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From research to application: An evidence-based psychosocial intervention for doping prevention in young athletes

in collaboration with the
University of Thessaly

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Introduction

In the last decade, there has been a considerable increase in our understanding of psychosocial factors associated with doping in athletes. A meta-analysis of psychosocial predictors of doping intentions and behavior (Ntoumanis et al., 2014) showed that the variables most strongly associated with doping are "moral" variables, and this is also confirmed in our own research (e.g., Kavussanu & Ring, 2017; Kavussanu et al., 2019). Specifically, factors such as moral identity, anticipated guilt or regret, moral disengagement, and moral norms have been strongly associated with doping intentions and behavior. Thus, a substantial body of literature exists that can guide researchers in the development of anti-doping interventions. However, no published study has examined whether an intervention that focuses on moral variables is effective in reducing doping intentions and behavior. Moreover, no study has compared the effectiveness of a moral versus an educational anti-doping intervention across different countries.

Aim and Research Questions

The aim of this research project was to develop, implement, and evaluate an evidence-based moral[1] intervention, and determine whether it is more effective than a standard educational (i.e., knowledge-based) intervention, in reducing doping likelihood in young athletes, in the UK and Greece. Our research questions were: (a) Is a moral intervention more effective than a standard educational intervention in reducing doping likelihood, and are these effects maintained over time? (b) Can the moral intervention produce changes in the moral identity and moral disengagement of young athletes, and in the moral atmosphere of the team? (c) Does anticipated guilt mediate the effects of the moral intervention on doping likelihood? and (d) Are the effects of the moral intervention on doping likelihood equivalent across countries?

Phase 1 – Intervention Development and Screening Survey

In the first phase of the project, we developed the moral intervention (each consisting of six one-hour sessions). The intervention focused on changing three variables, which have been identified as predictors of doping intentions in previous research: moral identity, which is the importance one places on being a moral person; moral disengagement, which refers to the cognitive mechanisms people use to justify unethical behavior; and moral atmosphere, which pertains to a team's shared understanding of what is acceptable behaviour, for example taking drugs may be viewed as acceptable in one team but not in another. The activities we devised aimed to influence these three variables as well as anticipated guilt. They included group discussions, illustrations of points made with stories and videos of athletes, interviews with athletes, debates, etc. In this phase, we also developed the educational intervention based on a variety of resources typically used by national and international anti-doping organizations (e.g., WADA, UKAD, ASADA, etc). Both interventions were delivered via power-point presentations, and each of their six sessions focused on one theme. Prior to their delivery, the two interventions were pilot-tested with five athletes in Greece and five athletes in the UK, and intervention material was revised based on the feedback we received.

During this phase, we also conducted a large screening survey, aimed to identify eligible participants (i.e., whose doping likelihood was *not* too low). Over 1000 athletes completed the survey across the two countries. Athletes who indicated some likelihood to use banned substances, were invited to take part in the main study.

Phase 2 – Intervention Delivery and Evaluation

Across the two countries, a total of 280 athletes from 24 clubs (or sport colleges) took part in the study. Clubs (or colleges) were randomly assigned to either the moral or the educational intervention. In Greece, 82 and 77 athletes completed the moral and educational interventions, respectively. The respective numbers in the UK, were 66 (moral) and 55 (educational). Participants (186 males, 94 females) were aged 16-22, of a reasonably high standard, recruited from individual (e.g., boxing, swimming, track and field) and team (e.g., football, netball, lacrosse, rugby) sports. The six sessions were delivered to groups of 4-14 athletes, once a week, over a period of six-to-eight weeks. We measured doping likelihood, moral identity, moral disengagement and anticipated guilt using established questionnaires; for moral atmosphere we constructed items specifically for this study. Measures were taken at four time points: before the interventions started, after the interventions were completed, and at approximately three and six months after the interventions were completed. This research design allowed us to examine the long-term effectiveness of the interventions.

We analyzed the data separately for each country, using SPSS. Specifically, we performed a 2 Intervention (moral, educational) X 2 Gender (male, female) X 4 Time (1, 2, 3, 4) repeated measures multivariate analyses of variance on our outcome variables. This was followed by polynomial contrast analyses. In Greece, both interventions led to lower doping likelihood, moral disengagement, and (im)moral atmosphere[2], and higher moral identity and guilt, from pre to post test, and these changes were maintained over time. Importantly, the moral intervention was more effective than the educational intervention in reducing doping likelihood and (im)moral atmosphere, and increasing moral identity, over time. Mediation analysis indicated that the change in doping likelihood was mediated by changes in moral disengagement, moral atmosphere and anticipated guilt. In the UK, the two interventions were similarly effective in reducing doping likelihood and moral disengagement and increasing guilt from pre to post test. They were also effective in reducing (im)moral atmosphere at three and nine months follow up, compared to the initial assessment.

Phase 3 – Focus Groups

Once the interventions were completed, we conduced 12 focus groups with 32 participants in Greece, and 7 focus groups with 35 participants in the UK. Results showed that the moral intervention was perceived as effective in reducing doping likelihood, increased participants' understanding of the consequences of doping for others, confirmed that they were happy with the structure of the intervention, and pointed to the need for more information on the potential health consequences of banned substances.

Conclusion

Our findings underline the importance of targeting moral variables when developing interventions aimed to prevent intentional doping in sport. By highlighting the values of honesty and fair play, and sensitizing athletes to the consequences of one's doping for others, we can create programmes that can be effective in reducing doping likelihood and contributing to the ideal of clean sport.

Footnotes
[1]We use the term moral (rather than psychosocial which was used in the original title) because we focused on "moral" variables. Thus, this term better reflects the content of our main psychosocial intervention.
[2]We refer to this as (im)moral atmosphere to enhance clarity, because higher scores on the moral atmosphere variable reflect participants' perception that most athletes within their group would approve (rather than disapprove) the use of banned substances.

Introduction

The use of prohibited Performance Enhancing Substances (PES) and methods, also known as doping, by athletes is a pervasive phenomenon in sport. It is well known that doping has significant adverse health consequences for athletes and contributes to a very negative image of sport in society. Therefore, developing effective anti-doping interventions is of utmost significance.

Current Anti-Doping Interventions

Some attempts have been made to develop interventions to combat doping. In a project on ethical decision making, funded by WADA, Elbe et al (2012) developed sport-specific moral dilemmas (Melzer et al., 2010) aimed at changing athletes' moral reasoning. However, due to the large drop out, the effectiveness of this intervention is yet to be determined. The large dropout may have been due to the online nature of this intervention, highlighting the need for the development of in-person programs. Two well-known in-person interventions are ATLAS (Athletes Training and Learning to Avoid Steroids) and ATHENA (Athletes Targeting Healthy Exercise & Nutrition Alternatives) developed by Goldberg and Elliot (2005). These programs are based on conveying knowledge about a range of unhealthy behaviors including doping. An educated supervisor leads eight to ten 45 minute sessions in which, via role-playing, group work and interactive practice, knowledge about anabolic steroids, nutritional supplements and alcohol is conveyed to participants. The assumption is that this knowledge will empower participants to resist taking drugs.

Very few studies have used randomized control trials to determine the effectiveness of the ATLAS and ATHENA programs. A meta-analysis (Ntoumanis et al., 2014) reported that studies examining these programs did not find a significant reduction in the number of reported cases of doping over a season or one school year compared to a control group (Goldberg et al., 2000, 2003; Ranby et al., 2009). In studies examining doping intentions, the intervention showed a very small reduction in the intervention group compared to the control group (Elliot et al., 2008; Goldberg et al., 1996, 2000). In sum, the few randomized control trials, which have investigated whether knowledge-based interventions, such as ATLAS and ATHENA, are effective in reducing doping intentions and behavior, have shown either a null or a very small effect.

One explanation for the limited effectiveness of these interventions is that they aim to influence athletes' overall health-related behaviors, thus they are not sufficiently focused (Ntoumanis et al., 2014). For example, ATHENA includes information and activities about healthy and unhealthy eating, as well as use the of alcohol, tobacco, marijuana and anabolic steroids (Elliot et al., 2004, 2008; Ranby et al., 2009). A second explanation is that participants had low initial intentions to dope (i.e., a floor effect), and therefore, there was not much room for a reduction in their doping intentions and behaviors (see Ntoumanis et al., 2014). Importantly, none of these interventions have attempted to manipulate variables, which have been associated with doping in empirical research. Doping is an intentional behavior with moral connotations, performed in a social context. It makes sense that effective anti-doping interventions should include variables that pertain to those aspects of doping.

The Need for Evidence-Based Interventions

In the last decade, our understanding of the social-psychological factors associated with doping intentions and behavior has substantially increased. In a recent meta-analysis of 63 studies, Ntoumanis et al (2014) identified several predictors of doping intentions and behavior. Among the strongest predictors were moral disengagement, and subjective norms, which involve the perception that significant others in the athletes' environment approve or support doping. Other predictors of doping were goal orientation, self-efficacy to refrain from doping, gender (males

more likely to dope than females), and having friends who doped. The findings of this meta-analysis suggest that to tackle doping one should try to change both personal and social environmental factors, and that "moral" variables are important.

In a project funded by WADA (Kavussanu et al, 2013), we investigated several psychosocial predictors of doping in football players, in three countries. We included both personal (e.g., moral identity, moral disengagement, anticipated guilt) and social environmental variables (e.g., motivational climate, moral atmosphere). All variables predicted doping intentions to a certain degree; however, the strongest predictors across the three countries were moral identity, moral disengagement, and moral atmosphere. We discuss these variables next.

Moral identity is the cognitive schema a person holds about his or her moral character (Aquino et al., 2009). Individuals with a strong moral identity consider being moral as an important aspect of their self (Aquino & Reed, 2002) and are motivated to behave in a moral manner. In our research, moral identity has been inversely associated with antisocial behavior, such as faking an injury and pushing another player in football (Sage et al., 2006). In our research, moral identity has also been a predictor of doping likelihood such that across three countries (UK, Denmark and Greece) football players with a strong moral identity reported lower doping likelihood (Kavussanu & Ring, 2017; Kavussanu et al., 2019).

Moral disengagement refers to cognitive mechanisms that individuals use to minimize negative emotions such as guilt when engaging in transgressive behavior (Bandura, 1999). For example, players may use "diffusion of responsibility" by claiming that everyone on the team cheats or uses PES, and therefore they should not be blamed for also doing this. Moral disengagement has been positively and strongly associated with doping intentions (e.g., Lucidi et al., 2004, 2008; Zelli et al., 2010), and doping likelihood (e.g., Kavussanu et al., 2016, 2019; Kavussanu & Ring, 2017).

Moral atmosphere refers to the collective group norms regarding moral action, that is, the type of behavior considered acceptable in a group by its group members, and is developed over time through interaction among group members. In our research (Kavussanu et al., 2002; Kavussanu & Spray, 2006), we presented basketball and football players with scenarios describing cheating behaviors, such as faking an injury and asked players to indicate whether the coach encourages cheating and the number of teammates likely to cheat. A moral atmosphere condoning cheating was associated with reported cheating. In our WADA project, moral atmosphere has been strongly associated with doping intentions in British, Danish, and Greek football players, while Ntoumanis et al (2014) reported that subjective norms, which reflect perceived approval of a behavior by significant others - a concept similar to moral atmosphere - was a strong predictor of doping intentions in 11 studies (n = 5,000).

In our research, anticipated guilt mediated the effects of both moral atmosphere and moral disengagement on doping intentions (Kavussanu et al., 2014, 2016, 2019; Kavussanu & Ring, 2017). Guilt is a self-conscious moral emotion that plays an important role in regulating moral action (Tangney et al., 2007). People avoid doing bad things because they want to avoid the negative feelings associated with transgressive behavior (Bandura, 1991). This variable has been negatively associated with doping likelihood (Kavussanu et al., 2019). In this project, we examined whether guilt, alongside moral identity, moral disengagement and moral atmosphere, mediated the effects of the moral intervention on doping likelihood.

In sum, to date no effective anti-doping intervention has been developed targeting variables that have been empirically associated with doping intentions and behaviour, in past research. Existing educational interventions are not evidence-based. To our knowledge, no study has attempted to intervene on psychosocial variables linked to doping in empirical research and examine their effect on doping intentions. The need exists, therefore, to develop an anti-doping intervention that

focuses on variables, which have been empirically associated with doping.

Several studies have examined doping intentions, or past doping behavior, as their outcome variable (e.g., Gucciardi et al., 2011; Lazuras et al., 2010; Lucidi et al., 2008; Moran et al., 2008). Researchers have highlighted the difficulty of studying doping due to the sensitive issue of the topic (e.g., Moran et al., 2008). Essentially, researchers ask athletes to be honest about dishonest intentions! Although some studies have taken measures to facilitate honest responding (e.g., Lazuras et al., 2010), the problem of obtaining honest reports of doping intentions and past doping behavior remains. To overcome this problem, in this project, we used two scenarios that described hypothetical situations and asked athletes to indicate their doping likelihood in that hypothetical situation.

OBJECTIVES – RESEARCH QUESTIONS

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1. Is a moral intervention more effective than a standard educational intervention in reducing doping likelihood, and are these effects maintained over time?
2. Can a moral intervention produce changes in the moral identity and moral disengagement of young athletes, and in the moral atmosphere of the team?
3. Does anticipated guilt mediate the effects of the moral intervention on doping likelihood?
4. Are the effects of the moral intervention on doping likelihood equivalent across countries?

Phase 1 – Intervention Development and Screening Survey

Intervention Development

In the first phase, we developed the moral and the educational interventions. The interventions were developed at the University of Birmingham, with feedback received from the University of Thessaly. They were designed to be delivered by a facilitator to small groups of athletes, using PowerPoint presentations in a classroom setting. Each intervention consisted of six one-hour sessions, and each session focused on one theme. Throughout the interventions, stories of real athletes and their experiences related to doping were presented to facilitate participant engagement and learning (Singler, 2015). The two interventions were similar in duration, mode of delivery, and type of activities (i.e., interactive, encouraging group discussion). The main difference between them was that the moral intervention focused on the three moral variables, which have been linked to doping likelihood in past research, whereas the educational intervention focused on conveying information contained in anti-doping interventions typically delivered by various National Anti-Doping Organizations.

Each intervention was pilot-tested with small groups of 5 university student-athletes, first in the UK and then in Greece (after the sessions were translated in Greek). The sessions were delivered via a power-point presentation in a classroom setting, and participants were asked to indicate what they liked and did not like about each session, and how we can improve the session. There were also questions about the pace of each session, as well as several slide-specific questions for those parts of the sessions that we felt needed improvement. Participant feedback was extensive and was used to further refine the sessions. Given the importance of the facilitator in delivering the intervention, we also included questions about the facilitator in terms of the focus, flexibility, ability to explain concepts, communication, and management of group dynamics. In general, the feedback that pertained to both facilitators was very positive.

In the *moral* intervention, we aimed to influence moral identity, moral disengagement, and moral atmosphere. Moral identity involves a focus on the values of fairness, honesty, and hard work, and the intervention aimed to strengthen these values. Moral disengagement involves the justifications people use for their unethical behavior, for example that everybody does it, they do

it to help their team, etc. We made participants aware of these justifications with examples of athletes who have doped and use them, and challenged justifications of doping behavior, for example by presenting the opposing point of view (e.g., doping is very serious with important consequences for others). Moral atmosphere refers to the shared understanding of what is acceptable behavior in one's group. By contrasting a team that plays the "right way" versus a team that cheats, and through discussions with members of the same team, we aimed to influence teams to view doping as unacceptable behavior.

The content of the *educational* intervention was based on information from a variety of sources, such as the German NADA, UKAD, ASADA, and WADA. This intervention was a standard educational intervention, similar to the interventions typically used by major anti-doping organizations. We focused on conveying information about the WADA governance, the rules and regulations, the doping control process, the potential health-related consequences of banned substances, the risks of supplements, the need for healthy and appropriate nutrition, and whistleblowing. We avoided references to any moral issues, doping as cheating, and fair play, to ensure that this intervention was as distinct as possible from the moral intervention. A detailed description of the content of the two interventions can be found in Tables 1 and 2.

Table 1. The Moral Intervention - Title, aims, and content of the six sessions

Title (targeted variable)	Aim	Content
Success in sport (moral identity)	To promote the value of hard work and an appreciation of feelings of success when athletes develop their talent and reach their athletic potential	Participants are presented with two approaches to success: (a) winning at-all-costs and (b) being the best-you-can-be. They are asked to compare the pros and cons of each approach. The value of working hard (moral identity trait) is emphasized. The link between the be-the-best-you-can-be and the Spirit of Sport is made, highlighting the values of excellence in performance, dedication, and commitment.
Values in sport (moral identity)	To highlight the importance of honesty and fair play in sport and discuss the role of doping in undermining these values	Cases of elite athletes displaying honesty and fairness (two moral identity traits) at the cost of their own victory are discussed, and contrasted with athletes who dope. Participants reflect on the importance of fair play. A debate of whether "doping is cheating" illustrates the fact that doping undermines fair play.
Justifications for doping (moral disengagement)	To make participants aware of the justifications athletes use for doping and to challenge these justifications	The justifications athletes use for doping are presented (e.g., comparing doping with worse acts, blaming others for our behaviour, etc) using real athlete stories. Participants are asked to identify justifications in athletes who have doped, challenge these justifications, and reflect on their own experiences of justifying bad behaviour.
Consequences of doping for others (moral disengagement)	To highlight the consequences of doping for others, thus challenging the distortion of consequences mechanism of moral disengagement	The devastating consequences of doping for others are discussed. Stories of athletes who have been awarded medals retrospectively (e.g., Kelly Sotherton, Adam Nelson, Valerie Adams) are presented, drawing attention to the emotions they experience. Consequences for one's teammates and family are also discussed.
The culture of the team (moral atmosphere)	To get participants to understand that taking part in sport "the right way" is the best way forward.	Two types of teams are presented and contrasted using real life examples: teams who value winning at-all-costs and teams who play "the right way" by respecting others and forfeiting winning for the sake of fair play. The different team cultures are discussed and participants are asked to identify ways they can play sport "the right way".
Course conclusion	To summarise the main points of each session	Participants are asked to present the main points of the sessions discussed in the previous five sessions and to come up with a slogan that accurately represents the content of each session. The facilitator also summarizes the main points.

Note. The aim of the moral intervention was to reduce doping likelihood by targeting three variables known to be positively or negatively associated with doping likelihood in sport: moral identity (-), moral disengagement (+), and (im)moral atmosphere of the team (+). Each session focused on one of these variables.

Table 2. The Educational Intervention - Title, aims, and content of the six sessions

Title	Aim	Content
Introduction to doping	To introduce participants to the WADA and its role in regulating doping in sport	The WADA Code and the 10 anti-doping rule violations are explained.
Doping control	To introduce participants to the doping control process	Participants are informed that they can be drug tested at any time and place. The anti-doping drug testing procedure is explained and participants role-play each step of the procedure using official anti-doping bottles and documentation. They are also informed about ADAMS and the athlete biological passport.
Banned substances	To introduce banned substances and the consequences they can have on athletes' health	The risks associated with the most common types of banned performance-enhancing substances (e.g., anabolic steroids, stimulants, erythropoietin) are explained, and participants watch a video of the East German shot putter, Heidi Krieger. They are also introduced to the process of obtaining a Therapeutic Use Exemption (TUE).
Sport supplements	To inform participants of the risks associated with sport supplements (e.g., protein, energy drinks, creatine)	Participants are informed about the potential contamination of sport supplements with banned substances and are instructed to check sport supplements using the Informed-Sport website. Cases of athletes failing a drug test due to contamination of sport supplements are presented. Participants are also asked to assess the need of sport supplements and consider if the benefits are the result of a placebo effect.
Nutrition	To discuss the role of nutrition and its benefits for performance and recovery	Information about carbohydrates, proteins, fats, vitamins, and minerals is presented and how to use these pre, during, and post competition. Participants are asked to examine their own nutrition using the MyFitnessPal app and identify the areas of their diet that could be improved.
Whistleblowing	To discuss the importance of whistleblowing in protecting clean athletes	Whistleblowing is explained, and examples of athletes who blew the whistle (e.g., Yuliya Stepanova) are presented. Participants are informed how to use the WADA Speak-Up website, and they are asked to test their knowledge about anti-doping rules and regulations using the WADA Play-True quiz.

Note. The aim of this intervention was to introduce doping, and doping control process, and to provide information about the health consequences of banned substances, the risks of sport supplements, and healthy nutrition. Whistleblowing is also covered in this intervention.

Participants

Previous research aimed to test anti-doping interventions suffers from recruiting participants, who are too low on doping intentions, thus observing a "floor effect". To avoid this, we first screened participants to ensure their doping likelihood were not too low. Participants responded to two scenarios (performance enhancement and injury recovery) measuring doping likelihood. Across the two countries, over 1000 athletes completed the screening survey.

Measures and screening criteria

Participants were asked to read the scenario presented below and imagine themselves in the situation described in the scenario. Then, they were asked to respond to three questions. The scenario described a situation where the participant had the opportunity to use a banned, undetectable, substance to enhance performance. The full scenario is presented below.

"It's the week before the most important competitive game/event of your season. Lately, your performance has been below your best. You don't feel you have the necessary fitness for this competition, and you're concerned about how you'll perform. You mention this to a teammate, who tells you that he/she uses a new substance that has enhanced his/her fitness and performance. The substance is banned for use in sport, but there's no chance that you will be caught."

Following the scenario, participants were asked to indicate the likelihood that they would use the banned substance, if they were in this hypothetical situation. Responses were made on a 7-point scale (1 = not at all likely, 7 = very likely). We used responses on the first item of this scenario (i.e., how likely are you to use the banned substance if you were in this situation) to calculate mean scores for each club. Clubs with scores greater than 1 were invited to take part in the intervention.

Procedure

Prior to starting the data collection, we received ethical approval by the University Ethical Review Committee. Coaches of sport clubs and colleges in the UK, and sport clubs in Greece, were contacted via e mail, post, or telephone, and asked to allow their athletes to take part in a short survey. They were informed that the project was funded by WADA, and its purpose was to understand doping attitudes and behaviour. At this point, coaches were also informed that their club *may* be invited to take part in the second part of the project, and they were going to receive information about this at a later point. A time and date for data collection was set with those coaches who agreed to take part in the survey.

The survey was administered to athletes by a Research Assistant, either at the start or the end of a training session. As well as the doping scenarios described above, the survey included measures of the variables examined in the Main Trial, which the intervention aimed to change (described in the next section): moral identity, moral disengagement, and moral atmosphere. The survey also included questions about demographics. Prior to completing the survey, participants were informed that there is a second part to the study, and that they would receive information about the second part in due course. Participants who were interested in taking part in the second part of the study were asked to provide their contact details. However, the main contact was done via the coaches, who facilitated participation of their athletes in the interventions.

Phase 2 – Delivery and Quantitative Evaluation of Interventions

Method

Research design

We used a 2 Intervention (Moral, Educational) X 4 Time (pre-intervention, post-intervention, 3-month follow up, 6-month follow up) mixed design, with one between and one within-participants factor. We followed the same procedures in each country, however, the club assignment and data collection were completed separately in each country.

Participants

A total of 280 athletes participated in the main trial in Greece and UK. Descriptive statistics of athletes' characteristics in each intervention by country are presented in Table 3 below. From the teams recruited in Greece, 38% competed at club level, 45% at national and 17% at international. In the UK, 25% competed at club level and 75% at national level. The GPower 3.0 power calculation software indicated that with 40 participants in each intervention group (in each country) and adopting an alpha of .05, the study is powered at .80, to detect a medium ($f2 = .50$) effect size. To avoid floor effects (i.e., participants being too low on doping likelihood), observed in previous interventions (see Ntoumanis et al., 2014), we will administer the doping likelihood measure (described below) to a large number of athletes and select only those who are at risk for doping.

Table 3
Participant characteristics by country and intervention

Country		UK		Greece	
Intervention		Moral (*n* = 66)	Educational (*n* = 55)	Moral (*n* = 82)	Educational (*n* = 77)
Gender	Male	76%	62%	63%	65%
	Female	24%	38%	37%	35%
Sport type	Individual	9.1%	10.9%	45.1%	49.4%
	Team	89.4%	89.1%	54.9%	50.6%
Competition Level	Club	56.1%	12.7%	52%	58%
	University	0	41.8%	n/a	n/a
	County	9.1%	3.6%	n/a	n/a
	Regional	6.1%	12.7%	n/a	n/a
	National	6.1%	21.8%	37%	31%
	International	1%	7.3%	11%	10%
Mean ± SD	Age	16.60 ± 0.68	18.00 ± 1.82	18.68 ± 2.23	19.20 ± 1.65
	Hours/week training	11.11 ± 4.94	6.89 ± 3.12	6.4 ± 4.0	8.3 ± 3.5
	Years training	8.83 ± 4.0	8.31 ± 3.45	8.3 ± 3.9	8.6 ± 4.4
	Doping likelihood	2.37 ± 1.49	2.88 ± 1.69	2.49 ± 1.44	2.32 ± 1.18

Measures

All measures used in this study can be found in Appendix A. Below we offer a brief description of each measure.

Doping likelihood. Doping likelihood was measured using two scenarios, which have been developed and used in our previous research (e.g., Kavussanu et al., 2019; Kavussanu & Ring, 2018). Scenario 1 described a situation, where athletes had the opportunity to use a prohibited substance to enhance their performance (performance enhancement), while Scenario 2 described a situation, where athletes could take a prohibited substance to speed up recovery from injury (injury recovery). The two scenarios are presented below:

Scenario 1 – Performance Enhancement

"It's the week before the most important competitive game/event of your season. Lately, your performance has been below your best. You don't feel you have the necessary fitness for this competition, and you're concerned about how you'll perform. You mention this to a teammate, who tells you that he/she uses a new substance that has enhanced his/her fitness and performance. The substance is banned for use in sport, but there's no chance that you will be caught."

Scenario 2 – Injury Recovery

"It's two weeks before the most important competitive game/event of your season. You really want to take part. However, two months ago, you sustained a knee injury, and you know you need at least one more month of rehabilitation to fully recover. One of your teammates tells you that he/she has recently used a new substance, which has helped him/her recover faster than usual from a knee injury."

After participants read the scenarios, they were asked to indicate, if they were in this hypothetical situation: how likely it is that they would use the banned substance and responses were made on a Likert scale anchored by 1 = not at all likely and 7 = extremely likely. In line with previous research (Kavussanu et al., 2019), we examined doping likelihood as the average of the two items. The same approach of computing the average of all relevant items was used for all variables.

Moral identity. Moral identity was assessed using the 5-item internalization subscale of the moral identity scale (Aquino & Reed, 2002). This subscale taps the degree to which moral traits are central to individuals' self-concept (Aquino & Reed, 2002). Participants were presented with nine traits (i.e., hardworking, honest, fair, helpful, compassionate, caring, friendly, generous, and kind) validated as necessary characteristics of a moral person (Aquino & Reed, 2002), and were asked to respond to statements concerning these traits (e.g., "It would make me feel good to be a person who has these characteristics"). Responses were made on a 7-point scale, anchored by 1 (*strongly disagree*) and 7 (*strongly agree*). The scale has demonstrated very good internal consistency, with an alpha coefficient of .85 (Aquino & Reed, 2002).

Moral disengagement. Moral disengagement in doping was measured with the Moral Disengagement in Doping Scale (Kavussanu, Hatzigeorgiadis, Elbe, & Ring, 2016). Participants were asked to read six statements and indicate their level of agreement using a Likert scale anchored by 1 = *strongly disagree* and 7 = *strongly agree*. Sample items are "Doping does not really hurt anyone" and "Players/athletes cannot be blamed for doping if their teammates pressure them to do it". The scale scores have shown very good levels of internal consistency (α range = .82 - .86), and support for the factorial, convergent, concurrent, and discriminant validity of the scale has been provided (Kavussanu et al., 2016).

Moral atmosphere. The moral atmosphere created by the teammates was measured with six items developed specifically for this study. First, participants were asked to imagine that there was an

opportunity to use an undetectable banned substance to significantly enhance performance in a very important competition. Then, they responded to six items indicating "In this hypothetical situation…" how many of their teammates would approve the use of the substance, be tempted to use it, etc. Responses were made on a 7-point Likert scale with anchors of 1 = no-one and 7 = everyone.

Anticipated guilt. We measured anticipated guilt with the five-item guilt subscale from the State Shame and Guilt Scale (Marschall, Sanftner, & Tangney, 1994). Participants were asked to imagine that they had used a banned substance to significantly enhance their performance in a very important competition and indicate how they think they would feel. The stem for each item was "If I had used a banned substance…" and sample items are "I would feel remorse, regret" and "I would feel bad about what I had done". Participants indicated their responses on a Likert scale anchored by 1 = not at all and 7 = very strongly. Marschall et al. (1994) reported very good internal consistency for this measure (α = .82).

Procedure

Unless otherwise stated, the same procedure was followed in the UK and Greece. In each country, once clubs eligible for the main study were identified (i.e., average score of the club > 1 on Scenario 1 doping likelihood), coaches of these clubs were contacted and asked to allow their athletes to take part in the study. Within each country, clubs who had agreed to take part were randomly assigned to either the moral or the educational intervention. We assigned clubs rather than individual athletes to avoid contamination of the intervention, which would have occurred if athletes from the same club, assigned to different groups, spoke to each other about what is happening in their group. In assigning clubs to the two interventions, we took care to distribute equally sport type (team vs individual) and gender (male vs female). The allocation ratio to the two interventions was 1:1.

Prior to the start of the study, participants were informed about the study requirements, specifically that it involved attending six one-hour sessions once a week over a period of six weeks. They were given broad information about the content of the intervention and were told that all information obtained would be anonymous and used only for research purposes.

In each country, the two interventions were delivered by the same trained facilitator over a period of six-to-eight weeks. The two facilitators had experience with teaching small classes of sport science university students and seminars/interventions in young athletes (Greece) or delivering interventions in small groups of prisoners (UK). Prior to the start of the delivery, the material was discussed with the facilitators, and they were observed delivering some sessions in small groups of student-athletes. Both facilitators were very competent in delivering the interventions.

The same questionnaire which included all measures detailed above (see Appendix A) was used at four time points in a classroom setting or in their club. If participants were not available at the club during the data of our visit, they were sent an online link to the questionnaire. Participants completed the questionnaire (a) just before the start of the first session; (b) at the end of the sixth session; (c) three months after each intervention was completed; and (d) six months after the intervention was completed. The questionnaire asked participants to come up with a password based on information known only to them. This was important to ensure participants felt comfortable to give honest responses. No participant was identified by name in any of the questionnaires, and questionnaires could be linked to each other only by using the code provided by the participant.

Results

As participants were recruited in each country separately, we analyzed the data also separately for each country, using SPSS software. The primary analyses conducted were intervention (moral, educational) by gender (male, female) by time (pre-intervention, post-intervention, 3-month

follow-up, 6-month follow-up) analyses of variance (ANOVA). We included gender as a factor in our analyses to control for variations in the numbers of male and female athletes in each intervention, thus accounting for potential gender differences in doping-related variables that have been reported in the literature (e.g., Ntoumanis et al., 2014). We report partial eta-squared (η_p^2) as the effect size; with .02, .13 and .25 as small, medium and large effects, respectively (Cohen, 1992). We report the multivariate solution for any of these analyses involving the within-participant (repeated measures) factor (i.e. time). Effects were deemed significant when probability of the effect was equal to or less than five percent ($p \leq .05$). Significant effects involving the within-participant factor (Time), were followed, where appropriate, by post hoc comparisons (t tests). In addition, in the Greek sample only (where we had full data throughout), polynomial trend analyses were used to describe the pattern of changes (i.e., linear, quadratic, or cubic) in the variables from before to after the interventions up until the six-month follow-up. Finally, we conducted mediation analyses to explore the moral processes underlying changes in doping intentions using the MEMORE macro for SPSS (Montoya, 2018; Montoya & Hayes, 2017). In these analyses we report the Partially Standardized Indirect Effect (PSIE), which represents the size of the indirect effect in terms of standard deviation units of the outcome variable (MacKinnon, 2008). We present the results for Greece first, followed by the UK results. Only significant effects are reported below.
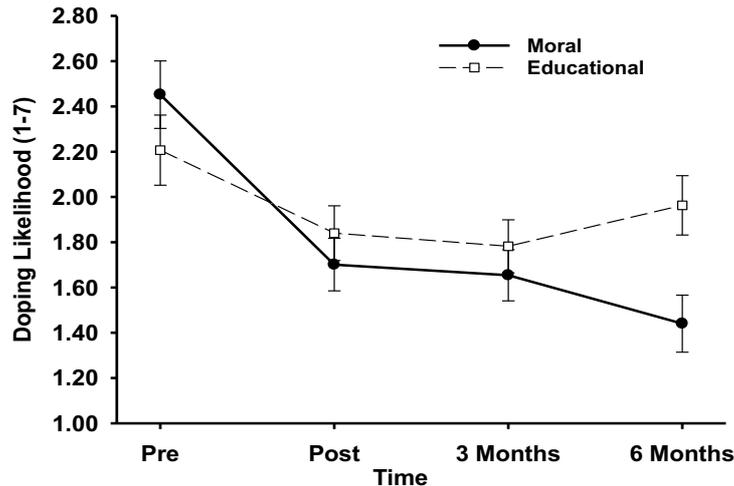
Greece

The 2 Intervention (moral, educational) x 2 Gender (male, female) x 4 Time (pre-intervention, post-intervention, 3-month follow-up, 6-month follow-up) MANOVA on the five variables (i.e., doping likelihood, moral identity, moral disengagement, moral atmosphere, guilt) yielded multivariate effects for intervention, $F(5, 151) = 2.23$, $p = .055$, $\eta_p^2 = .069$, time, $F(15, 141) = 7.99$, $p < .001$, $\eta_p^2 = .460$, and intervention by time, $F(15, 141) = 2.88$, $p = .001$, $\eta_p^2 = .235$. The individual 2 x 2 x 4 ANOVA on each variable are presented below. We present first the findings for doping likelihood, which was our primary outcome variable, followed by the four moral variables, which were our secondary outcome variables.

Effects on doping likelihood

A 2 Intervention (moral, educational) x 2 Gender (male, female) x 4 Time (pre-intervention, post-intervention, 3-month follow-up, 6-month follow-up) ANOVA, with intervention and gender as between-participants factors and time as a within-participants factor, yielded a Time main effect, $F(3, 153) = 14.38$, $p < .001$, $\eta_p^2 = .220$, and an intervention by time interaction effect, $F(3, 153) = 3.89$, $p = .01$, $\eta_p^2 = .071$, on doping likelihood. Polynomial contrast analyses confirmed a small-to-medium sized intervention by time interaction for the linear trends, $F(1, 155) = 10.50$, $p = .001$, $\eta_p^2 = .063$, with the moral intervention producing a greater linear reduction in doping likelihood compared to the educational intervention. Post hoc tests indicated that doping likelihood was lower following the interventions compared to before the intervention in both moral and the educational intervention groups, with doping likelihood even lower for the moral intervention group than the educational intervention group at the six-month follow-up.

These large-to-medium reductions in doping likelihood (Figure 1) demonstrate that both interventions were able to successfully reduce doping likelihood in the context of performance enhancement and recovery from injury, and that the moral intervention was most successful.

Figure 1. Mean (*SE*) doping likelihood before and after the interventions in Greece (N = 159).

Effects on moral variables

We performed a series of 2 Intervention (moral, educational) x 2 Gender (male, female) x 4 Time (pre-intervention, post-intervention, 3-month follow-up, 6-month follow-up) ANOVAs on moral identity, moral disengagement, moral atmosphere and anticipated guilt about doping. The results of these analyses are presented in Figure 2.

For *moral identity,* there was a time main effect, $F(3, 153) = 3.81$, $p = .01$, $\eta_p^2 = .070$. As shown in Figure 2A, after completion of both interventions, moral identity increased (i.e., pre-intervention < post-intervention & 3-month follow-up). Polynomial contrast analyses revealed a small-sized intervention by time interaction for the linear, $F(1, 155) = 4.35$, $p = .039$, $\eta_p^2 = .027$, and quadratic, $F(1, 155) = 5.49$, $p = .020$, $\eta_p^2 = .034$, trends: The moral intervention caused a larger and more sustained increase in moral identity relative to the educational intervention.

There was a time main effect for *moral disengagement*, $F(3, 153) = 13.82$, $p < .001$, $\eta_p^2 = .213$. This variable decreased (i.e., pre-intervention > post-intervention, 3-month follow-up, 6-month follow-up) after completion of both interventions (see Figure 2B).

For *moral atmosphere* there was a time main effect, $F(3, 153) = 13.87$, $p < .001$, $\eta_p^2 = .214$, and an intervention by time interaction, $F(3, 153) = 3.48$, $p = .017$, $\eta_p^2 = .064$ (Figure 2C). Moral atmosphere decreased after both interventions (i.e., pre-intervention > post-intervention, 3-month follow-up, 6-month follow-up). However, the moral intervention group reported lower moral atmosphere than the educational intervention group post-intervention , and this was maintained at both three- and six-month follow-ups. We also found a small-sized intervention by time interaction for the linear trends, $F(1, 155) = 4.35$, $p = .039$, $\eta_p^2 = .027$, with the moral intervention producing a greater linear reduction in moral atmosphere compared to the educational intervention.

For *guilt*, analysis revealed a Time main effect, $F(3, 153) = 10.69$, $p < .001$, $\eta_p^2 = .173$: Guilt increased following both interventions (i.e., pre-intervention < post-intervention, 3-month follow-up, 6-month follow-up), as shown in Figure 2D.
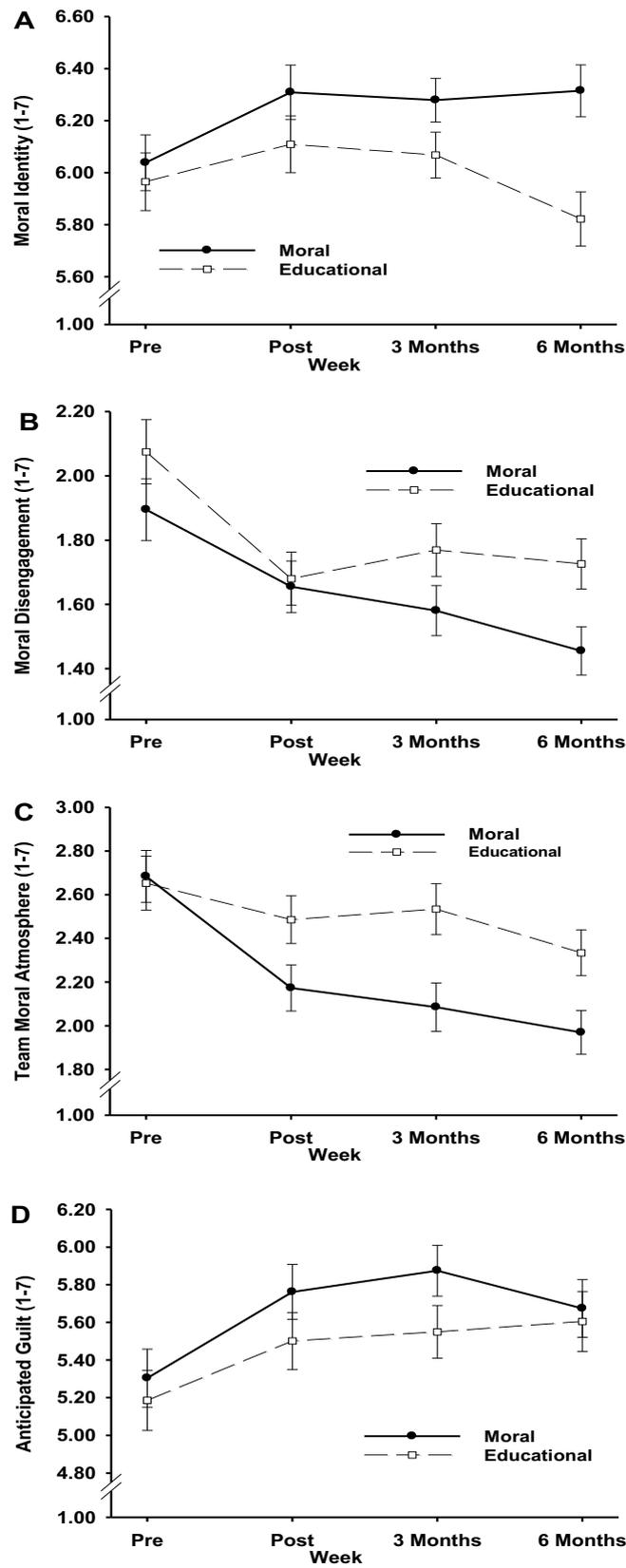
Figure 2. Mean (*SE*) moral identity (A), moral disengagement (B), moral atmosphere (C) and anticipated guilt (D) before and after the interventions in Greece (N = 159).

Mediation analysis

Since both interventions were effective at reducing doping likelihood, we examined whether the change in doping likelihood from before the intervention (at week 0) to after the intervention (at week 6) was mediated by corresponding changes not only in anticipated guilt (our third research question) but also in moral identity, moral disengagement, and moral atmosphere. We used MEMORE, model 1, (Montoya, 2018; Montoya & Hayes, 2017), the SPSS macro, to explore within-participant mediation. We used 10,000 bootstrap samples to compute bias-corrected 95% confidence intervals (CI); an effect was significant when the intervals did not cross zero.

In the first set of analyses, we included all participants. We entered pre-intervention and post-intervention doping likelihood as the paired outcome variable (i.e., pre-intervention doping likelihood minus post-intervention doping likelihood) together with one of the corresponding moral variables (moral identity, moral disengagement, moral atmosphere, guilt) as the paired mediation variables (e.g., pre-intervention and post-intervention moral identity). Thus, we performed a separate analysis for each mediator (i.e., moral identity, moral disengagement, moral atmosphere, guilt). These analyses indicated that the change in doping likelihood from pre- to post-intervention, was mediated by the changes in moral atmosphere and guilt. Moral identity and moral disengagement did not mediate these changes.

Table 4. Direct and indirect effects (via each mediator) of Time (pre- minus post- intervention) on doping likelihood in Greek athletes (N = 159)

	Direct Effect		Residual Effect: Intercept		Indirect Effect: Estimate		
	ΔTime on ΔDL		ΔTime on ΔDL		Time on DL via Mediator		
Mediator	*b*	*95% CI*	*b*	*95% CI*	*b*	*95% CI*	*PSIE*
Moral Identity	.591[*]	.410, .773	.608[*]	.422, .794	-.017	-.074, .012	-.006
Moral Disengagemen	.591[*]	.410, .773	.598[*]	.392, .803	-.007	-.111, .086	-.014
Moral Atmosphere	.591[*]	.410, .773	.496[*]	.301, .690	.095[*]	.025, .189	.081[*]
Guilt	.591[*]	.410, .773	.493[*]	.305, .682	.098[*]	.032, .195	.083[*]

Note. * The effect is significant when the 95% confidence intervals (CI) do not cross zero. PSIE = partially standardized indirect effect. DL = doping likelihood. Δ = change (i.e., pre-intervention minus post-intervention value).

Moderation analysis

In order to examine whether the mediation differed between the moral intervention and the educational intervention groups, we performed a series of moderated mediation analyses using MEMORE. These analyses revealed that mediation of the changes in doping likelihood was moderated by the intervention in the case of moral disengagement: This variable was a mediator in the moral (indirect effect = .076) but not the educational (indirect effect = -.049) intervention.

UK

We first performed a 2 Intervention (moral, educational) x 2 Gender (male, female) x 2 Time (pre-intervention, post-intervention) MANOVA on all five variables (i.e., doping likelihood, moral identity, moral disengagement, moral atmosphere, guilt), due to the loss of data at the three and six-month follow-ups. This yielded a multivariate effect for Time, $F(5, 113) = 5.80$, $p < .001$, $\eta_p^2 = .204$, but no main effect for intervention, $F(5, 113) = 2.03$, $p = .080$, $\eta_p^2 = .082$, or intervention by time interaction, $F(5, 113) = 1.30$, $p = .267$, $\eta_p^2 = .055$.

Effects on doping likelihood

A 2 Intervention (Moral, Educational) x 2 Gender (male, female) x 2 Time (pre-intervention, post-intervention) ANOVA on doping likelihood yielded a main effect of Time $F(1, 117) = 7.81$, $p = .006$, $\eta_p^2 = .063$. Doping likelihood was lower post-intervention compared to pre-intervention in both groups (Figure 3). Additional analyses were conducted on the subsample of participants who completed the three- ($n = 91$) and six- ($n = 89$) month follow-ups. These 2 Intervention x 2 Gender x 2 Time (pre-intervention, 3-month follow-up, and, pre-intervention, six-month follow-up) yielded Time main effects for both the three-month, $F(1, 87) = 13.49$, $p < .001$, $\eta_p^2 = .134$, and six-month, $F(1, 85) = 19.25$, $p < .001$, $\eta_p^2 = .185$ follow-ups, whereby doping likelihood was lower at both follow-ups compared to pre-intervention irrespective of intervention group. With a view to examining maintenance of the anti-doping response after the intervention, we conducted 2 Intervention x 2 Gender x 2 Time (post-intervention, 3-month follow-up, and, post-intervention, six-month follow-up) ANOVAs. These yielded a Time main effect, that approached significance, $F(1, 85) = 1.78$, $p = .055$, $\eta_p^2 = .043$, whereby doping likelihood was even lower at the six-month follow-up compared to the immediate post-intervention in both groups.
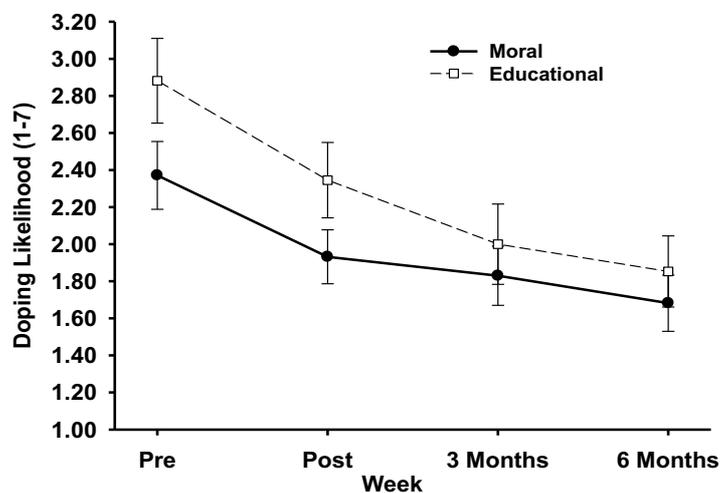
Figure 3. Mean (*SE*) doping likelihood before and after the interventions in UK
(n = 121 at pre-intervention, n = 91 3-month follow-up, n = 89 at 6-month follow-up)

Effects on moral variables

The means and standard errors for the two interventions across the four time points can be seen in Figure 4. Due to data loss at Times 3 and 4 (i.e., the two follow-ups), we conducted separate analysis for the various time points. First, we conducted 2 Intervention (Moral, Educational) x 2 Gender (male, female) x 2 Time (pre-intervention, post-intervention) ANOVAs on the moral

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identity, moral disengagement, moral atmosphere and guilt in the pre- and post-intervention assessments. Then, we examined differences in the moral variables between the pre-intervention and follow-ups (i.e., times 1 and 3/4) and between the post-intervention and follow-ups (i.e., times 2 and 3/4) subsamples who completed measures at those time points.

The analyses showed Time (pre-intervention, post-intervention) effects for *moral disengagement*, $F(1, 117) = 22.16$, $p < .001$, $\eta_p^2 = .159$, and *guilt,* $F(1, 117) = 10.44$, $p = .002$, $\eta_p^2 = .082$; after the intervention, participants in both groups reported lower moral disengagement and indicated that they would feel more guilty if they had used a banned substance. We found no Time effect for *moral identity* or *moral atmosphere.*

Next, 2 Intervention x 2 Gender x 2 Time (pre-intervention, 3-month follow-up; pre-intervention, 6-month follow-up) ANOVAs on the subsamples who completed the follow-up measures yielded Time main effects at three-months for moral identity, $F(1, 87) = 4.05$, $p = .047$, $\eta_p^2 = .045$, moral atmosphere, $F(1, 87) = 19.13$, $p < .001$, $\eta_p^2 = .180$, and guilt, $F(1, 87) = 10.28$, $p = .002$, $\eta_p^2 = .106$, and at six-months for moral disengagement, $F(1, 85) = 17.00$, $p < .001$, $\eta_p^2 = .167$, moral atmosphere, $F(1, 85) = 19.66$, $p < .001$, $\eta_p^2 = .188$, and guilt, $F(1, 85) = 6.68$, $p = .011$, $\eta_p^2 = .073$. In these instances, moral identity and guilt were higher while moral disengagement and (im)moral atmosphere were lower at follow-up compared to the pre-intervention assessment in both groups.

Finally, 2 Intervention x 2 Gender x 2 Time (post-intervention, 3-month follow-up; post-intervention, 6-month follow-up) ANOVAs on the subsamples who completed the follow-up measures yielded Time main effects for moral atmosphere at both the three-month $F(1, 87) = 4.57$, $p = .035$, $\eta_p^2 = .050$, and six-month, $F(1, 85) = 8.33$, $p = .005$, $\eta_p^2 = .089$, follow-ups. In both instances, the (im)moral atmosphere, was lower at three- and six-months compared to the immediate post-intervention assessment in both groups.
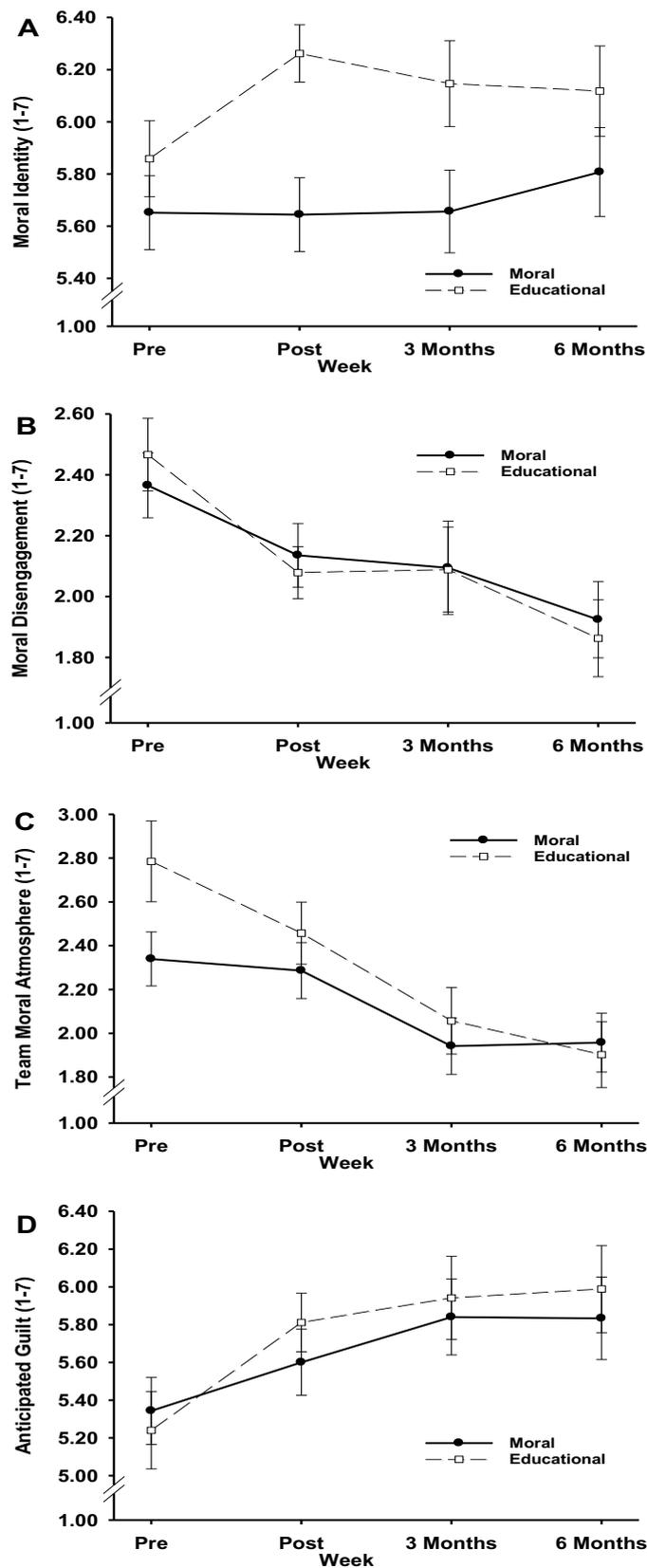
Figure 4. Mean (*SE*) moral identity (A), moral disengagement (B), moral atmosphere (C) and anticipated guilt (D) before and after the interventions in UK (N = 121 at pre-intervention, n = 91 3-month follow-up, n = 89 at 6-month follow-up)

Mediation analysis

Within-participant mediation analysis using MEMORE (Table 5) revealed that the change in doping likelihood from pre- to post-intervention was mediated only by the change in moral disengagement.

Table 5. Direct and indirect effects (via each mediator) of time (pre-intervention minus post-intervention) on doping likelihood in UK athletes (N = 121).

	Direct Effect		Residual Effect: Intercept		Indirect Effect: Estimate		
	ΔTime on ΔDL		ΔTime on ΔDL		Time on DL via Mediator		
Mediator	*b*	*95% CI*	*b*	*95% CI*	*b*	*95% CI*	*PSIE*
Moral Identity	.483*	.221, .746	.461*	.193, .729	.023	-.010, .097	.016
Moral Disengagemen	.483*	.221, .746	.296*	.016, .575	.188*	.059, .371	.127*
Moral Atmosphere	.483*	.221, .746	.430*	.173, .688	.053	-.003, .180	.036
Guilt	.483*	.221, .746	.424*	.152, .696	.060	-.039, .244	.041

Note. *Significant effect when 95% confidence intervals (CI) do not cross zero. PSIE = partially standardized indirect effect. DL = doping likelihood. Δ = change (i.e., pre-intervention minus post-intervention value).

Moderation analysis

Within-participant moderated mediation analyses using MEMORE indicated that mediation of the changes in doping likelihood was moderated by the nature of the intervention in the case of anticipated guilt: This variable was a mediator in the educational (indirect effect = .354) but not the moral (indirect effect = .003) intervention.

GREECE versus UK

Inspection of doping likelihood in Greece and UK (see Figures 1 & 6), coupled with the formal statistical analyses and effect sizes reported above, indicates that the interventions were similarly effective at reducing participants' doping likelihood in both countries.

In the case of the moral variables, in both countries the athletes reported similar increases in moral identity and guilt coupled with decreases in moral disengagement and moral atmosphere.

In the case of mediation by these moral variables, moral atmosphere and guilt emerged as mediators in Greece whereas moral disengagement was a mediator in the UK.

Although this was not part of our original project plan, we felt that it was important to conduct focus groups to evaluate the effectiveness of the interventions and to better understand the experiences of the participants. The ultimate aim of this part of the project was to gain information that would allow us to further improve the two interventions. To this end, we conducted 12 focus groups with 32 participants in Greece and 7 focus groups with 35 participants in the UK. The focus groups allowed us to better understand the experiences of the participants during the interventions. Details of the method and data analysis are provided below.

Method

Interview guide

We developed a semi-structured interview guide following the guidelines by Krueger and Casey (2015). The guide started with opening, introductory and transition questions to develop rapport and encourage participant involvement (e.g., name, position/event and favourite athlete, course expectations, etc). The main discussion centred around six key questions: (a) what was particularly useful about the course; (b) what was not useful; (c) in what way the course may have changed how they view banned substances; (d) what parts of the course changed their views about the use of banned substances; (e) what they thought about the delivery of the course; and (f) what they thought about their own participation during the course. The discussion concluded with two closing questions, first finding out how we can improve the course and second, inquiring if participants would like to add anything that we missed. Throughout the focus group, probing questions were used by the moderator to extract further information. The full interview guide can be seen in Appendix 2. We used identical questions for the moral and educational interventions, with the exception of the probing questions that referred to the specific content of the sessions.

Procedure

Upon completion of the intervention, participants were contacted by phone or email and were invited to take part in a focus group. Focus groups were conducted in the same place as the intervention (i.e., training ground, clubhouse or college/university classroom). Prior to commencing the focus groups, participants were welcomed and informed about the purpose of the session. The recording system, was explained, and participants were reminded of the voluntary nature of the study and were informed that all data collected would be anonymous and would be used only for research purposes. They were encouraged to be as honest as possible and it was explained that no repercussions would occur as a result of any views they expressed during the focus group. Then they provided written informed consent. Participants were seated around a table to facilitate communication, and each session lasted approximately 35 minutes. All focus groups were audio-recorded.

Analysis and trustworthiness

Transcripts from the UK focus groups were transcribed and uploaded to QSR NVivo 12. To enhance familiarity with the data, one of the investigators engaged in a process of indwelling (Maykut & Morehouse, 1994) by reading each transcript several times. Transcripts were analysed inductively and a three-code coding process was used: (a) a summary report of each focus group to highlight the most pertinent issues; (b) a pool of narrative centred on specific higher order themes; and (c) a thematic grouping structure of general dimensions from categorisation and organisation of each higher order theme. An iterative process was employed throughout the

analysis, whereby themes were revisited, reviewed and revised to better understand their fit (Srivastava & Hopwood, 2009). In Greece, a report was produced with the main findings of the focus groups. Below we present the findings of the focus groups for each intervention. As the themes that emerged were similar in the two countries, to minimize overlap, results for each intervention are presented together for Greece and UK. Quotes are included to illustrate each theme.

Results

Moral intervention

In general, participants of the moral intervention found the program interesting and useful. They liked the videos and athlete stories we included. They identified consequences of doping for others as the most interesting topic. Five dimensions emerged from the analysis: (a) consequences of doping; (b) values in sport; (c) the effectiveness of the intervention; (d) the structure of the intervention; and (e) suggested improvements. These dimensions are discussed below, with direct quotes to illustrate them.

Consequences of doping for others

Although participants had some knowledge about doping and its health consequences, nobody had ever thought of the social consequences of doping. The intervention increased their understanding of the consequences of doping for others. Participants recognized the significant impact this can have. They suggested that education regarding the social aspects of doping should become a priority, because it is interesting and unknown to most athletes. They also thought that this would have a strong impact on one's decision to dope. Participants said that it is easier to make a decision to dope when you are thinking only about yourself (e.g. to harm your health), but it is totally different when you are thinking about others.

> *"I was surprised on how much the effects one person taking drugs can have on people."*

> *"It's crazy how much of an effect it has. Before I would not have thought of the effects of doping on other people other than yourself."*

> *"Seeing how it affected people other than themselves, just made me want to be clean even more than I wanted to be at the start. I just wanted to win only if I was good enough, not if I was taking drugs and not being fair."*

> *"I was waiting to hear the consequences of drugs (biochemical things) on human body... but I heard another side of doping which I was not aware of; 'the social part of doping'"*

> *"We have no idea about how much we are harming the others"*

> *"I was expecting to hear about all the risks of doping, but this was totally different; thing we had never considered before"*

Values in sport

Participants liked the focus on the values of honesty and fair play and making athletes think in a different way. They pointed to the values in sport when asked what they found useful.

> *"education on values.. will change the way of thinking on the future"*

> *"hearing about the moral aspects around doping was something new"*

"The examples of fair play and everything. I didn't realise that some people are that honest."

"Just learning really. Seeing how it affected people other than themselves. It just made me want to be clean even more than I wanted to be at the start. I just wanted to win only if I was good enough not if I was taking drugs and not being fair."

"The fairness. If you can't win as you are you obviously aren't good enough to compete at that level. If you do it with drugs you're just cheating and you don't feel good about it. Well I wouldn't anyway."

Effectiveness of the intervention in reducing doping

The intervention was perceived as effective in reducing the likelihood of participants doping and reinforcing their decision to not dope.

"I don't think I would ever use them [drugs] now"

"it has opened my mind-set on the consequences doping can have on my career"

"I am not in doubt anymore… I can see clearly why doping should not be done"

"I was negative about doping, but now I'm absolutely convinced"

"I was against doping, but now I am convinced in a multidimensional way; there are thousands of reasons for not doping"

Structure of the intervention

Participants commented on the structure and time length of the intervention. They indicated that having six one-hour sessions spread over six weeks was beneficial in helping them reflect on the previous week's session.

"Because the sessions weren't too long for most of the session you were concentrated because it wasn't as if you were there for hours listening to the same things."

When asked about having more sessions or increasing the time of each one, participants believed this would have a negative effect and influence how well they retained the information.

"I wouldn't have taken any information in. It would have literally been a complete overload. I probably would have taken half as much as what I have done broken up each week."

Suggested improvements

Participants also reported areas for improvement. Prior to attending the intervention, they expected to be informed about the health consequences of doping and information relating to drug testing.

"I'd like to have learned more about what drugs athletes take and the sides effects for health these can have."

"Provide examples specific to each sport"

"Increase the number of sessions, but keep the length"

"Add some information about the consequences on health"

Educational intervention

In general, participants found the program very interesting and useful. The most interesting topic was about sport supplements and how these can "trap" an athlete. Additionally, it was the first time that someone expressed the need for more "freedom" to report a doping incident – as a result of the whistle blowing session. Participants felt that such kind of programs should be delivered to all sport clubs because they educate athletes and challenge their thinking. They appreciated the fact that they were familiarized with the doping control procedures (e.g. drug tests and whereabouts) as they will now be more prepared, they will feel more comfortable in a doping control and they will know their rights if they have to undergo one. Also, they gained knowledge about the banned substances and medication; which substances they have to avoid and be careful of and how severe the consequences might be in many levels (e.g. banned from sport, health and social consequences). Lastly, they said that they found the nutrition session very useful because they enriched their knowledge and learned some very specific information about the foods they should eat.

The following dimensions emerged from the thematic analysis: (a) unintentional doping; (b) the use of videos and real-life stories; (c) role-play tasks; (d) program delivery; (e) suggested improvements. These dimensions are discussed below, with direct quotes to illustrate them.

Unintentional doping and use of supplements

Most athletes said that they found very interesting the session on nutritional supplements. They said that they became aware of the risks that come along with their use, as they might be contaminated with banned substances. Several participants mentioned that they were "shocked" to discover some athletes were labelled a "doper" after failing a drug test because of the use of a sport supplement contaminated with a banned substance. Athletes reported using the websites that were presented to them to check the nutritional supplements they use as well as their medication following the program. They also used the provided information about nutrition to form their diet. They declared that the program changed their views about doping and they will avoid using any banned substances in the future. Even after the end of the program, they continued to discuss about the information they were presented and they also gave advice to other people to check their supplements and be more careful.

> *"So one of my friends who takes protein powders. So I was like, talking to him about it and I like made him put it into… you know that website. It didn't have it on there, so it is not checked. And I was like, 'well you shouldn't be taking that.'"*

> *"We were motivated, we all started to search our supplements, we told each other "mine is in the website but I didn't find yours"*

> *"I don't think I would have ever considered failing a drug test because of the use of a supplement. It important to have this information. I feel like sometimes I would have considered taking supplements for the gym rather than for my sport. It's good to be aware of what you are taking and more information is always good."*

Videos and real-life stories

Participants found that the use of videos and real-life stories of athletes were useful and interesting as they helped them to concentrate and better understand the information. Participants described the video of Andreas Kregier as "shocking". This video has a strong influence and made participants realize that doping can have consequences that they could never imagine.

> *"watching someone's life change so much by doping is so unfortunate".*

"I knew that doping has negative consequences in our health… but did not know that it is possible to change a human being - a woman to become man"

"All videos were very interesting and needed. Maybe if there weren't the videos it wouldn't be that interesting. They made the presentation more engaging."

Role play tasks

The use of role playing tasks to highlight the drug testing procedure was effective in helping participants understand the anti-doping rules and responsibilities. Participants revealed that role playing helped them retain information far easier.

"You know you said they have to see it (urine) pass from the athlete to the bottle. I went and told my house mates, 'you know if you do a doping test, you have to see it pass'. That just stuck with me!"

"Now I know how the (doping control) procedure is done. It won't be that new to me, not such a big shock."

Programme delivery

Participants said that although they expected that the program would be boring and lecture-like, in fact it was very interesting, well edited and had a good flow with a variety of subjects relevant to the topic. They thought that the duration of the program was as it should be, since six one-hour sessions were an appropriate period of time for such a program. Participants were very concentrated, engaged and they participated a lot during the program. They reported a positive interaction with the facilitator; the delivery mode was interactive, and, overall, the sessions were fun and easy to attend. The facilitator was well informed about the topic of doping, understood the mentality of the participants and captured their attention.

"You didn't just read the slides, you spoke to us, you asked us questions, we discussed and so time passed easily and pleasantly and it was a good briefing."

"Every session we did was interactive. We all seemed to wake up afterwards, didn't we really. Normally we're dead after our lessons but we all seemed to wake up as soon as the presentations and group work came into."

Suggested improvements

Participants mentioned three areas that would help improve the intervention. Participants reported that the intervention could be improved by including content about current doping scandals. The second suggested improvement was to include more examples related to the participants' own sport, and more about the emotions and moral implications that athletes experienced while they were doping.

"More about current doping scandals" and *"events that are going on in the news right now"*

"Found it interesting, but it would have been better if there were examples of netball players"

"Maybe some interviews of people who have been through it. Maybe some more interviews of their point of view and if they regret it."

"the case studies and the people that had done it and what they had done. So maybe more detail into that and more detail into what they had done and how they got away with it and whatever."

Participants also suggested that more information was needed about nutrition and supplements (the participants believe that everybody uses supplements and they should be informed properly regarding that topic). Implementation of the program to the coaches (the participants believe that coaches have the greatest influences on athletes; even from their parents). Also, they reported the necessity of the implementation of this program to younger athletes (they need to be informed before they become elite athletes.

Discussion

Doping is an intentional behaviour that can have significant consequences for others. Although vast amounts of money have been invested to tackle this problem, doping remains. Research has shown that the variables most strongly associated with doping are "moral" variables (e.g., Kavussanu & Ring, 2017; Kavussanu et al., 2019; Ntoumanis et al., 2014). To our knowledge, no published study has attempted to intervene on psychosocial variables linked to doping in empirical research and examine their effect on doping. The aim of this research project was to develop, implement, and evaluate an evidence-based moral intervention, and determine whether it is more effective than a standard educational (i.e., knowledge-based) intervention, in reducing doping likelihood in young athletes, in the UK and Greece. To enable the comparison of our moral intervention, we also developed an educational intervention based on resources from a variety of national and international organizations (e.g., WADA, ASADA, German NADO, UKAD).

Our primary outcome variable was doping likelihood, measured with two hypothetical scenarios. In both Greece and UK, both interventions were effective in reducing doping likelihood from pre to post test, and these effects were maintained over time. Importantly, in Greece, the moral intervention led to a greater linear reduction in doping likelihood over time, compared to the educational intervention. This finding underscores the importance of integrating moral variables in the development of programs that aim to reduce intentional doping. These programs could incorporate activities and group discussions that focus on the values of honesty and fair play as well as the consequences of doping for others, thus highlighting that doping is a behavior to be avoided. Indeed, consequences of doping for others, emerged as the most important and interesting topic of our moral intervention. It is not clear why the reduction in doping likelihood was greater in the moral intervention (relative to the educational one) only in Greece. Perhaps participants in Greece were more sensitive to elements of the moral intervention such as the consequences doping can have on others.

A consistent finding across the two countries was that the two interventions decreased moral disengagement and increased guilt (from pre to post test), and these effects were maintained over time. Although these findings were expected only for the moral intervention, elements contained in the educational intervention may have influenced these two variables. For example, the last session of the educational intervention was on whistleblowing, which represents a moral dilemma and reinforces the point that doping is an unethical behavior. By viewing examples of athletes who decided to "blow the whistle" because this was "the right thing to do", participants of the educational intervention would have received the message that doping is "not right", thus triggering feelings of anticipated guilt, in the hypothetical situation of using a banned substance. Guilt is a moral emotion, that is elicited when people are engaged in a transgression (Tangney et al., 2007). It would be interesting to examine the effects of the standard educational intervention on doping likelihood when information about whistleblowing is not conveyed to participants. It is also possible that by discussing doping-related issues over six sessions in the educational intervention, participants became more sensitive to the doping problem, and this may have led to a reduction in moral disengagement and an increase in anticipated guilt.

The findings regarding moral identity and (im)moral atmosphere were somewhat different between the two countries. In Greece, both interventions increased moral identity and reduced (im)moral atmosphere from pre to post test. Importantly, over time, the changes were larger for the moral intervention, indicating that this intervention was more effective than the educational one in affecting moral identity and (im)moral atmosphere. In the UK, the two interventions were similarly effective in changing moral identity and moral (im)moral atmosphere, but these effects were observed only at the three- and six-month follow up (compared to pre-test). Once again, it may be that the Greek participants, possibly due to cultural differences, are more sensitive to some of the content of the moral intervention. Indeed, qualitative analysis showed that the Greek participants identified the consequences of doping for others as a very important session that made them think in a totally different way about doping.

The fact that in Greece the moral intervention had stronger effects over time underscores the significance of including moral variables in anti-doping educational programmes. Such variables are typically neglected in these programes with the main focus being on offering information that would prevent un-intentional doping. There is preliminary evidence to indicate that even though some of these programs enhance athletes' knowledge of banned substances and the doping control process, their influence on intentional doping is not lasting (e.g., Hurst et al., 2019). Taken together with previous research (Hurst et al., 2019), our findings clearly point to the importance of incorporating moral variables in anti-doping education programs.

An important strength of our research is that we showed that our interventions had long-term effect on both our primary (doping likelihood) and our secondary (moral identity, moral disengagement, (im)moral atmosphere, guilt) variables. This is a significant finding that suggests that our work had the potential make an important contribution to the development of anti-doping education programmes. Ultimately, the aim of these programmes is to produce long-term changes in intentional doping. Our interventions clearly show that this is possible.

Although we anticipated effects on doping likelihood and moral variables only on the participants of the moral intervention, qualitative results may explain the effects of the educational intervention on these variables. Specifically, it is clear from the quotes of the participants that they found our educational intervention very interesting and engaging. Care was also taken to deliver this intervention also in a manner that was interactive and engaging to ensure participant retention. Clearly they know that doping is cheating. By participating in programme for six weeks, they may have started to think about the ethical repercussions of doping, hence the effect of the educational intervention on moral variables.

Given that both interventions had an effect on both our primary and our secondary variables, we conducted mediation analysis to understand these effects. Although our main focus was on guilt, we also examined the other moral variables as potential mediators. This analysis showed that different mediators emerged in each country. Specifically, in Greece, for both interventions, the change in doping likelihood from pre- to post-test, was mediated by the change in moral atmosphere and guilt. This means that the two interventions were able to reduce doping likelihood because they made participants think that their fellow athletes would not consider doping acceptable, and they also increased their anticipated guilt. For the moral intervention, the reduction in doping likelihood was also mediated by moral disengagement. In the UK, guilt explained changes in the doping likelihood only in the educational intervention, while moral disengagement explained changes in doping likelihood in both interventions.

Conclusion

In conclusion, this is the first research project to develop and evaluate an intervention that focuses on moral variables that have been associated with doping likelihood and intention in empirical

research. To enable the evaluation of our moral intervention, it was necessary to also develop a standard educational intervention. Our research showed that although both interventions were effective in reducing doping likelihood and changing most of our moral variables in the expected direction, the moral intervention had longer-lasting effects in Greece. The findings underscore the importance of targeting moral variables in anti-doping education programs, most notably including information on the consequences of doping for others. Such programs typically focus on preventing un-intentional doping with very little information on the ethical aspects of doping. Our project provides unique information that can aid the development of anti-doping education.

DISSEMINATION OF FINDINGS

Presentations at National and International Conferences

1. Kavussanu, M., King, A., Hurst, P., Galanis, E., Hatzigeorgiadis, A., Elbe, A.M., & Ring, C. (2018). *Preventing doping in sport: the HEROES project.* In: Division of Sport and Exercise Psychology Annual Conference, 3-4 December, Belfast.

2. King, A., Hurst, P., Skoufa, L., Barkoukis, V., & Kavussanu, M. (2018). *Evaluating the effectiveness of the VIRTUES and HEROES projects: qualitative evidence.* In: Division of Sport and Exercise Psychology Annual Conference, 3-4 December, Belfast, UK.

3. Kavussanu, M. (2018). *Moral action in sport: Why does it matter?* Invited lecture, XXII National Congress of the Italian Association of Sport Psychology (AIPS), 25-27 May, Venice, Italy.

4. Kavussanu, M., King, A., Hurst, P., Galanis, E., Hatzigeorgiadis, A., & Ring, C. (2019). *To cheat or not to cheat? A moral intervention can prevent doping in sport*. In 15th European Congress of Sport & Exercise Psychology, 15-20 July, Munster, Germany.

Presentations at NADOs and Sport Organizations

1. On February 15, 2018, Maria Kavussanu and Philip Hurst visited the UK Anti-Doping, and discussed our project with Amanda Butt and her team.
2. On 22 May 2018, Philip Hurst presented project findings at UK Athletics Anti-Doping Policy and Support Team meeting.
3. On June 4-6, 2019, Maria Kavussanu presented project findings at a meeting with the Greek Anti-Doping Organization (ESKAN), as well as to the Greek Athletics and Rowing Federations, in Athens, Greece.

Planned Publications

1. One article outlining the results of the main trial is in preparation and will be submitted to *Sports Medicine*, *Journal of Sport & Exercise Psychology,* or other relevant journal.

2. One article describing the results of the focus groups will be submitted to the journal *Qualitative Research in Sport and Exercise*, or other relevant journal.

3. One article based on the screening survey, which included all measures of the main trial will be submitted to *Psychology of Sport and Exercise*, or other relevant journal.

Endnotes

1. We shared our powerpoint presentations with Tony Cunningham from WADA when we submitted our Year 2 report. All material is available upon request for WADA or any NADO to use in their anti-doping education programmes.

2. The original co-investigators in this project were Professors Antonis Hatzigeorgiadis and Anne Marie Elbe, who at the point of the award was at the University of Copenhagen. During the first year of the project, Professor Elbe relocated at the University of Leipzig. This process was somewhat stressful, and in combination with various project delays, resulted in Anne Marie being unable to continue with the data collection of the project, and participating or offering feedback during the development phase of the intervention, thus offering her expertise on doping to benefit the project. Although the initial intention was to include Prof Elbe in the publications that result from this project, this would not be in line with the APA ethical guidelines, her final overall limited involvement in the project is worthy more of an acknowledgement than authorship.

3. In the questionnaire we asked some additional questions (e.g. doping temptation, doping willingness, moral atmosphere created by the coach). We have not discussed these additional questions in this report as we did not analyse the relevant data to be in line with our previous publications. Similarly, unlike the original application and Year 1 and 2 reports, where we referred to doping intention, in this report we examined doping likelihood, to ensure consistency with the papers that we plan to submit for publication. In previous reports, doping intention was computed by averaging the six items that followed the two doping scenarios.

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Questionnaire

*A. Below are two scenarios describing two **hypothetical** situations that athletes could encounter in their sporting career. Imagine that you are in these hypothetical situations and respond to the questions that follow, as **honestly** as possible.*

Scenario One

It's the week before the most important competitive game/event of your season. Your opponents are of similar ability to you. Lately, your performance has been below your best. You don't feel you have the necessary fitness for this competition, and you're concerned about how you'll perform. You mention this to a mate, who tells you that he uses a substance to enhance fitness. The substance is banned for use in sport, but there's **no chance** you'll be caught.

If you were in this **hypothetical** situation, and there was **no chance** that you would be caught…

How **likely** is it that you would use the banned substance?						
1 not at all likely	2	3	4 somewhat likely	5	6	7 very likely
How **tempted** would you be to use the banned substance?						
1 not at all tempted	2	3	4 somewhat tempted	5	6	7 very tempted
How **willing** would you be to use the banned substance?						
1 not at all willing	2	3	4 somewhat willing	5	6	7 very willing

Scenario Two

It's two weeks before the most important competitive game/event of your season. Your opponents are of similar ability to you. You really want to take part. However, two months ago, you sustained a knee injury, and you know you need at least one more month of rehabilitation to fully recover. One of your mates tells you that he/she has recently used a new substance, which has helped him/her recover faster than usual from a knee injury. The substance is banned for use in sport, but there is **no chance** that you will be caught.

If you were in this **hypothetical** situation, and there was **no chance** that you would be caught…

4. How **likely** is it that you would use the banned substance?						
1 not at all likely	2	3	4 somewhat likely	5	6	7 very likely
5. How **tempted** would you be to use the banned substance?						
1 not at all tempted	2	3	4 somewhat tempted	5	6	7 very tempted
6. How **willing** would you be to use the banned substance?						
1 not at all willing	2	3	4 somewhat willing	5	6	7 very willing

B. *Athletes have different views about doping (i.e., the use of banned performance enhancing substances) in sport. Listed below are a number of statements describing some. Please read these statements carefully and indicate the extent to which you agree with each one by circling the appropriate number. Please respond **honestly**.*

	Strongly Disagree			Neutral			Strongly Agree
1. Doping is just a way to "maximize your potential"	1	2	3	4	5	6	7
2. Compared to the illegal things people do in everyday life, doping in sport is not very serious	1	2	3	4	5	6	7
3. Doping does not really hurt anyone	1	2	3	4	5	6	7
4. A player/athlete should not be blamed for doping if everyone on the team/club is doing it	1	2	3	4	5	6	7
5. Doping is alright because it helps your team/club	1	2	3	4	5	6	7
6. Players/athletes cannot be blamed for doping if their teammates pressure them do it	1	2	3	4	5	6	7

C. *Imagine that you used a banned substance to enhance your performance. How do you think you would feel?*

	Not at all			Some what			Very strongly
1. I would feel remorse, regret	1	2	3	4	5	6	7
2. I would feel bad about what I had done	1	2	3	4	5	6	7
3. I would not stop thinking about what I had done	1	2	3	4	5	6	7
4. I would feel like apologizing	1	2	3	4	5	6	7
5. I would feel like confessing	1	2	3	4	5	6	7
6. I would feel tense about what I had done	1	2	3	4	5	6	7

*D. Imagine that there was an opportunity to use an **undetactable banned substance** to significantly enhance performance in a very important competition. In this **hypothetical** situation…*

How many of your **teammates** would...	No-one			About half			Every one
1. …favour using the substance	1	2	3	4	5	6	7
2. ...be tempted to use it	1	2	3	4	5	6	7
3. …suggest to other athletes to use it	1	2	3	4	5	6	7
4. …approve its use	1	2	3	4	5	6	7
5. …are likely to use it	1	2	3	4	5	6	7
6. …use it	1	2	3	4	5	6	7

E. In the hypothetical situation described above, how would your coach react?

My **coach** would…	Strongly Disagree			Neutral			Strongly Agree
1. …approve the use of the banned substance	1	2	3	4	5	6	7
2. …allow its use	1	2	3	4	5	6	7
3. …overlook its use	1	2	3	4	5	6	7
4. …encourage its use	1	2	3	4	5	6	7
5. …agree with its use	1	2	3	4	5	6	7
6. …tolerate its use	1	2	3	4	5	6	7

F. Listed below are characteristics that may be used to describe a person:

Fair	Compassionat	Caring	Friendly	Generou
Hardworking		Kind	Helpful	Honest

The person with these characteristics could be you or it could be someone else. For a moment, visualise the kind of person who has these characteristics. Imagine how that person would think, feel, and act. When you have a clear image of what this person would be like, **indicate your agreement with each one.**

	Strongly disagree		Neutral			Strongly agree
1. It would make me feel good to be a person who has these characteristics	1 2 3 4 5 6 7					
2. Being someone who has these characteristics is an important part of who I am	1 2 3 4 5 6 7					
3. I would be ashamed to be a person who has these characteristics	1 2 3 4 5 6 7					
4. Having these characteristics is NOT really important to me	1 2 3 4 5 6 7					
5. I strongly desire to have these characteristics	1 2 3 4 5 6 7					

G. Please provide some information about yourself and your club. Tick only one box when given the option.

1. Club name _____   2. League name _____

3. Sport _____   4. Years competing ____   5. Hours per week training ____

6. Competition level: club □   university □   county □   regional □   national □   international □

7. Date of birth _____   8. Gender: Male □ Female □ 9. Phone number_____

THANK YOU VERY MUCH FOR YOUR PARTICIPATION IN THIS STUDY

Guidance
- As participants arrive, welcome them and try to make conversation, with <u>each</u> participant, e.g., how are the games going? How is school going? As they come into the room, give them the <u>handout</u> with the summary of each of the six sessions.
- Explain that the session will be recorded and ask if they are OK with this.
- Ask them to sign the consent form.
- Ask them to write on the back of the consent form what they <u>remember the most</u> about the course.

Opening, Introductory and Transition Questions
1. Tell us your name, what is your favourite food, and who is your favourite athlete?
2. Think back to when you first started this course in *insert month they started*. <u>Before</u> you started, what did you expect from the course?
3. Now that you have completed the course, <u>what do you remember the most</u>? Please read what you wrote on the back of the consent form.

Key Questions – Allow sufficient time for a full discussion
4. What was particularly useful about the course?
    a. What did you like about it?
5. What was not useful about the course?
    a. What did you not like about it?
6. Has the course changed how you view the use of banned substances, and if so, in what way?
7. In your opinion, what parts of the course changed your views about the use of banned substances?
    a. Probe for the content of the five sessions, listed below as reminders (see also handout).
        i. Success and values in sport
        ii. Justifications athletes use and consequences of doping for others
        iii. Team culture and doping
8. What do you think about the delivery of the course?
    a. Probe for number of sessions, how long each session was, how long the course was, the way it was delivered, e.g., how interactive and engaging it was.
9. What do you think about your own participation during the course?
    a. How engaged you were, e.g., answering questions
    b. How concentrated you were

Closing Questions
10. We want to know how to improve this course. Everything you say, positive, or negative is very useful.
    a. How do you think we can improve the course?
11. Did we miss anything from today's discussion? Is there anything that we should have talked about but didn't?
    a. Would you like to add anything that we didn't talk about today?

Note. In the Educational intervention, the same interview guide was used with the exception of question 7, which was replaced with the following:

In your opinion, what parts of the course changed your views about the use of banned substances?
    b. Probe for the content of the six sessions, listed below as reminders (see also handout).
        i. 10 anti-doping rule violations, Drug testing, Health consequences
        ii. Risks with using sport supplements (unintentional doping), Nutrition
        iii. Whistleblowing