisfied are you that athletes who appeal a positive test before the Court of Arbitration in Sport will be given a fair hearing?

Very satisfied 1
 Somewhat satisfied 2
 Somewhat dissatisfied 3
 Very dissatisfied 4
 Don't know 9

Q48. What is your age?

.....

Q49. Are you:

Male 1
 Female 2

Q50. What is your highest level of education? (adapted to country)

Completed Year 9 or less 1
 Completed Year 10 2
 Completed Year 11 3
 Completed Year 12 4
 Some technical college 5
 Some University 6
 Currently enrolled in technical college 7
 Currently enrolled in University 8
 Completed technical college 9
 Completed University 10

Q51. To what extent do you currently derive income from your participation in sport? Include here both direct payments and winnings as well as sponsorships, endorsements and scholarships.

No income at all from sport 1
 Occasional income from sport 2
 Regular income but less than half of total income 3
 About half my income from sport 4
 More than half from sport, but not all my income 5
 All or almost all of my income from sport 6

Q52. What is your total annual income from all sources? (adapted to country)

Less than 10,000 1
 10,000 to 19,999 2
 20,000 to 29,999 3
 30,000 to 49,999 4
 50,000 to 69,999 5
 70,000 to 99,999 6
 100,000 or more 7

Thank you for completing this survey. Please return it in the reply paid envelope provided.